Superfast UK: the rising popularity of FTTP

A report from UK Plus

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1. Background

This short report provides an update to our March 2016 publication**, _Superfast UK: rising to the ultrafast challenge_**. It covers the latest announcements and activities of the country's two largest superfast players, BT and Virgin Media. It looks at developments and progress made by the alternative infrastructure providers, and offers an update on the Broadband Delivery UK (BDUK) process and activities at local authority and community level. It also covers regulatory moves affecting the superfast broadband sector. Further details of the projects mentioned here, and many others, can be found in our separate Point Topic _**Superfast broadband projects directory**_.

As with our previous superfast broadband publications, this report focuses on fibre-based network deployments including fibre-to-the-cabinet (FTTC), fibre-to-the-premises (FTTP) and fibre-to-the-building (FTTB) with the exception of student and military accommodation. We also cover superfast cable infrastructure (Docsis 3 and in future Docsis 3.1). Although we do not cover wireless broadband connections specifically, a number of the players mentioned use fixed wireless broadband technology as part of their overall offering, providing services at superfast speeds. Several have a long history in fixed wireless access (FWA) provision and are adding fibre-based solutions to their portfolios.

2. Introduction

Fibre-to-the-premises technology is experiencing something of a sea change in terms of its popularity in the UK. Ultrafast broadband infrastructure is now a real focus for the country's players and increasingly local authorities and Government, and a central part of this is proving to be the use of FTTP. Calls for higher levels of FTTP penetration are coming not just from those which have consistently expounded its virtues, particularly in the alternative network operator community, but also from players that have traditionally displayed less warmth towards the medium.

Although Openreach remains absolutely wedded to its FTTC and G.fast deployment approach with an ambition to bring G.fast technology to 10 million premises, the incumbent has also resurrected its FTTP credentials and aims to serve another two million premises with FTTP services expanding this base out from the 300,000 homes and businesses it currently passes. Meanwhile Virgin Media is making progress with Project Lightning aimed at adding four million premises to its footprint, of which it says around a quarter will be connected using FTTP technology.

A recent series of agreements with the house building sector is also putting FTTP at the centre of broadband deployment for new builds. Openreach, Virgin Media and Independent Fibre Networks Limited all have agreements in place to make it easier for house builders to get fibre installed as part of the housing building process. Meanwhile recent investment announcements by Hyperoptic and Gigaclear suggest a growing market confidence in delivering FTTP over the long term. The Government's plan to establish a broadband investment fund in partnership with the private sector, to support the growth of ultrafast broadband, may also benefit FTTP rollout.

Advances in more cost-efficient deployment methods for FTTP including micro-trenching have a role to play in this. But it is proven consumer demand for higher-speed services plus increasing pressure to cater for businesses, which to date have been ill served in comparison with the residential sector in superfast and increasingly ultrafast symmetrical broadband, which has become a key driver for FTTP.

Meanwhile the Government's Digital Economy Bill is designed to enable more infrastructure investment and lay the basis for a new Universal Service Obligation (USO). And regulator Ofcom has set out the terms on which it wants to see Openreach operate following its Strategic Review of Digital Communications, including Openreach's independence as a company, and easier access by rival companies to Openreach's ducts and poles.

Point Topic has collated the fibre-based projects of over 30 active alternative network operators as well as many community-led initiatives, either underway or at various stages of development, as published in our separate *Superfast broadband projects directory*. These are diverse in nature and illustrate the range of players and approaches within the UK's superfast broadband landscape. Table 1 gives estimated fibre-based and Docsis 3.0 superfast connections at the end of June 2016 for deployments with connections of 10 lines and above. The majority are to residential properties with some to SMEs although we have added in figures for Bridge Fibre and WarwickNet. We also provide figures for premises passed, and give Point Topic estimates where actual numbers are not available.

Table 1: Superfast fixed broadband connections, end-June 2016

Operator	Project Locations	Technology	Connections at end-June 2016 (estimates in italics)	Total premises passed reported by network operators end-June 2016 (estimates in italics)
Ask4	Leeds, Manchester, Sheffield, Shipley	FTTB	5,000	10,000
Atlas Communications	Middletown, Northern Ireland	FTTC	*50*	150
	Arc apartments in Titanic Quarter, Northern Ireland	FTTB	400	474
Aylesbury Vale Broadband (AVB)	North Marston, Granborough, Swanbourne in Buckinghamshire	FTTP	*90*	*300*
Bridge Fibre	Various business parks including Bristol, Cambridge, Glasgow, Norwich	FTTB	500	*700*
Broadband for the Rural North (B4RN)	Lancashire	FTTP	2,050	*4,000*
BT Openreach	Enabled exchange areas: BT Infinity	FTTC	*6,167,000*	25,000,000
		FTTP	*72,000*	300,000
Call Flow Solutions	Various deployments	FTTC	*2,000*	*15,000*
	Innovation pilot Hampshire	FTTP and wireless	174	1,336
Chess Telecom (acquired Isrighthere)	Leeds, Liverpool, London	FTTB	719	1,079
CityFibre Holdings	Bournemouth	FTTP	*250*	21,000
	York (with TalkTalk and Sky)	FTTP	1,300	11,000
	Various cities	FTTP	*3,490*	*278,000*
Community Fibre	Westminster, Wandsworth	FTTB	*500*	*3,000*
Connexin (took over assets of NextGenUs UK CIC)	Ashby de la Launde, Lincolnshire	FTTP	*60*	65
Cybermoor	Cumbria	FTTP	50	*100*
	Innovation pilot Northumberland	FTTP and wireless	69	287
Gigaclear and Rutland Telecom	Various deployments	FTTP	*5,800*	*21,000*
	Rutland	FTTC	190	
Fibre Options	Derwenthorpe	FTTP	300	700
	Greenwich	FTTP	300	300
	North West Bicester	FTTP	90	300
	Overbury	FTTP	*35*	*90*

FizzyLiving	Four sites in London	FTTB	*100*	*246*
G-Ti	Gateshead	FTTP	*80*	*80*
Hampshire County Council	Villages of Smannell, Little London and Enham	FTTC	*30*	*53*
Herefordshire Community Networks CIC	Dewsall Court and Callow in Herefordshire	FTTP	*27*	*30*
Hyperoptic	London various sites	FTTB	*60,000*	*200,000*
IFNL	Across various sites	FTTP	18,710	18,710
Internet Connections Ltd	Cheddleton in Staffordshire	FTTC becoming FTTP	50	350
ITS Technology Group	Various	FTTP	*2,500*	*25,000*
KCOM	In and round Kingston upon Hull	FTTP, FTTC, FTTN, FTTB	30,699	73,195
MediaCityUK	Salford Quays in Salford, Greater Manchester	FTTB	*244*	*378*
Relish (was Keycom) owned by UK Broadband	London, York, Edinburgh	FTTB, FTTP	*1,200*	*4,000*
Sky	Basingstoke in Hampshire	FTTP	*120*	*120*
	Swadlincote in Derbyshire	FTTP	*500*	*4,000*
Solway Communications/ TripleConnect	Crindledyke Farm, Carlisle	FTTH	*70*	*100*
TrueSpeed Communications	Priston, near Bath	FTTH	*30*	*90*
Velocity1	Wembley, NW London	FTTB	*630*	*630*
Virgin Media	30 to 152Mbps	Docsis 3, FTTP	*4,520,000*	*13,057,000**
	Woolhampton	FTTP	*10*	10
Venus Business Communications	Battersea	FTTB	*24*	*24*
Vision Fibre Media	City of London	FTTP	800	2,200
	King's Chelsea, London	FTTP	100	300
Vtesse Networks (not taking new orders)	Across deployments in Hertford, Rugby, Broughton and Hatt and Higher Pill near Saltash, Cornwall	FTTC	*180*	*1,247*
West Whitlawburn Housing Co-operative	Glasgow	FTTP	100	100
WightFibre	Isle of Wight	Docsis 3, FTTP	*4,500*	*13,000*
Several of these operators have additional subscriber lines using non-superfast broadband services				
We have removed Digital Region following network switch-off				
* Point Topic is now using Virgin Media's figure for two-way homes, residential multiple dwelling units or commercial units passed by the Virgin Media cable network				

3. The service provider picture

Internet service providers using the Openreach network had 1,982,000 superfast lines between them at the end of June 2016. This compares with 1,803,000 lines at the end of December 2015.

Additions for these non-BT suppliers dropped markedly during the first quarter of 2016 to just 28,000 compared with previous quarters in the hundreds of thousands – this appears to be linked to BT Group including EE numbers for the first time in its results. Additions recovered in the following three months to end-June 2016 with 151,000 superfast lines added. However this is still 15 per cent lower than last year and is, according to BT, due to higher levels of migrations between communication providers.

These lines accounted for 45 per cent of Openreach superfast connections made between April and June 2016. This is a set-back, again likely to be the result of BT Group's acquisition of EE. This figure had been just below 50 per cent in Q4 2015. Table 2 shows non-BT superfast connections on Openreach infrastructure.

Table 2: Openreach sales to non-BT service providers

Thousands (000)	Q3 2013	Q4 2013	Q1 2014	Q2 2014	Q3 2014	Q4 2014	Q1 2015	Q2 2015	Q3 2015	Q4 2015	Q1 2016	Q2 2016
Total non-BT sales	364	474	572	687	8280	994	1,183	1,356	1,559	1,803	1,831	1,982
Quarterly additions	121	110	98	115	141	166	189	173	203	244	28	151

Source: BT Group/Point Topic

As of September 2016 Openreach listed 24 residential service providers up by one year-on-year, including BT Consumer, Sky and TalkTalk, as offering residential packages on its FTTx network and 71 business providers up from 62 including BT Business. There is some overlap with certain players offering both.

BT Consumer had 46 per cent of its broadband customer base signed up to its fibre-based Infinity product at the end of June 2016, no change from the end of December 2015. Additions appear to be slowing with only 181,000 lines added during Q2 2016 compared with 217,000 Q2 2015. This brings its superfast total to 4,257,000 compared with 3,226,000 a year ago.

TalkTalk Telecom Group had a total of 740,000 FTTx lines at the end of June 2016 with sales holding up while its overall broadband base declined. Point Topic estimates Sky to have had 660,000 FTTx customers at the end Q2 2016 if the operator is still adding around 60,000 superfast lines each quarter. Both these service providers continue their own FTTH infrastructure build projects as outlined below.

4. BT Group makes its ultrafast move

At its Capital Markets Day on 5 May 2016, held every three years, BT Group made a series of announcements covering future infrastructure build and investment plans, as well as plans on customer care. BT announced its aim is to make ultrafast broadband available to 12 million homes and businesses by the end of 2020. It said its Openreach and EE businesses will between them spend around £6 billion in capital expenditure over the next three years in the first phase of a plan to extend superfast and 4G mobile coverage beyond 95 per cent of the country by 2020. It also stated there would be new initiatives across the company to improve customer service.

The ambition is that two million of this total will be homes and businesses using FTTP while 10 million will use G.fast technology. According to Openreach's relatively new CEO, Clive Selley, an engineer by background with a clear passion for technology (he used to run BT Labs), Selley has spent three months reviewing FTTP and says he thinks very differently about the technology as a result. FTTP lines are to be deployed to SMEs in high streets and business parks, to new build housing estates (free of charge if 30+ houses) and to rural areas where it may provide the most appropriate solution. Selley says that trials in various locations and premises types have produced more cost-effective deployment methods. However it was emphasised a number of times during the day that BT needs the right regulatory framework in order to support these ambitions.

On 11 April 2016 Openreach announced its FTTx network had passed the 25 million premises milestone, meaning more than 70,000 premises have been passed on average every week since the build began in July 2009. Around four million of the 25 million premises have been reached as a result of the Government's Broadband Delivery UK (BDUK) programme. By the end of June 2016 Openreach's FTTx network was available to "well over 25 million premises" according to BT Group, and 6.2 million premises were connected representing 24 per cent of those passed. This compares with 24 million premises at the end of December 2015.

More than 300,000 homes and businesses now have access to FTTP via Openreach's network. This figure was provided by BT Group in a press release on 15 June 2016 and was given following several years during which the extent of Openreach's FTTP implementation was rarely revealed. The business is planning to expand that footprint significantly in the coming years whilst increasing the top speeds on offer to businesses from 330Mbps to 1Gbps.

BT Group plans to help take fibre coverage to 95 per cent of the country by the end of 2017, and says it intends to go even further. Having reached take-up levels of 20 per cent at the end of June 2015, BT Group increased its base case assumption to 28 per cent penetration, with 30 per cent in BDUK areas. The milestone of passing more than 19 million homes and businesses, representing around two thirds of UK premises, was announced on 8 May 2014. The company originally said it would cover 19 million premises with its next-generation network in total. BT says it is spending more than £3 billion on deploying fibre-based broadband – £2.5 billon on its commercial fibre footprint plus further funds in rural projects including those under BDUK initiatives.

More details on key announcements by BT Group in relation to superfast broadband since our last report in February 2016 are given below. Details of Openreach's historic and current trials and deployment initiatives are provided in our *__Superfast broadband projects directory__*.

BT's last exchange fibre-enablement announcement was back in September 2013 when it said it would cover another 19 exchanges as part of its commercial rollout. Then focus shifted to Fibre on Demand (FTTPoD) availability and in April 2014 a further set of FTTPoD exchanges was announced based almost exclusively in cities involved in the Broadband Connection Voucher Scheme. This followed notification in December 2013 of 82 exchange areas for FTTPoD coverage with availability scheduled during 2014. A number of other exchange areas had already been named. For an historic list of fibre-enablement announcements, see previous versions of this superfast broadband report.

4.1 FTTP deployment ambitions

In March 2016 it was announced that Openreach was conducting two new trials of Business Fibre-to-the-Premises technology in Bradford, providing up to 1Gbps in the city's Kirkgate High Street and Listerhills Science Park. The new trials in Bradford are to explore if the technology can be installed faster and more efficiently in business parks and high streets. Work had already begun on the network, and the first businesses were expected to be connected in late Spring 2016.

Openreach has been trialling new deployment methods for FTTP in Bradford and, according to Selley, these have progressed very well and include a new 'plug and play' approach to allow customers to be connected more quickly and easily. Further details of these techniques can be found in our short report outlining Point Topic's show case visit, Openreach: reviving the case for FTTP.

4.2 SMEs to be targeted with FTTP rollout

These new techniques will be used in wider deployment beginning with nine locations announced on 15 June 2016 in relation to Openreach's SME-focused plans. These areas will receive the operator's new FTTP product specifically designed for SMEs, offering ultrafast speeds of up to 1Gbps. They are Bath, Bradford, Bristol, Liverpool, Manchester and Salford – as well as Westminster, Holborn and the City – in London, and will have network rolled out over the course of the next nine months, with communications providers able to offer ultrafast speeds to businesses from the end of December 2016. Further deployment phases will then follow. The first phase focuses on areas which boast strong science and technology sectors, including the Bristol and Bath technology hub and the cities integral to the 'Northern Powerhouse'.

The deployment will be focused on SMEs located in high streets, as well as science and business parks and clusters of businesses that do not have access to fibre broadband from Openreach. The new FTTP product is designed as an alternative for SMEs which may want ultrafast speeds at a lower price point than that available with dedicated lines.

Openreach will continue to consult with industry as it develops the product and pricing. It will also seek feedback from industry on likely demand before confirming which specific areas will benefit from deployment. This approach will enable Openreach to identify areas that may not have access to its existing fibre services and where demand could be strongest. As the new service becomes available, it says that communications providers will be able to offer SMEs a range of ultrafast speeds and business grade service levels.

The rollout forms part of Openreach's wider plan to make ultrafast broadband available - via FTTP and G.Fast technology - to up to one million businesses by the end of 2020. The operator has said expansion of the FTTP footprint will also eventually benefit hundreds of thousands of adjacent residential homes in the targeted areas.

4.3 FTTP for housing developments

Openreach also said on 3 March 2016 it is committed to build FTTP infrastructure free of charge into new housing developments that have more than 250 premises. Construction of FTTP infrastructure (ducting, poles and wires) will be carried out for free. Standard connection and ongoing service provider charges will apply and excess construction charges continue to apply where the site is more than 4.5km from Openreach's existing fibre network.

This followed the 5 February 2016 announcement by the Department for Culture, Media & Sport (DCMS) that it had worked with Openreach and the House Builders Federation (HBF) on an agreement aiming to deliver superfast broadband connectivity to new build properties in the UK. DCMS said the new deal will see fibre-based broadband offered to all new developments either for free or as part of a co-funded initiative. It is estimated that more than half of all new build properties can be connected to fibre broadband free of charge to developers.

In an update to this, on its website as of 23 September 2016 Openreach says it will deploy FTTP, free of charge, into all new housing developments of 30 or more homes, registered from November 2016. This could apply to at least 9 out of 10 new build homes.

4.4 G.fast ambition for 10 million premises

In March 2016 Openreach said it would build on trials of ultrafast 'G.fast' technology with new pilot sites in Cherry Hinton, Cambridgeshire and Gillingham, Kent. This will cover 25,000 homes and businesses in these areas enabling access to download speeds of up 330Mbps using G.fast from their nearest street cabinet.

On 22 September 2016 Selley reportedly announced that G.fast is moving onto production equipment with trials widening to around 140,000 premises by the end of March 2017 in 17 locations, namely Bolton, Cherry Hinton, Cheltenham, Derby, Donaldson, Gillingham, Langside, Gosforth, Huntingdon, Luton, Rusholme, St. Austell, Swansea, Swindon, Sheffield and in London - Balham and Upton Park. Huawei and Nokia have been chosen to provide a range of equipment and the new kit will be rolled out initially in parts of Gillingham and Cherry Hinton later in 2016.

This followed confirmation from the operator on 1 February 2016 of the extension of its NGA2 trial from 31 March 2016 to 30 September 2016, testing the suitability and reliability of G.fast and a new variant of Fibre-on-Demand (FoD). This is the third six-month trial for G.fast technology. Communication provider trials have been ongoing in Huntingdon in Cambridgeshire and Gosforth in Newcastle since late summer 2015. Openreach says the trials are going well but in order to allow further testing of the technology and to monitor in-life performance it was extending the trial end date to 30 September 2016.

Openreach is also running a smaller technical G.fast trial in Swansea, intended to cover homes and offices within apartment blocks or multiple dwelling units (MDUs) and business centres. This is in the SA1 postcode area of Swansea Waterfront and the Maritime Quarter. Originally announced in May 2015, around 100 premises have been selected to take part, based on technical criteria. The trial will also look at the economic impact on SME businesses of deploying higher speed wireline services.

According to Openreach and Alcatel-Lucent, a potential future development of G.fast broadband technology, known as XG-FAST, has achieved speeds of more than 5Gbps in early experimental lab trials conducted by the two companies. Announced in October 2015, Openreach said XG-FAST is in the early stages of lab testing, but has exceeded expectations in trials at Adastral Park, BT's research and development campus in Suffolk, and Alcatel-Lucent's labs in Antwerp. The technology delivered aggregate speeds of 5.6Gbps over 35 metres of BT cable, and performed well over longer distances, with aggregate speeds of 1.8Gbps over 100 metres – most UK homes are within this distance of their local distribution point.

4.5 Duct and pole sharing trial launched

On 7 July 2016 Openreach said it had begun trialling new, simplified duct and pole sharing processes with five communications providers. The trials should give companies the ability to carry out more work themselves without seeking permission from Openreach.

Call Flow Solutions, NextGenAccess and WarwickNet are among these taking part. The trials will test several enhancements to the current process, including:

- Faster survey and build – allowing companies to inspect Openreach's ducts and poles and, if there is space, install fibre cables immediately without seeking additional permission
- Autonomous blockage clearing – giving companies the authority to clear any blockages they find, without needing consent from Openreach
- New distribution permissions – allowing companies to install new distribution joints inside Openreach junction boxes, making deployments quicker and more cost-effective.

The trial will run until December 2016, and around 65km of duct had been reserved as of 22 September 2016 with 51km under construction. Openreach's ducts and poles have been available for other companies to use since 2011. These efforts to streamline the process have been developed by an industry working group, which launched in November 2015.

Openreach is separately working to create new digital maps which will chart its UK network infrastructure and further support any communications provider that wishes to plan and deploy their own new fibre networks.

4.6 Cornwall's looks at new EU-funded programme

Cornwall's new programme will aim to cover at least 8,600 premises of the 30,000+ premises in Cornwall that could still benefit from an upgrade to superfast broadband and will aim to complete this rollout by the end of 2017.

Activity covering these premises will be undertaken in phases. Initial analysis was completed for the first phase, which aimed to upgrade about 1,700 premises by September 2016. A contract was signed between Cornwall Council and BT Group in June 2015 following announcement of the new Growth Deal for Cornwall and the Isles of Scilly in England by the then Government Minister for Rural Affairs, Dan Rogerson.

Cornwall Council is also working on a further part-EU funded programme. This is still under development and a contract has yet to be signed. Plans are to complete procurement and sign a contract by 31 March 2017. Cornwall Council says it is also keen to ensure a complementary scheme is included so that any businesses or communities that cannot be covered under the rollout can apply for funding to help with alternative technologies.

The original programme began in 2010 and reached its goal of making fibre-based connectivity available to 95 per cent of Cornwall and the Isles of Scilly, ahead of the original aspiration of 80 per cent. By June 2015 some 258,000 homes and businesses were covered by the Openreach network representing 90 per cent of the Duchy. These numbers included 85,000 premises representing 30 per cent with access to FTTP. Over 67,000 homes and businesses were connected through 60 different internet service providers. Some areas upgraded early on in the project were seeing take-up in excess of 40 per cent.

4.7 Grants available to serve local schools in final five per cent

As part of its Community Fibre Partnership scheme, BT has made £2 million available via a grant for Community Fibre Partnerships that could benefit local schools. This enables communities in the final five per cent of the UK not covered by fibre broadband rollout plans to apply for a grant of up to £20,000 toward the cost of their new fibre infrastructure, if that new infrastructure could also serve their local school.

The grant is available to communities where their proposal for a new co-funded fibre infrastructure serves a school that does not have access to fibre broadband, or has a low broadband speed typically less than 10Mbps. Grants are subject to a contract being signed within three months of the date of the offer letter. The grant is open for applications from 28 June 2016 to the point that the fund has been exhausted and are conditional on the community raising all of the required funding, and given on a 'first come, first served' basis.

Meanwhile BT continues to work with individual rural communities using its gap funding model. In July 2016 the Bussage and Chalford Broadband Action Group (BCBAG), representing a 400 home community at Chalford Hill near Stroud in Gloucestershire, announced that cabinets 9 and 17 were accepting superfast broadband orders. In October 2015 it had placed a contract with Openreach for the upgrade of two cabinets and made a down payment of 50 per cent of the price of the upgrade via BT's Community Fibre Partnerships programme. Hampshire residents in the village of Beaulieu have also joint-funded a fibre-based build to around 40 premises in the Dock Lane community.

Preston, a small Hertfordshire village 30 miles north of London, was the first in the UK to co-fund its network with BT and so produce the Community Fibre Partnership model. With 300 residents in 130 properties, many households in the village were experiencing slow broadband speeds of just 0.5

Mbps. The FTTC solution cost £38,000, the difference according to BT between the cost of the Openreach commercial case and the actual deployment cost.

On 31 March 2016 Coleorton became the 50th Community Partnership nationwide to connect to the Openreach FTTx network after a small group of residents in the Leicestershire village partnered with Openreach. People living in Coleorton Hall, a Grade II listed building converted into 22 residential apartments, agreed to jointly fund the build with Openreach contributing the standard amount for a fibre upgrade in line with its commercial model. A new roadside fibre broadband cabinet was installed just outside the Hall entrance, as previously each property was connected by 'exchange only' lines. This is also of benefit to around 120 homes and businesses across the wider village.

4.8 Testing of Long Reach VDSL

On 19 August 2016 Openreach announced that around 20 households in the Outer Hebrides village of North Tolsta on the Isle of Lewis had been identified to take part in a test for Long Reach VDSL. The technology has already been deployed there and initial results are said to be encouraging with most households seeing significant increases in their fibre broadband speeds, according to the infrastructure operator. The village was chosen due to its remoteness and that fact its fibre cabinet supports a cluster of long lines. Openreach says it plans to hold further trials of the technology in a number of locations around the UK. Long Reach VDSL operates at higher power levels and makes use of a wider range of frequencies to increase broadband speeds and the distance over which they can be delivered.

On 22 September 2016 Selley was reported by Thinkbroadband as saying that Long Reach VDSL had shown average increases of 13Mbps across eight lines in a trial in Isfield and that 2017 will see an expansion on the existing two trial locations (Isfield and North Tolsta) to cover 1,500 premises including in Ashcott, Somerset and Peatling Magna in Leicestershire.

4.9 Openreach's position within BT Group

On 26 July 2016 BT confirmed it had volunteered governance changes to increase the independence and transparency of Openreach. The company says it believes these changes can form the basis for a fair, proportionate and sustainable regulatory settlement, and can also help Ofcom conclude its review and achieve its aims in a quicker timeframe. These changes are:

- Creation of an Openreach Board with an independent chair and a majority of independent members. Openreach will produce Annual Operating and Medium Term Plans setting out its budgetary, strategic and operational objectives. The Openreach Board and CEO will also control how they deploy capital, within the overall budget agreed with the BT Board.
- Greater delegation of strategic, operational and budgetary responsibilities – a formal three stage process will be introduced whereby industry will be consulted in advance on substantial investment decisions and the development of new products. This process will include an early stage during which Openreach can engage with its communications provider customers on a confidential basis.

- An enhanced consultation process with industry on future investment plans – Openreach will have access to sufficient capabilities and resources to make its own decisions and run its own operations.

BT has submitted a formal notification to Ofcom of its intention to implement changes to the existing functional separation arrangements of Openreach in full immediately upon Ofcom agreeing to vary BT's Undertakings. In any event, BT intends to implement so much of this reorganisation as possible whilst remaining compliant with the Undertakings in their current form, within six months.

This followed the initial conclusions of Ofcom's Strategic Review of Digital Communications published on 25 February 2016 (see below). BT Group says it has put forward a proposal which it hopes can form the basis for further discussions with Ofcom and the wider industry.

4.10   Customer care targets

Openreach is also keen to demonstrate improvements in customer case. On 18 July 2016 the operator announced its engineers fix 84 per cent of faults within two working days – compared to 67 per cent when reporting began two years earlier. The business installs 93 per cent of new lines on time, and it has cut the average time to get an appointment from 11 to seven days.

It also claims to have reduced the number of appointments its engineers miss by more than a third in just three months and is on track to halve missed appointments this year.

The company says it is exceeding all of the 60 service measures set by the Ofcom which introduced Minimum Service Level rules in July 2014. It says it sees these objectives as a minimum rather than a target, and is determined to continue exceeding them as the thresholds get tougher each year.

Openreach has hired more than 5,000 new engineers over the last three years, and is currently in the middle of a recruitment drive which will see 1,000 engineers and more than 200 apprentices join the company before May 2017.

5. Virgin Media brings FTTP into the picture

Virgin Media's cable network passed 13,072,300 homes, residential multiple dwelling units or commercial units in the UK at the end of June 2016, with premises capable of providing two-way services including video, internet and telephony numbering 13,057,000.

The operator said its Project Lightning initiative is on track to pass more than 500,000 premises in 2016 and that 85,000 were added in the three months to end-June 2016. In addition to these properties, approximately 12,000 homes were identified through Project Lightning on the existing footprint that required no construction activity. Virgin Media also said that customer penetration, ARPU and build costs remain in line with its business plan for the project, and that a quarter of its expansion would be covered by FTTP technology (see below).

During 2015 Virgin Media had already added over 250,000 premises as part of Project Lightning, which aims to extend the cable network by four million to 17 million premises in the UK by the end of 2019. The £3 billion Project Lightning was unveiled on 13 February 2015 and the pace of build has accelerated with over 40 per cent of 2015 new premises delivered during the final quarter. More details on Project Lightning's progress and our predictions of its coverage can be found within our UK Plus service.

Point Topic estimates Virgin Media had 4,520,000 lines providing speeds of 30Mbps and above, meaning it is still ahead of BT Consumer. The cable operator reported its Vivid broadband service, providing 100Mbps or above services, is taken by 49 per cent of its total 5.2 million broadband internet subscribers in UK and Ireland. Assuming this percentage is indicative of the UK alone, we estimate Virgin Media has 2,356,000 subscribers to what it terms to be "ultrafast" speeds.

Demand for faster broadband speeds is strong with an additional 597,000 subscriptions over the last 12 months to the Vivid broadband tiers including 114,000 in the three months to end-June 2016. Virgin Media's Hub 3.0 router, which it launched in November 2015 enhancing the speed and reliability of customers' in-home wifi, had an installed base of 550,000 units at the end of June 2016. Further marketing campaigns around speed were underway with the July 2016 summer campaign ahead of the Olympics featuring Usain Bolt to reinforce a "superior speed" message.

The operator is also continuing its focus on small businesses having launched new bundles featuring top speeds of 300Mbps, and introducing its "Homeworks" service, offering enhanced technical support for home office workers subscribing to high-end broadband products. Virgin Media claims these new services are resonating well and driving increased sales in the SOHO customer segment which increased during Q2 2016 by 6,000 on an organic basis to 45,000. The company launched a 300Mbps service for small business customers in January 2016, having announced the new product in November 2015.

5.1 Quarter of Project Lightning to be FTTP

On 27 April 2016 Virgin Media announced it would connect FTTP technology to at least a quarter of the four million additional homes and businesses being added to its network as part of the Project Lightning expansion plans. Virgin Media has a Hybrid Fibre Coaxial (HFC) network in the UK which

combines optical fibre and coaxial cable. The core network is fibre-optic which provides ultrafast broadband to the street cabinet. Broadband is then delivered to the majority of premises using coaxial cable with by DOCSIS 3.0 technology.

Virgin Media had already started to roll out FTTP in Cambridgeshire and Leicestershire with work expected to start soon in West Yorkshire, Devon and East Sussex. Using new engineering techniques such a 'narrow trenching', FTTP can be deployed at lower cost and more quickly in areas where demand is high. Narrow-trenching reduces the width of the trench used to lay optical fibre cables from around 40cm to just 10cm and enables engineers to cover up to 100 metres in a day, making it more than twice as fast as current methods according to the operator.

5.2 London network expansion plans unveiled

On 20 July 2016 Virgin Media announced the next phase of its London programme, part of Project Lightning, saying that when complete in 2018 around 450,000 new homes and businesses will be connected to the company's network taking the number of Greater London premises covered by Virgin Media to more than three million.

Virgin Media has connected approximately 100,000 new premises to its network in London since 2014 and says it is on track to deliver ultrafast broadband to another 100,000 London premises by early 2017. It expects to cover the remaining 250,000 by the end of 2018, taking the total to 450,000.

The expansion will include 6,000 premises in Westminster and "a significant investment" in Barnet which will see fibre connected directly to 40,000 homes and businesses. Other areas where Virgin Media will build include Greenford, Southall, Hammersmith & Fulham, Twickenham, St John's Wood, Bexley and Croydon. The majority of this London expansion will extend Virgin Media's HFC network, however premises in Barnet will see fibre connected directly.

Virgin Media has also installed wifi hotspots in Islington and Croydon. This is currently in a trial phase with connectivity open for all members of the public to use. Public access points are being located on top of existing street cabinets.

5.3 New build home initiative takes off

On 5 September 2016 Virgin Media announced an agreement with Redrow Homes to supply ultrafast broadband to new build homes. The first will be 13,000 homes across Tamworth, Shrewsbury and Evesham, and the operator says the infrastructure being constructed for the homebuilder should benefit several thousand in residents and businesses in nearby local communities. Virgin Media is building 11km of cable trench to reach the new homes at Redrow's Lime Tree Meadows development in Shrewsbury.

Part of Project Lightning, many new properties will be connected with FTTP. Investment for the new Redrow development in Evesham, Maple Gardens, for example, will create broadband connections for almost 4,400 local residents and businesses.

The move follows a partnership between Virgin Media the Home Builders Federation (HBF) to increase delivery of ultrafast broadband services to new homes. Announced in June 2016 the agreement is designed to enable HBF members to build homes with infrastructure in place to provide 200Mbps broadband, TV channels and landline services. HBF members account for around 80 per cent of all new homes built in England and Wales in any one year.

A part of the agreement, Virgin Media will provide developers with the equipment to connect homes to its network and offer a rebate scheme to cover any costs of the work. The company will offer a dedicated manager for each site. Virgin Media will also provide exclusive discounts for new build homeowners moving into properties under the scheme.

Virgin Media has set up a [dedicated new portal](#) including technical guidance and a new site request form, with Virgin Media carrying out all initial new site assessments free of charge.

5.4 Virgin Media Business ramps up business coverage

On 19 July 2016 Virgin Media Business said it plans to build out network to tens of thousands more businesses under Project Lightning initially targeting underserved business parks and office blocks within reach of its existing optical fibre network.

This follows a report commissioned by Virgin Media and published in October 2015 which concluded that businesses can capitalise on a £92 billion potential opportunity offered by the digital age and that digital technologies could provide a boost to the economy equivalent to 2.5 per cent of GDP.

Two business parks in Andover, Hampshire will be the first with 9,000 businesses in the next six months to be passed. The first sites will be the Portway and Walworth Business Parks, which cover 150 hectares. Test Valley Borough Council has worked to enable coverage. According to Virgin Media local businesses typically have download speeds of 5Mbps. Virgin Media also hopes this expansion will help it deliver broadband to further residential areas.

5.5 Leeds businesses targeted with ultrafast bandwidth

Also specifically on the business front, in May 2016 Virgin Media said that nearly 1,500 businesses in Leeds and Bradford co-located in 125 buildings would be offered connectivity through a package designed to support the connectivity needs of businesses based in multi-tenanted buildings.

Leeds is the fourth major city identified by the operator as an area that would benefit from ultrafast connectivity with equal upload and download speeds. Similar packages have been launched in London's Tech City, Manchester's Northern Quarter and Birmingham Jewellery Quarter. Businesses located within multi-tenanted buildings within Leeds's Civic, Cultural and Financial Quarters will be able to receive upload/download speeds of up to 100Mbps. Packages will be offered at £199 or £249 monthly fee for a 50Mbps or 100Mbps connection respectively. Several buildings close to Bradford city centre will also be offered these services. A 1Gbps connection will be installed into a building and businesses within it can purchase a 50Mbps or 100Mbps product.

As mentioned above, this followed a similar offer to over 2,000 businesses in 250 buildings in Birmingham's emerging tech hubs including the Jewellery Quarter, Colmore Business District, Hagley Road and Broad Street.

5.6 Forty communities announced as part of Project Lightning

Virgin Media unveiled the next 30 communities it will cover in its infrastructure rollout that have been voted for by local residents and businesses (see Table 3). The announcement on 11 July 2016 falls under the operator's Supercharging Local Communities initiative, launched earlier this year as part of Project Lightning. FTTP technology will be used with connections due to be in place by Spring 2017.

Under the initiative local residents and businesses are urged to vote for their community to be included in Project Lightning. Launched on 29 February 2016 homes and businesses in 18 counties were eligible to take part by registering interest at www.virginmedia.com/cablemystreet.

According to Paul Buttery, Chief Operating Officer at Virgin Media, the operator has been overwhelmed by the response from local communities and as a result has decided to speed up network expansion plans. The company is urging more residents and businesses to register interest to continue an effectively demand-led build programme.

The first 10 communities were announced in April 2016 with four located in Scotland. All 10 will also see FTTP technology used. Over 7,000 votes were cast between 29 February and 29 April 2016. Voting was paused temporarily at the end of April to announce the first 10 communities which received the most votes. Then over 5,000 votes were cast between 29 February and 30 June 2016.

Table 3: Virgin Media's Supercharging Local Communities initiative

Counties eligible to take part	Berkshire, Buckinghamshire, Derbyshire, Dorset, Glamorgan, Hampshire, Leicestershire, North Yorkshire, Oxfordshire, Renfrewshire, Rhondda, South Yorkshire, Staffordshire, Surrey, Warwickshire, West Lothian, West Yorkshire, Worcestershire
First 10 communities announced	Kirknewton (West Lothian) Houston, Crosslee, Craigends and Brookfield (Renfrewshire) Bridge of Weir (Renfrewshire) Ratby (Leicestershire) Wilsden (West Yorkshire) Kilmacolm (Inverclyde) Stoke Poges (Buckinghamshire) Lightwater (Surrey) Hartley Wintney and Phoenix Green (Hampshire) Oakley (Dorset)
Next 30 communities announced	Windlesham (Surrey) Sutton Courtenay (Oxfordshire) Balsall Common (West Midlands) Old Basing (Hampshire) Oakley (Hampshire) Farnham Common (Buckinghamshire)

Wargrave (Berkshire)
Lickey, Catshill, Marlbrook & Barnt Green (Worcestershire)
Cullingworth (West Yorkshire)
Shrivenham (Oxfordshire)
Baddesley Ensor (Warwickshire)
Harden (West Yorkshire)
Broughton Astley (Leicestershire)
Grimethorpe (South Yorkshire)
Wigginton & Haxby (North Yorkshire)
Copmanthorpe (North Yorkshire)
Grassmoor (Derbyshire)
Pontyclun (Rhondda)
Darfield (South Yorkshire)
Talke & Talke Pits (Staffordshire)
Cudworth (South Yorkshire)
Duffield (Derbyshire)
Shafton (South Yorkshire)
Denham (Buckinghamshire)
Llanharry (Rhondda)
Marcham (Oxfordshire)
North Leigh (Oxfordshire)
Repton (Derbyshire)
North Cornelly (Bridgend)
Watchfield (Oxfordshire)

5.7 Swindon, Chester and Wrexham to gain network expansion

In June 2016 Virgin Media said it would expand its network to 7,000 homes and businesses in Swindon as part of Project Lightning. The move extends Virgin Media's existing network which passes 65,000 premises in the town. FTTP technology will be used and work was due to begin within two months for completion in early 2017.

A significant part of the build is due to take place in north-west Swindon covering the Haydon, Priory Vale and Blunsdon St Andrew areas. Network gaps will also be filled throughout Swindon in areas including Greenmeadow, Old Town, Toothill and Eastleaze. Also in June 2016 Virgin Media announced it would be expanding its network to 45,000 homes and businesses in Chester and surrounding areas by the end of 2017 using FTTP technology. Work is due to start towards the beginning of 2017 and cover locations such as Blacon and Huntington with more areas to be added following discussions with local councillors and demand from residents.

Wrexham is set to see Virgin Media network expansion to 24,000 homes and businesses in the town and surrounding areas by the end of 2017. Again FTTP will be used with the operator saying that Wrexham will be the first town in North Wales to receive FTTP connectivity. Work will start towards the end of 2016 beginning in the Acton Park area and extend to Wrexham Industrial Estate, Wrexham Technology Park, will include the villages of Llay, Rossett, Coedpoeth and Gwersyllt as well as Wrexham town centre. Our *Superfast broadband projects directory* provides current and historic details of Virgin Media's pilots, trials and partnerships in next-generation network deployment.

6. Alternative network operators promote their ambitions

The UK's alternative network providers remain serious contributors to the country's superfast and increasingly ultrafast infrastructure deployment. Continued expansion of their footprints, growing relationships with service providers, local authorities and one another, are strengthening the altnet hand and potentially share of the high-speed broadband market.

CityFibre continues to see major growth and form new relationships, and has become a real cornerstone of business broadband in particular supplying service providers targeting this sector with superfast and ultrafast offerings on a wholesale basis. It remains to be seen whether CityFibre can do the same for the residential market but with fibre now in 37 cities it is an increasingly attractive proposition to those larger residential providers that may want an alternative to Openreach.

IFNL and sister company GTC are developing further relationships with the UK's house builders including through the House Builders Federation. Meanwhile business park specialists WarwickNet and Bridge Fibre are expanding their footprints, often working closely with local authorities to bring connectivity to various business clusters in the UK.

Investment continues to flow into the altnet sector, with both Hyperoptic and ITS Technology Group raising significant funding in recent months. This is on top of successful funding rounds for Gigaclear and Community Fibre. And on the rural front, specialists Broadband for the Rural North (B4RN) as well as Gigaclear, continue their expansion putting in place new approaches to cope with increasing coverage and demand.

Meanwhile Kingston upon Hull's KCOM, although not technically an altnet, has now passed 100,000 premises with its mainly FTTP network. Our *__Superfast broadband projects directory__* also published this month, lists the country's alternative network fibre-based projects.

6.1 Altnet association calls for Gigabit Britain

On 8 September 2016 INCA, the Independent Networks Co-operative Association representing alternative infrastructure providers, published its Building Gigabit Britain report. The document was created in consultation with its members including Sky and Vodafone, alongside CityFibre, Hyperoptic, Gigaclear, Relish, ITS Technology Group, WarwickNet and others. It outlines a number of measures it believes are required to facilitate the wide-scale deployment of FTTP which it says is the infrastructure essential to ensure the UK remains digitally competitive.

The report states that the UK currently has the lowest FTTP deployment in the OECD, with around two per cent coverage, and outlines how this puts the country at an inflection point, with legacy copper-based networks increasingly unable to cope with the exponential growth in data. INCA states that only the deployment of pure fibre infrastructure, supporting vastly greater speeds, more symmetry upstream as well as down and lower latency than copper or hybrid networks, will support the UK's growing needs. It says fibre networks are needed to support the growth of both fixed wireless and mobile wireless services.

The report goes on to propose a number of specific actions it believes the UK Government must take to provide the connectivity British businesses and consumers need to support them in an increasingly digital future by encouraging the deployment of FTTP. It lists a number of recommendations:

- The Government should set out a clear and achievable 'Gigabit Britain' strategy – including a target for 80 per cent of the UK population to have access to an FTTP connection by 2026, and near universal coverage by 2030.
- Remove financial barriers to FTTP rollout – regulation should be designed to foster continued private investment in digital infrastructure by removing barriers such as unequal business rates on fibre assets for the next 10 years.
- Create a regulatory environment which encourages competition and a collaborative approach between all digital infrastructure providers – Ofcom designing a fair playing field, enabling greater infrastructure investment.
- A review of advertising guidelines – consumers and businesses require greater clarity on the differences between fibre and a hybrid copper-fibre solution.

6.2 CityFibre's continued expansion with a presence in 37 cities

The CityFibre footprint has grown with a number of announcements in recent months in line with its 'Well Planned City' approach. The infrastructure builder claims to be the UK's largest alternative provider of wholesale fibre network infrastructure. It has major metro footprints in 37 cities and a national long distance network that connects these cities to major data-centres across the UK and peering points in London. The company's customer base includes service integrators, enterprise and consumer service providers and mobile operators. It provides a portfolio of active and dark fibre services, and CityFibre's network potentially address 26,000 public sites, 7,400 mobile masts, 260,000 businesses and 3.7 million homes. It says it is targeting a total of 50 cities by 2020, in theory reaching 20 per cent of the UK market.

These are not FTTH access networks, however. CityFibre says the new infrastructure can serve as a backbone for a future rollout of FTTH network and services, and that with more than 3.5 million homes within reach of CityFibre's metro networks, this will make all CityFibre's project cities strong candidates for future FTTH deployments.

On 14 September 2016 CityFibre announced Reading as its latest 'Gigabit City'. The alternative network operator has around 30km of fibre network and is working with launch partner BtL, a provider of business-to-business IT and telecoms services with a customer base in the region. The Reading Gigabit City was officially launched at The Madjeski Stadium in Reading, with businesses, public sector organisations and schools able to register their no obligation interest.

In August 2016 CityFibre announced its Hull Gigabit City project in partnership with Pure Broadband, an established telecoms provider in the city, using a CityFibre 62km network across Hull. Pure Broadband has launched a separate division called Pure Speed to offer affordable, ultrafast internet services to businesses in Hull and the surrounding area.

CityFibre had already installed fibre connections to mobile masts in Hull, upgrading the majority of the city's mobile traffic to 4G, following a national framework agreement with mobile network operators EE and Three UK. This project led to an increase in mobile internet use on Three's network in the city of 380 per cent and has enabled Three to upgrade the majority of the city's mobile traffic to 4G.

Also in August 2016 CityFibre said it is on track to complete the installation of Edinburgh's new 150km ultrafast network by the end of September 2016. It said that construction has been delivered at speed, with CityFibre employing over 150 engineers and workers at the project's peak. It has taken 12 months to install over 100km of fibre infrastructure throughout the Scottish capital, taking the current total to 126km since launch. Upon completion, the network will provide connectivity to around 7,000 businesses and reach over 300 public sector sites including schools, libraries and office buildings.

Meanwhile construction is set to start later in 2016 on CityFibre's 40km multi-million-pound fibre investment to make Glasgow Scotland's third Gigabit City with connections expected to go live in early 2017. The first phase will take up to 12 months to complete and will be capable of reaching over 7,000 businesses and public sector organisations as well as seven hospitals, including the new Queen Elizabeth University Hospital.

In July 2016 CityFibre announced its Bristol fibre network as live, and said that the first businesses were connected through its partnership with service provider Triangle. The network was launched in February 2016.

And earlier in July 2016 the infrastructure provider announced Milton Keynes would be a 'Gigabit City'. The infrastructure provider will be providing wholesale services over 160km of fibre available to businesses, schools and colleges via city launch partner dbfb and education partner Exa Networks.

July 2016 also saw CityFibre say that Peterborough City Council had trebled use of its Peterborough fibre infrastructure with an order for a further 220 new sites via the ICT managed service provider, Serco. Sites cover CCTV cameras, wifi connections and a network of information traffic system locations. The Peterborough Gigabit City network comprises 90km of fibre and duct infrastructure built originally to connect 107 public sector sites including schools, council buildings and health sites.

On 25 April 2016 CityFibre announced that its Leeds and Bradford network was available for use by businesses and the public sector. The network comprises nearly 200km of fibre. Launch partners are Exa Networks and Diva Telecom. Also in April 2016 CityFibre announced two commercial agreements, with Exa Networks and Diva Telecom adding 350 new sites to its new networks in Leeds and Bradford. Diva Telecom, a business telecoms provider with a customer base in Leeds, made an initial commitment of 100 connections comprising new and existing customers.

In addition, Exa has agreed a strategic national partnership with CityFibre targeting the UK's education sector. Exa serves thousands of schools and colleges across the country with connectivity and filtering services. The partnership will support Exa in bringing services to educational institutions across CityFibre's national network footprint.

In March 2016 Southend-on-Sea Borough Council chose CityFibre to supply a 50km dark fibre network connecting 120 public sector sites throughout the town. The deal, worth £3.24 million over 10 years, will make Southend another CityFibre 'Gigabit City'. As with all CityFibre's Gigabit City projects, the new network will be made available on a wholesale-basis to service providers. These will then be able to offer the majority of Southend's 6,000 businesses access to gigabit speed services.

Back in December 2015 CityFibre announced the £90 million acquisition of KCOM's national fibre and duct network assets. The company also stated it had secured £180 million in financing to facilitate the acquisition and to continue commercialising its national network. The transaction was completed on 18 January 2016. Then in early April 2016 SSE Enterprise Telecoms was announced as the UK's first national service provider to buy dark fibre capacity over this newly acquired long distance network (LDN). The 15-year agreement secures capacity along a 48km stretch of network between Reading and Slough.

CityFibre is also developing relationships with other altnets. On 1 July 2016 Gigaclear and CityFibre said they had formed a strategic partnership to help accelerate rollout of next generation ultrafast internet access to hundreds of thousands of rural homes and businesses in the UK. The agreement is designed to give Gigaclear access to more capacity, faster delivery and more flexible bandwidth across the country.

6.3 TalkTalk pleased with take-up levels in York FTTP trial

Cityfibre's joint venture with Sky and TalkTalk to build a city-wide, FTTP network in the City of York continues with TalkTalk providing quarterly updates in its results press releases. In its 20 July 2016 statement, TalkTalk said it had continued to make good progress with its Ultra Fibre Optic (UFO) trial in York. The build had passed nearly 11,000 homes with penetration reaching around 12 per cent three and a half months after commercial launch. Take-up is ramping steadily according to the service provider and compares with seven per cent of homes passed three months earlier. Interestingly nearly half of TalkTalk connections are from customers who were not previously with TalkTalk, driving an increase in the company's market share in the area.

With build costs already established at below £500 per home passed, TalkTalk is increasingly confident of reaching its targeted penetration level of 30 to 40 per cent and delivering the proof of concept required to expand beyond York. The company has said this could result in a 10 million household network across the UK.

Earlier in the year on 12 May 2016 TalkTalk said it was making significant progress meeting the key operating metrics (cost per home passed, customer experience and penetration) in Ultra Fibre Optic (UFO). Build at that time comprised the first 8,000 homes at a cost of under £500 per home.

Customer trials ended in March 2016 when TalkTalk launched the proposition commercially. The company had said that 262 trialists were signed up to the York trial from the 3,328 homes in the first phase of the build. Over 90 per cent of trial participants chose to retain the service and pay £21.70 per month, and the vast majority were not existing TalkTalk customers. The service provider regards its Ultra Fibre Optic product as an opportunity to build a mass market, value for money proposition

with keen pricing and rapid scaling. It expects to review progress and decide on the next phase of development later in 2016. Rollout is reportedly due to reach 20,000 premises.

6.4 Sky trials FTTH in Derbyshire

Meanwhile Sky has deployed an FTTH network in Swadlincote, Derbyshire which reportedly passes several thousand homes. As of mid-September 2015 the build had just been completed using a 50/50 mix of duct and pole infrastructure in order to understand the efficiencies of both. Trialist numbers had yet to be determined but speeds provided should to be up to 940Mbps.

The operator's trial in Basingstoke, Hampshire was extended beyond the original 12 months ending in July 2015 to at least Christmas 2015. The technical FTTP trial in partnership with digital TV solution provider, Love Digital TV, involved households in several streets in the town, based on overhead fibre on Sky-owned telegraph poles connected to the operator's own infrastructure.

6.5 IFNL sees significant expansion in site numbers

By the end of June 2016 Independent Fibre Networks Limited (IFNL) was contracted to deliver services to 126 sites in the UK, up from 87 sites at the end of December 2015. Residential properties connected to the infrastructure builder's network stood at 17,671 at the end of June 2016, up from 12,231 at the end of 2015.

Business connections on the IFNL network numbered 1,039 by end-June 2016. There are 36 commercial service providers delivering services across the infrastructure including Virgin Media Business, Vodafone, Colt, Spitfire Communications and Exponential-e. This is up from 30 providers at in February 2016.

A fourth residential service provider has been added to those already delivering services – Vfast Internet has joined Direct Save Telecom, Love Your Broadband and seethelight in offering broadband and other services to consumers. These ISPs are currently providing up to 300Mbps services although the network is capable of delivering 1Gbps and higher speeds. Vfast Internet is offering customers free voice lines, no monthly traffic limits, free webspace and email addresses. Both business and residential service providers are listed on the IFNL website.

6.6 GTC provides national deal for HBF members

IFNL works closely with GTC – both are owned by the same parent company, Brookfield Utilities UK Ltd. GTC is the sales and construction team, acquiring sites then installing the fibre and optical transport networks before passing the infrastructure to IFNL to manage and maintain.

Announced on 27 June 2016 the Home Builders Federation(HBF) and GTC have agreed a national deal for HBF members to provide FTTP technology to new-build homes in the UK. Under the agreement GTC's UltraStream300 fibre network is available to house builders with speeds of 300Mbps, ready for 1Gbps speeds. New homeowners can access a fixed line phone service, discounted Sky TV packages and a choice of broadband packages from the four residential service providers mentioned above.

The GTC commercial package aims to ensure house builders will not face higher costs via a structure of rebates payable to HBF members on connection. The agreement incorporates unlimited free site assessments, a dedicated site technical management and after sales benefits which include product training, promotional marketing material and a complementary sales-suite ultrafast broadband connection. Details of the HBF agreement and technical guides can be found on GTC's website.

GTC works with the top three house builders – Barratt Homes, Persimmon Homes and Taylor Wimpey – as well as the majority of the top 10 including Bovis Homes, Bellway Homes and J S Bloor. On 12 July 2016 GTC announced it had won a new contract for the provision of gas, electricity and fibre networks to a major residential-led development Stanton Cross by Bovis Homes in Wellingborough, Northamptonshire. The £900 million development of 3,650 homes and 1.55m sq ft of commercial space will also have a Fibre Integrated Reception System (FIRS) for television services installed.

6.7 Hyperoptic secures EIB investment

On 19 July 2016 it was announced that the European Investment Bank (EIB) had agreed to provide £21 million for Hyperoptic to provide 1Gbps fibre broadband to more than 500,000 homes in UK cities. This is a significant investment from EIB and represents its largest ever dedicated backing for an internet network investment in the UK. Together with Quantum Strategic Partners Ltd, a private investment fund managed by Soros Fund Management LLC, the deal brings total investment in Hyperoptic to more than £75 million.

The new eight-year EIB loan will be used to support Hyperoptic's planned expansion of 1Gbps broadband access to urban areas that only have slow access at present. Hyperoptic currently operates in 13 UK cities and has announced expansion plans to 20. The EIB-backed network expansion seeks to reach more than 300,000 homes in the next three years. The EIB loan is supported by 'InnovFin – EU Finance for Innovators', MidCap Growth Finance with the financial backing of the EU under Horizon 2020 Financial Instruments.

Hyperoptic has continued extending its coverage. On 11 April 2016 Brighton was announced as its 13th 'hyper-city'. The company says it is investing heavily in its infrastructure in the city. Services are live in the Sussex Heights development and a number of other Brighton developments are undergoing installation. Hyperoptic anticipates thousands of Brighton residents will be using its services by the end of 2016. Hyperoptic's services are already live across its other 12 cities, namely Greater London, Cardiff, Bristol, Reading, Manchester, Leeds, Liverpool, Sheffield, Birmingham, Glasgow, Newcastle and Nottingham.

At the end of May 2016 Hyperoptic reportedly confirmed to ISPReview that it will be taking its total city count to 20 with the additions of Portsmouth, Watford, Leicester, Southampton, Slough, Edinburgh and Woking. Its network is already said to be "live" in these cities and the first buildings to benefit would soon be targeted based on local demand.

Focused on developments with 50 or more units, installations are prioritised in buildings where there is greatest demand from the freeholder and residents. Once at least 10 per cent of residents have registered interest, Hyperoptic works with building management to arrange installation. Much

of its approach is around site acquisition having recruited staff experienced in the property sector – establishing relationships with freeholders, property managers, developers and councils – and treating every building as a separate project to ensure quality of design and installation.

Early background details on Hyperoptic can be found in Point Topic's case study, *Hyperoptic: a new breed of fibre provider* published in February 2013.

6.8 Ask4 has 5,000 residential connections

Also in the MDU market, Ask4 which predominantly provides superfast broadband services to students had around 5,000 residential FTTB connections in August 2016 and 10,000 homes passed. The Sheffield-based operator has FTTB deployments in Leeds, Manchester, Sheffield and Shipley.

In May 2014 Darwin Private Equity agreed to buy a majority stake in Ask4 for £21.5 million. In total Ask4 serves around 125,000 customers across several hundred sites, including over 100,000 student beds across the UK. It also has at least 400 businesses taking services.

Ask4 started providing internet access to private residential multi-tenant buildings in 2000, initially in a small block of flats on Penistone Road in Sheffield, followed by the 600-apartment West One development. It entered the student accommodation sector in 2005 following the acquisition of Horizon Telecoms.

6.9 Fibre Options sees strong take-up at Greenwich

By early August 2016 Fibre Options had 300 premises passed and connected at the Greenwich Peninsula in London, up from 170 six months earlier. Phase 1 of the development comprises 700 properties in total and residents have been moving in regularly since November 2015. Phase 2 is about to be released which will see connection numbers rise.

Fibre Options' Derwenthorpe deployment continues to grow with 300 live connections up from 230 in February 2016. There are 700 homes passed on the network which is on a new build estate near York. Here Fibre Options is working with the Joseph Rowntree Housing Trust.

Customers are now being connected at a new development in North West Bicester where 300 homes have been passed. There were 90 connections in early August 2016. Fibre Options has also connected 27 properties in rural Herefordshire for Herefordshire Community Networks CIC.

Meanwhile numbers remain stable at the Overbury Estate FTTP deployment in Gloucestershire, which passes and connects around 90 premises, and discussions are underway regarding expansion.

The operator is also the network provider at London's Perseverance Works, a creative hub in Shoreditch at which around 400 people run businesses, providing connections for businesses as well as a few select residential properties, and in the Tove Valley in Northamptonshire. It is branding its ISP offerings as 'Purefibre' www.purefibre.london, for its commercial products. .

6.10   ITS Technology Group adds Nottingham to network portfolio

On 20 September 2016 ITS Technology Group (ITS) announced the successful completion of a round of funding. The investment has come primarily from new shareholders in the business, with some conversion of existing shareholder loans into equity. The company says these funds will enable it to continue significant investment in new urban concessions, expand its geographical reach and accelerate deployment. ITS has won four concession agreements with local councils including London Borough of Hammersmith and Fulham, Bristol City Council and most recently Nottingham City Council, as well as building networks in 17 business parks and community areas.

ITS continues to expand its operations in a variety of geographies using a range of technologies. On 15 August 2016 the company announced it had signed a 20-year concession agreement with Nottingham City Council to manage the city's telecommunications ducting to connect local businesses to superfast broadband. During construction of Nottingham's NET tram extension to Clifton South and Toton Lane, the City Council installed 17km of underground telecommunications infrastructure along the routes. ITS will now extend the reach of the fibre network up to 100kms. The network will be operated as an open access network.

Under the deal the council should recoup its initial investment and be guaranteed an income over the life of the project. ITS' focus will be on SMEs, including those located at strategic sites along the tram route such as Ng2, Nottingham Science Park and Nottingham's Enterprise Zone. ITS will also bring improvements to the city centre which are currently not served by superfast services, including the Creative Quarter and its newly refurbished creative units at Sneinton Market.

According to Roy Shelton, CEO of ITS, this is the fourth agreement ITS has completed within the past 18 months to add to its established networks He also said the company is expecting to increase the number of networks it has to 25 by the end of 2016.

ITS already has a 20-year concession in Bristol to use the local authority's 85km BNet fibre infrastructure, a network originally built for traffic management and CCTV provision. The concession was won as part of a joint venture with Net Support UK. Spectrum Internet and Vapour Media are also on the network and ITS says it is in discussions with other service providers. In July 2016 the company announced that wholesale partners had been integrated and customers connected. The operator also has a 10-year concession to utilise 17km of ducts in London's Hammersmith & Fulham.

With its Wholesale Partner Programme now a formal part of its strategy, ITS said at the end of July 2016 that it had signed up 15 wholesale partners to sell services across a number of its networks. Under the company's national strategy it aims to amalgamate its disparate networks into one single wholesale network offering tier 2 and tier 3 products and services. Partners will be able to make cost savings by limiting the number of data centres they need to connect to in order to access multiple locations throughout the UK with enhanced delivery timescales. ITS' approved service provider relationships include partners such as Novus Group, Vapour Media, Efuse Telecom and Oryx Align.

The company has been upgrading and extending its North and Mid Wales wireless network and in July 2016 announced that a vast improvement in speeds was the result, with some customers getting up to 100Mbps on business tariffs and 30Mbps on consumer tariffs. Further upgrades and

extensions are planned over the next six months. ITS is also working on new product sets, focusing on simplifying its portfolio at front end and improving its business processes.

The company is also continuing its retail strategy, predominantly focused on services to businesses although residential customers are not excluded where the operator has its own infrastructure.

6.11   Community Fibre aiming for 10,000 premises passed

Community Fibre's funding round in December 2015 was over-subscribed and it says that its target is to pass over 10,000 homes by the end of 2016. The operator is deploying infrastructure for CityWest Homes in Westminster, a leading housing manager, to 22,000 households. Installations in a number of blocks went live during December 2015 and two service packages are being offered to properties. According to the CityWest Homes website, all tenants and leaseholders will have the service installed for free, with no set-up or equipment charges, and will also be able to access the standard package at no charge.

Fibre installation is by Horsebridge Network Systems which set up Community Fibre Ltd to provide the services. Israeli company ECI Telecom is supplying network solutions to the FTTH project which began in July 2013 and was due to take three years to complete. It was initially offered as a pilot to 1,000 homes in the borough. A demonstration centre has been set up at 32 Page Street and residents are invited to test out the new facility.

Community Fibre also announced a deal with Wandsworth Council in June 2014 to install a high speed fibre-optic network to all council-owned homes in purpose built blocks to provide access to free digital television channels, digital radio and a completely free 'walled garden' internet service.

As of mid-September 2015 the service provider had passed around 1,000 homes in Westminster and 200 in Wandsworth with its FTTP network and customer take-up was running at about 25 per cent.

6.12   Vision Fibre Media increases connections in City of London

A number of developments are taking place for Vision Fibre Media (VFM Ltd) due to come online in the near future. Vision Fibre Media continues its FTTP deployment to residential apartments in the City of London where there were 800 connections in early August 2016. This fibre all the way to the home network for The City of London is in the Grade II listed Barbican Estate. VFM has a contract with The City for 25 years. The operator also has its 300-apartment Kings Chelsea FTTP deployment.

Also in August 2016 the operator said it was about to launch a deal with Sky so that customers can gain discounts on Sky's Q products.

6.13   Gigaclear announces Devon and Somerset deployment

The UK's largest rural focused altnet Gigaclear continues to expand its footprint. On 27 June 2016 the operator announced plans to deploy an FTTP network in the Blackdown Hills area of Devon and Somerset. The project could see 2,000 properties in the area connected to ultrafast broadband using 120km of underground fibres. Over the coming months, Gigaclear will start to deploy its service across a number of villages in the Blackdown Hills area including Upottery, Hemyock and Kittisford.

In August 2016 Gigaclear had around 5,800 customers and had passed over 21,000 homes and businesses. It had nearly 50,000 premises in delivery half of which had been completed. This compares with mid-February 2016 when the operator and service provider had 4,500 live customers, had installed a fibre connection to approximately 14,000 homes and businesses, and completed rollout to another 3,500 to 4,000 premises in communities. The company expects to have passed 55,000 properties in total by the end of 2016.

Gigaclear owns and operates 56 rural fibre networks and has over 35 under construction across Kent, Oxfordshire, Northamptonshire, Cambridgeshire, Leicestershire, Buckinghamshire, Hertfordshire, Rutland, Gloucestershire, Berkshire and Essex, and more recently Devon and Somerset. It is targeting a market of 1.5 million rural households and businesses across thousands of rural communities.

Gigaclear is building networks under its own commercial investment and has also won three substantial BDUK contracts in Gloucestershire, Berkshire and Essex. Build and customers are ramping up in these areas and on 4 July 2016 the company announced that St. Andrew's school was the 1,000th property in Gloucestershire to get access to ultrafast broadband as part of the Fastershire Phase 2 project.

Historic background details on Gigaclear can be found in our previous superfast broadband update reports and in the case study, *Gigaclear: bringing FTTP to rural UK*, published in December 2013.

6.14   Cotswolds network under construction

Gigaclear's network in the Cotswolds is also under construction. On 10 May 2016 Cotswolds Broadband announced that work was to begin on the installation of 14 concrete plinths in villages across the district on which fibre cabinets will be installed. Dedicated cables will be run from these cabinets to form the backbone of the network. The plinths mark the first stages in a programme of works which contractors are due to accelerate over the coming months.

It is estimated that work on the whole network will be completed within 12 months. The project will fill in gaps not covered by other schemes ensuring that the whole of West Oxfordshire will be able to get superfast broadband. Residents and businesses are able to find out when they will be connected through a postcode checker to be made available on the group's website.

Cotswolds Broadband says it has been testing technology to install the cable which will avoid the need for major disruption of roads, drives and gardens. Instead of digging trenches in the traditional way, machinery including directional drills and mole ploughs will ensure cables are placed underground with little impact on the surface, wherever possible. Demonstrations have been staged recently on the Daylesford Estate which, the organisation says, proves how quickly cable can be laid in a bid to ensure speedy delivery of superfast broadband to previously inaccessible locations.

The project received formal sign off for a £1.6 million grant by the Government in December 2016. West Oxfordshire District Council is also investing matching funds in the form of a loan with another £3.2 million private investment from Gigaclear. The network will be provided by Cotswolds Broadband – Cotswolds Broadband CIC sold its entire share capital to Gigaclear Plc in December

2016. The deal brought a further network to add to Gigaclear's portfolio, together with pre-procured supplier ITS Technology Group selected following a public tender. The project is to cover an estimated 6,000 properties and a mix of technologies will be used including FTTP and, in very remote areas, wireless connectivity.

6.15   B4RN brings another seven nodes online

In early August 2016 Broadband for the Rural North (B4RN) had 2,050 live connections, up from 1,638 customers in February 2016. Seven village nodes went live in August 2016 so the community-based operator's expansion continues. This is expected to result in up to 150 additions per month, compared with a slower period in April and May 2016 of around 50 new customers per month. The result is that B4RN may well have around 3,000 live customers by the end of 2016.

According to CEO Barry Forde, the biggest push at present is from communities with FTTC-enabled street cabinets but where but properties further away from these cabinets do not receive higher speed broadband. He says that the whole community does not like such gaps in coverage. He also noted that B4RN has been accredited as a supplier for the Government's Basic Broadband Scheme and believes that around 1,000 properties in its postcode areas may be eligible for funding.

The B4RN area footprint plan has been extended to 33 parishes passing 4,850 properties, up from an original 3,500 properties in 23 parishes. Neighbouring communities outside the original planning B4RN footprint are keen to join the network, and most are said to be managing their own local investment, route-planning and volunteering well, keen to promote the core values of B4RN.

B4RN's final footprint is expected to be 10,000 with between 7,000 and 8,000 customers. However, the operator has been working on a new fibre route to Edinburgh to provide resiliency. This may lead to B4RN emerging in a number of other locations en route, for example parishes in Scotland, with break out points every 3kms and backhaul provision on tap.

The company has been almost entirely community funded with 778 shareholders now holding a total of £1.5 million in shares with an additional £1 million loaned to the company from the community.

6.16   Call Flow Solutions launches services in Berkshire

On 19 August 2016 Call Flow Solutions announced it had launched its FTTC service in Berkshire covering Windsor, Wraysbury, Littlewick Green and Colnbrook with speeds of up to 100Mbps. Service will also shortly be available in the Kent village of Fairseat and the operator has announced it is to cover the next village Stansted offering speeds up to 80Mbps. Call Flow Solutions was hoping to launch two cabinets in Fairseat in late September to early October 2016, dependant on third parties completing their part of the work needed. In Stansted the company was awaiting roadworks, cabling, wayleaves and the completion of underground digging and cabling.

Call Flow Solutions has been using Openreach's duct and pole access since 2011, and according to Andy Conibere, Call Flow Solutions' Managing Director, considers itself an expert in this area. In relation to the new trial mentioned above, he says, "These trials mean we can build significant

superfast and ultrafast networks quicker and cheaper, and can potentially make a massive difference to spreading fibre broadband to the most difficult to reach areas".

Call Flow Solutions announced it had successfully delivered a total of £2.5 million public contracts to build high coverage open access superfast networks in Berkshire, Hampshire, Kent and East Sussex to areas that the BT Programme will not reach. One of these is a Market Test Pilot project for the Government that was completed in 2016. The £1.3 million pilot project for BDUK in Hampshire, demonstrated how the operator's hybrid delivery model can achieve high coverage of rural exchange areas that are sub-superfast. Call Flow Solutions deployed established access technologies – FTTC (64 per cent of the premises), FTTP (20 per cent) and FWA (16 per cent) – and combined them to create solutions specific to local challenges. Taking advantage of the strengths of each technology proved an effective method to reach dispersed rural areas.

The project tested the value of different build options in reducing the cost of deploying fibre and wireless superfast networks through the use of existing infrastructure and different types of new network build. Take-up is stronger than predicted and the solution delivered superfast speeds consistently across the different access technologies that it deployed.

BDUK concluded that the technical solution and commercial model can be effective and sustainable in delivering superfast broadband solutions to sub-superfast premises on a larger scale. BDUK also recognised that Call Flow Solutions applied innovations in the build approach that can deliver increased value for money in deployment and operations.

6.17   Aylesbury Vale Broadband live in three villages

Aylesbury Vale Broadband (AVB) is now live in three villages, namely Granborough, North Marston and Swanborne, and plans to cover Oving next which has a population of around 500 people. It has set itself a target to be live in six villages in three months' time. The focus is on households and farms at present. But the operator estimates that one third of its customers work or run businesses from home. It offers a business as well as residential packages.

AVB is a joint venture, backed and supported by Aylesbury Vale District Council. Aylesbury Vale stretches from the Chiltern Hills and Aylesbury in the south to Buckingham/Silverstone in the north. Within this area there are many villages and small settlements, with most receiving less than 2Mbps broadband speed and it is these communities that AVB is targeting with its FTTP network.

On 9 August 2016 AVB said it had completed the extension via private land of its FTTH project in Buckinghamshire from North Marston and had reached the village of Swanbourne. This took two months covering around 6km.

The operator is sourcing new technologies for deployment from around the world, for example equipment from New Zealand allowing it to dig four ducts at a time instead of just one. It is also hoping to use micro-trenching techniques. It has passed around 300 premises and says it has registrations from around 400 households who will pay activation fees in the next 12 months. It also has 58 villages registered for deployment in Aylesbury Vale.

Funding was initially supported by £200,000 from Aylesbury Vale District Council (AVDC) and a further £500,000 to help the network expand via commercial loans. Reportedly a revised business plan and set of accounts are due to be reported to AVDC's Cabinet in September 2016 and then to the Finance and Services Scrutiny Committee in October 2016.

6.18 TrueSpeed Communications live in Priston

Another player to recently enter the altnet scene is TrueSpeed Communications. It plans to cover 8,000 properties with its FTTP network offering packages of 100Mbps to 1Gbps. It went live in the North East Somerset village of Priston in April 2016. The service provider, formerly Wansdyke Telecom, has reportedly connected with the Hibernia Express network which links North America to the UK.

Back in October 2015 the operator announced it would roll out infrastructure providing access in Chippenham, Bath, and villages across the region to the coast at Brean. Communities' Director for the group, Matt McCabe said the organisation was also starting to engage with business parks. In May 2015 the deal with Hibernia Networks was announced. The new Hibernia Express submarine cable system will provide a high capacity, low latency fibre-optic path between New York and London, so connecting Halifax, Nova Scotia and Brean to Chippenham in the UK. This build includes ducting across Wiltshire and Somerset.

6.19 Internet Connections rolls out superfast to Leekbrook

Internet Connections Ltd is making progress on its latest superfast deployment, the Wain Homes estate in Leekbrook in Staffordshire, and expects to have the first households connected by mid-September 2016, once its PCP cabinet has been delivered and power is available. In March 2016 the company announced it had plans to extend its network to provide of up to 50Mbps to the housing development which reportedly has 2 to 5Mbps broadband speeds. The operator said it needed 50 households to register their interest to make investment feasible.

Internet Connections Ltd continues to serve residential customers in Cheddleton, Staffordshire, with 50 subscribers on its FTTC infrastructure which passes 350 homes. It has now extended the fibre network into the St Edwards Park estate, to enable a 1Gbps FTTP service.

A provider of internet connectivity solutions to small businesses and large enterprises since 2002, Internet Connections is also offering a wireless service, limited to a select number of properties that are in line-of-sight of the company's broadcast point. The company was granted utility status by Ofcom in January 2015 allowing it to excavate the public highway and so removing its dependence on third party providers.

6.20 KCOM's superfast network passes 100,000 premises

KCOM, the incumbent in Kingston upon Hull previously known as KC, continues to make progress in expanding its fibre footprint, and had passed the 100,000th premises mark by 13 September 2016, up from nearly 56,600 premises six months ago with its predominantly FTTP network. Although not technically an altnet, we report on the operator's progress here.

At the end of June 2016 KCOM had passed a total of 73,195 premises of which 64,876 were residential and 8,319 were business properties. And in terms of connections, by 30 June 2016 KCOM had 30,699 customers receiving its Lightstream service, up from 23,826 at the end of 2015. This comprises 26,614 consumer connections and 4,085 business connections, up from 20,263 and 3,563 connections respectively at the end of 2015.

To date KCOM has defined "premises passed" as being premises where the operator has built the network and uploaded corresponding address data to its postcode checker so that customers can order the service. In future the operator says that reporting will be based on premises where the engineering build is complete.

Earlier this year KCOM announced plans to accelerate rollout of its superfast service over the next 18 months to make it available to around 150,000 properties – approximately three quarters of its network – by December 2017. By that time KCOM's total capital investment in installing fibre will have reached approximately £60 million.

KCOM has made a number of coverage announcements in recent months. On 3 August 2016 the operator said its Lightstream service would be available to more than 6,500 homes and businesses in west Hull's Willerby Road and surrounding streets later in 2016 and released details of over 220 streets in Hedon and Preston involved. From early September 2016 more than 2,000 households in streets including Lomond Road, Brooklands Road and Manor Road were due to be able to order Lightstream. A further 4,500 households in streets including Calvert Road, Priory Road and Wold Road are due to have superfast broadband access from the end of October 2016.

During summer 2016 Lightstream has been made available to 3,200 households in and around the Bricknell Avenue area of Hull, including Burniston Road, County Road North, National Avenue and Fairfax Avenue, where more than 600 homes had switched to Lightstream or made an appointment to have it installed by early August 2016.

In early July 2016 KCOM announced locations to be covered in Hedon and Preston comprising 5,000 homes before the end of 2016. It also named 50 streets containing over 5,000 properties in the Bricknell Avenue of Hull where the service would be available to order later in July 2016. Around 3,200 residents in the area could order the service from 20 July 2016, with the remainder able to go superfast in September and October 2016. And in early June 2016 KCOM said that more than 4,500 households in east Hull were being passed in 50 streets in the Holderness Road area.

KC changed its name to KCOM on 4 April 2016 saying that the adoption of a single brand and visual identity for all operations was a further important step in KCOM Group's transformation programme. The business had operated five brands serving more than 170,000 customers across the UK. Those brands came together on 4 April 2016 under the KCOM name with a new visual identity.

Historic details of KC's approach to fibre deployment are available in *KC fibre rollout: taking the local approach*, published in February 2012.

6.21 WarwickNet connects over 1,000 customers

Out-of-town business park specialist WarwickNet continues to expand its footprint with a string of announcements over the past six months. The operator and service provider says it is supplying high-speed internet to over 1,000 customers at 95 sites across the UK. In September 2016 it listed 71 separate business park deployments on its website and said it was deploying to 17 others. This compares with 57 deployed at the end of February 2016.

It has points of presence throughout Leicestershire, Warwickshire and the West Midlands, Northamptonshire, Berkshire, Derbyshire and Surrey. It uses a mixture of technologies including FTTC, sub-loop unbundling (SLU) and FTTP to implement superfast broadband and leased line solutions. Founded in 2008, WarwickNet turned over £3.4 million in the last financial year.

It announced on 16 September 2016 that more than 100 businesses at Minworth Industrial Estate in Sutton Coldfield were set to access its network. The infrastructure provider has built four cabinets across the site, and businesses will gain access to FTTC, FTTP, physical infrastructure access (PIA) and SLU technologies to enable services of up to 1Gbps.

Meanwhile at the end of August 2016 WarwickNet said over 100 businesses would benefit from three new cabinets in Coventry on Torrington Avenue which will allow it to supply FTTC and FTTP connections, as well as high capacity leased lines. Over the past five years, WarwickNet has increased its Coventry coverage from five to 23 business parks and city-centre locations, and now provides high-speed internet connections to more than 250 businesses in the area.

In Northamptonshire where WarwickNet offers connections to 85 sites, the provider announced in August 2016 it would be installing an additional 10 cabinets at Moulton Park, Brackmills Industrial Estate, Sywell Airport Business Park, Earlstree Industrial Estate, Phoenix Parkway, Willowbrook East Industrial Estate and Kettering Business Park, enabling up to 300 firms to receive FTTC and FTTP broadband services.

Other sites for expansion include extending its reach at Bardon Industrial Estate to nearly 100 businesses at the Coalville site; providing 100 Mbps across Swift Valley Park near Rugby; going live on four additional sites namely Brackmills Industrial Estate, Grange Park, Moulton Park and Park Farm in Northamptonshire with Earlstrees and St James Industrial Estate also set to go live in the coming months; Grange Park in Northampton covering 40 organisations operating from Waterside and Rushmills.

It has also deployed in two Nuneaton business parks, Attleborough Fields Industrial Estate and nearby Hemdale Business Park which house more than 60 businesses. This deployment leverages PIA, as does a deployment at Minworth Industrial Estate in Sutton Coldfield covering over 100 companies.

WarwickNet is one of the five ISPs deploying PIA commercially (see above). According to founder Ben King, "We have worked successfully with Openreach for a considerable amount of time and, as a relatively small company, we have been agile enough to access some of these enabling powers ahead of our larger competitors. Having access to BT's Openreach ducts and poles has allowed us to

deploy our own fibre networks across poorly connected business parks on a much faster timescale and has seen numerous businesses connected in a fraction of the time it would have taken otherwise."

WarwickNet has also introduced vectoring to most of its sub-loop unbundled street cabinets claiming to be the first ISP in the UK to commercially deploy the technology. It was first deployed by the operator on Coventry Business Park back in January 2015 and the company says this avoids interference and reduces congestion by up to 30 per cent.

6.22   Bridge Fibre expanding out from Cambridgeshire base

The UK's other main alternative network operator focused on the business park sector is Bridge Fibre based in Cambridge. Bridge Fibre has been deploying networks for about six years, initially as part of IT support company Bridge Partners, and was spun out as a separate company two years ago. It is focused on multi-tenanted sites including business parks and individual multi-tenant units and specialises in serving science parks and innovation centres. It has expanded from its Cambridge roots, having connected biotech sites in the area, and now has a presence in other parts of the UK including Norwich, Glasgow and Bristol. It serves around 500 customers on 25 parks.

The company essentially installs FTTB technology bringing a single or paired leased line into a site and then providing a range of connections. Its value-add is working with landlords at multi-tenanted sites that are often remote. Sites range from one with 90 customers on, to others that may contain 10 to 15 customers which may be larger firms.

Bridge Partners also owns FWA provider Air Broadband, which uses Bridge Fibre for backhaul. Again this started its deployment history in the Cambridgeshire area, with two networks, one growing out of Fenland and East Cambridgeshire, the other out of Ely using Ely Cathedral into which fibre was brought to provide a link to rural villages. The network has around 300 active customers and provides packages of up to 40Mbps. The company recently took over Northamptonshire FWA network provider Village Broadband, and is looking to acquire or work with smaller WISPs.

6.23   Student accommodation players

Although deployments in the UK's universities are not covered specifically by this report, the student market continues to provide a base for alternative fibre operators to address the wider residential and business sectors. We have profiled a number of these in previous reports including Ask4, Cablecom, Relish previously known as Keycom, ITS Technology Group, SDC Group and Velocity1.

7. Government project passes four million milestone

At the end of June 2016 over four million premises had a superfast broadband service – greater than 24Mbps – made available a result of BDUK-supported projects. This compares with 3.5 million at the end of 2015. The DCMS had previously reiterated the project is on track to take superfast access to 95 per cent of the UK by December 2017.

With a new Prime Minster post the EU referendum there have been changes at the Department for Culture, Media and Sport (DCMS) with Karen Bradley appointed as Secretary of State, and Matt Hancock MP appointed Minister of State for Digital and Culture. Hancock will cover policy areas including the digital economy, broadband, data protection, arts and culture, media and creative industries.

BDUK, part of DCMS, is charged with delivering superfast broadband and better mobile connectivity to the nation. The UK Government is investing over £1 billion in improving broadband and mobile infrastructure. In summary the programme comprises a number of elements:

- £790 million to extend superfast broadband (24Mbps and above) to 95 per cent of the UK by 2017 via the Rural Broadband Fund and the Superfast Extension Programme. This is in three phases – phase 1 aims to provide superfast broadband to 90 per cent of premises in the UK by 2016; phase 2 is to further extend coverage to 95 per cent of the UK by 2017; phase 3 tests options to rollout superfast broadband beyond 95 per cent and get near universal coverage by 2018
- £150 million and an additional £40 million to provide high-speed broadband to businesses in 50 cities under the Super-Connected Cities programme and Broadband Connection Voucher scheme. The other two components of this programme are wifi projects and innovative digital projects
- £150 million to improve quality and coverage of mobile phone and basic data network services under the Mobile Infrastructure Project to improve coverage for voice calls and text messages for the final 0.3-0.4 per cent of UK premises that do not currently have it
- £20 million in the Rural Community Broadband Fund (RCBF) aimed at bringing superfast broadband to more remote communities
- £10 million investment in a series of market test pilot projects to investigate the best way of tackling the most remote and hardest-to-reach places
- Announced in July 2015, a fund of up to £10 million to support connectivity in the South West through the broadband programme. The fund will be available for local projects to bid into, with priority given to those delivering ultrafast speeds
- In June 2016 the Government announced HM Treasury would establish a new broadband investment fund in partnership with the private sector, to support the growth of the ultrafast broadband.

7.1 Broadband Performance Indicator published for end-June 2016

In August 2016 DCMS published its latest Performance Indicator stating that 4,021,047 premises had a superfast broadband service made available by the end of June 2016 as a result of BDUK-

supported projects. This is a rise of 395,678 since the end of December 2015 and 180,404 by end-March 2016. The DCMS figures relate only to premises able to get over 24Mbps broadband speeds, and exclude overspill effects of BDUK-supported projects on premises which already have superfast broadband available.

BDUK grants to local authorities and budget transfers to devolved administrations amounted to a cumulative £492,573,929 in cash terms up to the end of June 2016. This equates to 8,163 premises covered per £ million of broadband delivery programme expenditure up to the end of June 2016. That is £122.50 per premises, up slightly from a cost of £122.25 at the end of 2015. Total public expenditure on the projects is higher as local authorities and devolved administrations add their own contributions and those from other sources such as the European Regional Development Fund (ERDF). These expenditure figures exclude BDUK support for Super-Connected Cities, the Mobile Infrastructure Project, the Rural Communities Broadband Fund, and DCMS administrative expenditure. Table 4 provides the cumulative total. The next update is due to be published in November 2016.

With the clawback mechanism seeing BT Group pay back £129 million for every 10 percentage points of take-up, and the underspend so far of £150 million, phase 1 and phase 2 are expected to bring superfast coverage to around 96 per cent of UK premises. Further pressure by BDUK on BT to ensure that slower areas in urban parts of the UK see more commercial investment should take superfast coverage to 97 per cent.

On 19 July 2016, the House of Commons Culture, Media and Sport Committee said in its report, Establishing world-class connectivity throughout the UK, that progress made in broadband rollout since 2010 had shown that the BDUK scheme and the use of FTTC technology was, on balance, the right decision. However, the Committee went on to state that one consequence of this is that the programme appears to have tackled easier to reach premises first.

Table 4: Cumulative total BDUK spend, end-June 2016

Cumulative to end of:	Premises with superfast broadband service made available	BDUK funding (£) cumulative	Number of premises covered per £ million of broadband delivery programme expenditure
December 2012	254	£434,735	584
March 2013	16,638	£6,767,185	2,459
June 2013	38,343	£6,767,185	5,666
September 2013	111,968	£10,347,568	10,821
December 2013	273,731	£14,182,547	19,301
March 2014	508,801	£ 58,586,408	8,685
June 2014	888,113	£ 72,437,233	12,260
September 2014	1,383,777	£99,766,011	13,870
December 2014	1,908,725	£252,084,918	7,572
March 2015	2,411,395	£301,444,870	7,999
June 2015	2,905,764	£ 331,828,330	8,757
September 2015	3,311,843	£ 372,153,178	8,899
December 2015	3,625,369	£ 406,918,848	8,909
March 2016	3,840,643	£ 476,742,422	8,056
June 2016	4,021,047	£ 492,573,929	8,163

Source: DCMS

7.2 Digital Economy Bill Part 1 to introduce USO

The Digital Economy Bill was announced in the Queen's Speech on 18 May 2016 to implement a number of Government commitments on the digital economy made in the Conservative Party Manifesto. The main elements of the bill are fast broadband and support for consumers (including a Universal Service Obligation (USO) for broadband), enabling digital infrastructure, protecting intellectual property, enabling Government digital services and protecting citizens in the digital economy.

On 5 July 2016 the Government issued guidance on the Digital Economy Bill Part 1: Access to Digital Services. It said the bill will:

- Create a new USO which will set out how Government and industry deliver broadband connectivity. The ambition is to ensure everyone has the legal right to request connection to 10Mbps broadband
- Enable Ofcom to set requirements on providers to make available more information on the matters that count to consumers, including complaints, statistics and accurate broadband speeds
- Require providers to follow procedures set by Ofcom when customers wish to switch provider, or compensation is due.

Back in November 2015 the Government announced that access to fast broadband would be put on a similar footing as other basic services, giving everyone a legal right to request a 10Mbps connection as a "safety net" by end of the current Parliament. The Government consulted on its proposal in early 2016 and published its response to the consultation in May 2016. Ofcom has consulted with industry and is due to publish a technical analysis in late 2016 after which the Government intends to consult again on the detail of the USO, including specific requirements and guidance for its design. This might include, for example, the minimum speed, quality and pricing. The current USO for internet access is set at 28.8Kbps.

7.3 Digital Economy Bill Part 2 to enable more infrastructure investment

Also on 5 July 2016 the Government outlined its aims as part of the Digital Economy Bill Part 2 to enable more investment in UK infrastructure, better network connectivity, and a wider choice and quality of digital communications services for consumers. Better use of radio spectrum is also a goal, as is making the planning system fit for purpose to help roll out digital infrastructure. Specifically, Part 2 of the Digital Economy Bill is designed to do the following:

- Reform the Electronic Communications Code, to deliver better coverage in rural areas through greater investment and faster rollout of mobile and broadband infrastructure
- Make it easier for communications providers to have access to land - moving to a "no scheme" valuation system more akin to the regime enjoyed by utility providers
- Protect landowners by strengthening the "access principle" and requiring communication providers to pass a public interest test
- Clarify roles and responsibilities for all parties that use the Code, helping commercial agreements to be reached more easily and disputes to be resolved more quickly

- Make it easier for digital communications companies to upgrade and share their equipment and get faster access to maintain sites
- Work with industry and Ofcom to develop a Code of Practice to ensure effective implementation of new rights
- Powers for Ofcom to use new technologies to better manage spectrum and make it easier for different users to share spectrum
- Make it easier to install broadband cabinets, overhead lines and poles in all areas except Sites of Special Scientific Interest (SSSIs) by making regulations introduced in 2013 for a period of five years to be made permanent.

In terms of planning, changes were first introduced in 2013 to help speed up deployment of fixed broadband infrastructure by reducing the time and costs associated with obtaining planning approvals, incentivise further investment and to support making digital connectivity available as quickly and as widely as possible. According to the Government, a review of the impact of these planning relaxations showed they have worked successfully and that there is a continuing need for them. A Siting Code of Practice was also introduced in 2013, developed by communications providers and planning authorities in order to safeguard against poorly sited infrastructure. This was independently reviewed and the evidence shows a high level of awareness of the Code and compliance with its principles.

7.4 Broadband Investment Fund for ultrafast broadband

George Osborne, the then Chancellor of the Exchequer, announced at the Budget on 16 March 2016 that the Government would, in partnership with the private sector, establish a new broadband investment fund. The aim is to support growth of the ultrafast broadband industry, particularly alternative ultrafast broadband network developers, by providing greater access to finance on a commercial basis.

A document was published setting out HM Treasury's (HMT) request for proposals on 16 June 2016. It explains that HMT is looking to invest, on arm's length commercial terms alongside the private sector, in businesses or projects operating in (and around, which would include support industries relating to) the UK broadband sector. HMT is considering providing up to 50 per cent of the total funds invested in this way. The Infrastructure and Projects Authority (IPA) is managing the delivery of the Fund on behalf of HMT. The deadline for receipt of proposals was extended to 8 August 2016.

7.5 Government's Better Broadband Scheme continues

The Better Broadband Subsidy Scheme continues to operate. It has been developed by the Government to ensure every household and business in the UK can access an affordable basic broadband service. Users are responsible for paying any remaining cost of installation and commissioning, choosing the features of the broadband service they require, and for paying a monthly subscription for the service they select (for a minimum period of 12 months). An online tool is available to check areas in which the scheme operates.

The scheme was rolled out through December 2015 and forms part of the existing 2Mbps Universal Service Commitment (USC), a Government pledge to make sure every home and business in the UK

can access speeds of at least 2Mbps by the end of 2015. An estimated 300,000 properties across the UK will be able to make use of the new offer.

It is administered by local authorities, and satellite broadband pilots were launched in September 2015 – one in Suffolk, the other in West Yorkshire. FWA providers are also involved in the scheme. However, registered suppliers are not confined to satellite or fixed wireless technologies. B4RN is also a supplier under the scheme in terms of its FTTP provision.

7.6 Out of phase 1 and into Phase 2 Superfast Extension Programme

The Rural Broadband Fund phase 1 of the Government's progamme which involved a total £1.2 billion in public investment including local authorities matching BDUK funding, has and continues to be delivered by 44 projects across the UK. The devolved administrations projects in their various phases – Highlands and Islands, Northern Ireland, Scotland and Wales – are also well into delivery (see below). All are contracted to BT.

Over recent months several more local authorities have reached phase 1 completion. In August 2016 the Central Bedfordshire Broadband project said it had completed. And in late April 2016 Lincolnshire said it had reached the end of the first phase of its project, claiming more than 90 per cent of premises were able to access superfast broadband in the county. Superfast Essex also reached its phase 1 target by summer 2017 with 87 per cent fibre-based coverage.

Meanwhile work is underway on phase 2 contracts. Announced in the June 2013 Spending Round, the Government is providing a further £250 million of funding to support the Superfast Extension Programme to increase coverage of superfast broadband to 95 per cent of UK premises by 2017. As with phase 1, local authorities have had room to negotiate on coverage levels despite the national target. Scotland, Wales and Northern Ireland benefit from over £40 million of extension funding between them and have been able to decide how to match fund and where to spend the money.

Some have gone to altnets. Gigaclear won three Superfast Extension Programme contracts as outlined above. Call Flow Solutions is also involved with the Superfast Berkshire phase 2 contract to extend superfast coverage to 95.6 per cent by the end of 2017 in West Berkshire and Windsor & Maidenhead. Other phase 2 contract winners include UK Broadband for a fixed 4G LTE network in Swindon and Airband in Northern Ireland.

Table 5 below lists links to local authority and devolved nations' broadband websites. Details are also available by initiative in our *__Superfast broadband projects directory__*.

Table 5: Rural Broadband Fund, Superfast Broadband Extension and Devolved Nations projects

Berkshire Councils	Lincolnshire
Black Country	Merseyside
Buckinghamshire and Hertfordshire	Newcastle upon Tyne
Cambridgeshire, Peterborough	Norfolk
Central Beds, Bedford Borough, Milton Keynes	Northern Ireland
Cheshire East, Cheshire West & Chester, Warrington, Halton	North Lincolnshire, North East Lincolnshire
Devon & Somerset (including Plymouth, Torbay, North Somerset, Bath & NE Somerset)	North Yorkshire
Coventry, Solihull, Warwickshire	Northamptonshire
Cumbria	Northumberland
Derbyshire	Nottinghamshire
Dorset, Bournemouth and Poole	Oxfordshire
Durham, Gateshead, Tees Valley and Sunderland	Rutland
East Riding of Yorkshire	Shropshire
East Sussex, Brighton and Hove	Staffordshire and Stoke-on-Trent
Essex, Southend-On-Sea, Thurrock	South Yorkshire
Greater Manchester	Suffolk
Hampshire	Surrey
Herefordshire and Gloucestershire	Telford & Wrekin
Isle of Wight	West Sussex
Kent and Medway	West Yorkshire
Lancashire, Blackpool, Blackburn with Darwen	Wiltshire, South Gloucestershire
South Yorkshire	Worcestershire
Highlands and Islands	Scotland
Leicestershire	Wales

Source: DCMS/Point Topic

7.7 EC approval for new National Broadband Scheme

The process of continuing to sign phase 2 contracts was made possible on 26 May 2016 when the European Commission announced its Decision to approve the 2016 National Broadband Scheme (NBS). This Decision recognises the NBS scheme as being compliant with EU competition law, and public bodies in the UK will not need to notify the Commission each time they wish to run a broadband procurement. Instead, they just need to demonstrate compliance with the NBS to BDUK. The NBS scheme will run until the end of 2020.

The scheme will be used to support procurements for the remaining funding of BDUK's Superfast Broadband Programme as well as the £10 million Ultrafast fund for the South West.

From 26 January to 24 February 2016 BDUK ran a focused market engagement exercise seeking views from local authorities, devolved administrations and operators of broadband networks regarding a proposed new procurement approach that would form part of a new EU State aid decision. To allocate public funding to projects, State aid approval is required through a decision

granted by the European Commission. The previous Decision expired on 30 June 2015 and BDUK has been in discussions with the European Commission about the new Decision in order to commit further public funding to projects. As part of these discussions, a new approach has been developed that includes a number of measures to support competition at tender stage, as well as promote open access networks intended to encourage long-term competition.

7.8 Government consultation on business broadband

In terms of business broadband, on 24 February 2016 the then Business Secretary Sajid Javid announced a wide-ranging review to improve business access to broadband. The review, jointly led by the Department for Business Innovation & Skills with DCMS, was to look at:

- The broadband speeds that businesses need now and in the future
- The barriers that exist for businesses to get the affordable, high-speed broadband they need
- The issue of leased lines and the role they play in the market.

On 13 May 2016 the Government issued a call for evidence, encouraging businesses, communications providers and other interested parties to describe the barriers businesses are facing in accessing superfast broadband. The consultation closed on 3 June 2016.

7.9 Broadband Connection Vouchers to expire

Also on the business front, the Government's Broadband Connection Voucher Scheme is fully committed and closed to new applicants. Vouchers not connected by 30 September 2016 will expire. The scheme ran from December 2013 to October 2015 and is widely regarded as a success, encouraging take-up of superfast and ultrafast services from the country's small business sector. On 16 November 2015 DCMS said more than 55,000 vouchers for superfast broadband connections were issued to SMEs during the lifetime of the scheme – 37,000 since April 2015 – and that more than 770 suppliers won voucher business out of 864 registered suppliers.

7.10   Ofcom outlines proposals to make Openreach independent

On 26 July 2016 Ofcom made its long awaited announcement of detailed plans following the initial conclusions of its Strategic Review of Digital Communications in February 2016. These conclusions had focused on a more independent Openreach; greater choice of broadband networks, including fibre connections to homes and offices, better quality of service across the whole industry, and better broadband and mobile coverage for people and businesses.

Ofcom has proposed that Openreach be a legally separate company within BT Group, with its own 'Articles of Association'. It is to have its own Board with a majority of non-executive directors, including the Chair. These non-executives should not be affiliated to BT Group in any way, but would be both appointed and removed by BT in consultation with Ofcom. Openreach would be obliged to consult formally with customers such as Sky and TalkTalk on large-scale investments. There should be a 'confidential' phase during which customers can discuss ideas without this being disclosed to BT Group. Ofcom's principle for the new model is that people who work for Openreach should be employees of the new company, rather than BT Group. And that Openreach should own its physical

network. The regulator says this would allow the Openreach Board to make decisions that depend on investing in, and looking after, Openreach's assets.

Ofcom also said that Openreach should develop its own strategy and annual operating plans, within an overall budget set by BT Group. It should have its own brand, not affiliated with BT Group, to help embed the organisational culture of a distinct company.

Ofcom said that if Openreach cannot achieve this, it will reconsider whether BT and Openreach should be split into two entirely separate companies, under different ownership. Ofcom is seeking views on the plans outlined by 4 October 2016.

7.11   Ofcom pushes easier access to Openreach's poles and ducts

In February 2016 Ofcom also committed to make it easier for telecoms providers to invest in advanced, competing infrastructure by improving access to Openreach's network of telegraph poles and ducts. The plans include making Openreach provide an online database showing the physical location and characteristics of its ducts and poles - a 'digital map' of the UK.

On 26 July 2016 Ofcom said that Openreach had demonstrated how this will work and noted that BT had already started trials of new, simpler processes for sharing its network, working with five other telecoms companies (see above). Ofcom will set out further detail on improved duct and pole access in Autumn 2016.

On 31 July 2016, new rules came into force that will give telecoms providers further rights to access physical infrastructure. These measures are designed to reduce the cost of deploying broadband networks, by sharing access to infrastructure across different sectors.

7.12   Ofcom wants step-change in quality of service

Also in February 2016, Ofcom announced a range of measures designed to ensure all phone and broadband companies provide service quality. It has taken steps to improve services including discussions with industry to require automatic compensation when service falls short, easier switching various services, and advanced coverage checkers including offering information on mobile and broadband coverage by individual address and not just postcode.

Ofcom says it will set out stricter minimum requirements for Openreach to repair faults and install new lines more quickly later in 2016.

In addition it has introduced new rules to require to BT to provide access to its fibre network of high-speed business lines to competitors. Ofcom published its Business Connectivity Market Review which considers the £2 billion market for leased lines, most of which are owned and maintained by BT on behalf of competing providers. Ofcom said that BT's Openreach must install high-speed business lines more quickly, that prices for Openreach's business lines should be significantly reduced, and that competitors should be able to access BT's 'dark fibre' network. The new rules were finalised at the end of April 2016, following approval by the European Commission.

8. Devolved nation initiatives update

8.1 Digital Scotland announces further exchanges for upgrade

On 19 September 2016 the Digital Scotland Superfast Broadband programme, delivered through two projects led by Highlands and Islands Enterprise in their area and the Scottish Government in the rest of Scotland, had reached more than 640,000 premises. This compares with 550,000 premises in March 2016.

Households and businesses in Glasgow North West, Glasgow Central and Glasgow North areas, the Banffshire and Buchan Coast area, Possil, Provanmill and Springburn areas, Hamilton, Larkhall and Stonehouse areas, and Tillicoultry are among the most recent covered by the scheme.

The Digital Scotland Superfast Broadband programme will deliver access to fibre-based broadband to 750,000 properties, representing around 95 per cent of premises by the end of March 2018 when combined with existing commercial rollout plans. It underpins the Scottish Government's aim for Scotland to become a world class digital nation by 2020.

On 13 July 2016 it was announced that upgrades are planned to provide access to thousands of homes and businesses in small communities such as Crathes in Aberdeenshire, Balmacara in the Highlands, Blair Atholl in Perth and Kinross, Lochinver in NW Sutherland and Carsphairn in Dumfries and Galloway, with the first connections due to go live this winter. At the time 600,000 premises across Scotland were covered and around 2,800 new fibre street cabinets were live across 620 Scottish exchange areas. BT engineers had laid more than 7,500km of cable. Exchange areas due to be upgraded are shown in Table 6.

Table 6: Exchange areas for FTTx upgrade announced 13 July 2016

Local Authority	New exchange area (rest of Scotland)
Aberdeenshire	Catterline, Crathes, Eden, Forgue, Whiterashes
Dumfries & Galloway	Bentpath, Boreland, Carsphairn, Carrutherstown, Drummore
Falkirk	Slamannan
Perth and Kinross	Blair Atholl, Glenalmond, Tummel Bridge
Scottish Borders	Camptown
Local Authority	**New exchange area (Highlands and Islands)**
Argyll & Bute	Achnamara, Cairndow, Crinan, Glenbarr, Kilchrenan, Minard, Southend, Whitehouse
Arran & Cumbrae	Kildonan
Highland	Applecross, Aultbea, Badachro, Balmacara, Bridge of Westfield, Carbost, Dornie, Farr, Forss, Glenelg, Glenshiel, Kinlochbervie, Kinlocheil, Latheron, Lochbroom, Lochinver, Morvern, Nigg, Nigg Station, North Erradale, Poyntzfield, Skeabost Bridge, Staffin, Strathy, Stromeferry, Whiteface.
Moray	Ballindalloch, Mulben
Shetland	Bigton, Bixter, North Roe, Ollaberry
Western Isles	Balallan, Carnan, Gravir, Grogarry, Locheport, Sollas

The end of January 2016 saw the launch of a campaign in Glasgow to encourage residents in the city and its surrounds to adopt fibre-based broadband services. And on 25 January 2016 Digital Scotland said it would be supporting the UK Government's national satellite programme (see above). This is aimed at the small number of premises not covered by the Digital Scotland Superfast Broadband programme or the Community Broadband Scotland initiative (see below) and which are unable to access broadband services of a minimum speed of 2Mbps.

The £410 million Digital Scotland Superfast Broadband programme comprises one project covering the Highlands and Islands area and the other, the Rest of Scotland. The first locations in the Highlands and Islands, in Inverness-shire and Moray, were announced in October 2013. On 9 July 2013, the Scottish Government signed a contract with BT for a £264 million investment in broadband improvements. Together with a £146 million partnership announced in March 2013 to bring faster broadband to the Highlands and Islands and commercial investment plans by the private sector, the project originally aimed to ensure that 85 per cent of Scottish properties have access to fibre broadband by the end of 2015 and around 95 per cent by the end of 2017.

8.2 Digital Highlands and Islands Project update

The overall aim of the Digital Highlands and Islands Project run by Highlands and Islands Enterprise (HIE) is to help meet the broadband targets set out by the European Commission, the UK Government and the Scottish Government. By 2020 HIE wants everyone in the Highlands and Islands to be able to access broadband download speeds of at least 30Mbps.

By 22 September 2016 more than 160 towns and villages were covered by the network. Coverage is expected to extend to around 84 per cent of premises by the end of 2016.

During Summer 2016 a Digital Scotland fibre showcase bus toured the Highlands including Duror, Fort William, Kingussie and Inverness to promote the arrival of high-speed fibre-based broadband for local homes and businesses. The network had reached around 77 per cent of Highland homes and businesses in more than 75 towns and villages. An online checker shows where services are available and lists places where work has started. The bus has also visited Argyll and Bute where coverage has reached around 57 per cent of premises and is expected to extend to more than 80 per cent by the end of 2016.

In April 2016 it was announced that over 122,000 households and businesses across the Highlands and Islands had access to superfast broadband under the project. New street cabinets for premises in Sullom Voe in Shetland, Dores at Loch Ness and Connel in Argyll were among the latest to go live, with 70 per cent of the region's total number of premises able to connect.

On 22 March 2016 the Highlands and Islands Next Generation Broadband Project launched a consultation to extend availability of superfast broadband across the Highlands and Islands of Scotland. This will use clawback funds from BT – the Highlands and Islands Enterprise has received an initial allocation of £2.23 million and intends to reinvest this in further coverage as part of current contracts. The consultation is to confirm areas that do not have next generation access broadband infrastructure delivering at least 30Mbps, or where there are no plans to provide such infrastructure over the next three years.

HIE also delivers the Scottish Government created Community Broadband Scotland (CBS) initiative, launched in early August 2012 with £5 million in funding to help communities least likely to benefit from the Digital Scotland Superfast Broadband scheme. On 14 July 2014 the Scottish Government announced an additional £2.5 million in funding to support digital connectivity across Scotland's hard-to-reach communities bringing total investment in the CBS programme to £7.5 million, extending the CBS programme to at least March 2018.

With five regional advisers CBS offers advice, guidance and significant capital funding (100 per cent of scoping and up to 89 per cent of capital investment cost) for communities willing to own, and in some cases operate assets required to bring better broadband to their residents. CBS can also access additional investment. The Scottish Rural Development Programme (SRDP) broadband grant scheme is a £9 million fund announced in August 2015 that is also being used to support community-led broadband projects. It is being delivered by CBS and is part of the £1.3 billion Scottish Rural Development Programme (SRDP) 2014-2020.

Recent months have seen a series of announcements regarding HIE and CBS- funded projects. Table 7 provides a selection. One key development is that concerning two rural community broadband groups, Southern Uplands Partnership and Broadband for Glencaple and Lowther (B4GAL). CBS has issued an open market review (OMR) to enable the groups to progress with their community broadband project. Southern Uplands Partnership and B4GAL are seeking to secure funding from CBS to bring superfast broadband to rural locations within the Scottish Borders, Dumfries and Galloway and South Lanarkshire.

B4GAL was first established in 2012 and comprises nine rural southern upland villages: Crawford, Crawfordjohn, Elvanfoot, Lamington, Leadhills, Roberton, Wanlockhead and Wiston. The area of Durisdeer is also included as part of the OMR. The Southern Upland Partnership's "Ettrick & Beyond" broadband project was formed in 2013 and is spread over two valley heads at the southernmost part of the 25 mile long Ettrick Valley. Both projects have been set up with the aim to deliver broadband speeds of 30Mbps, or more, to 100 per cent of premises within the project area. The OMR closed on 19 August 2016.
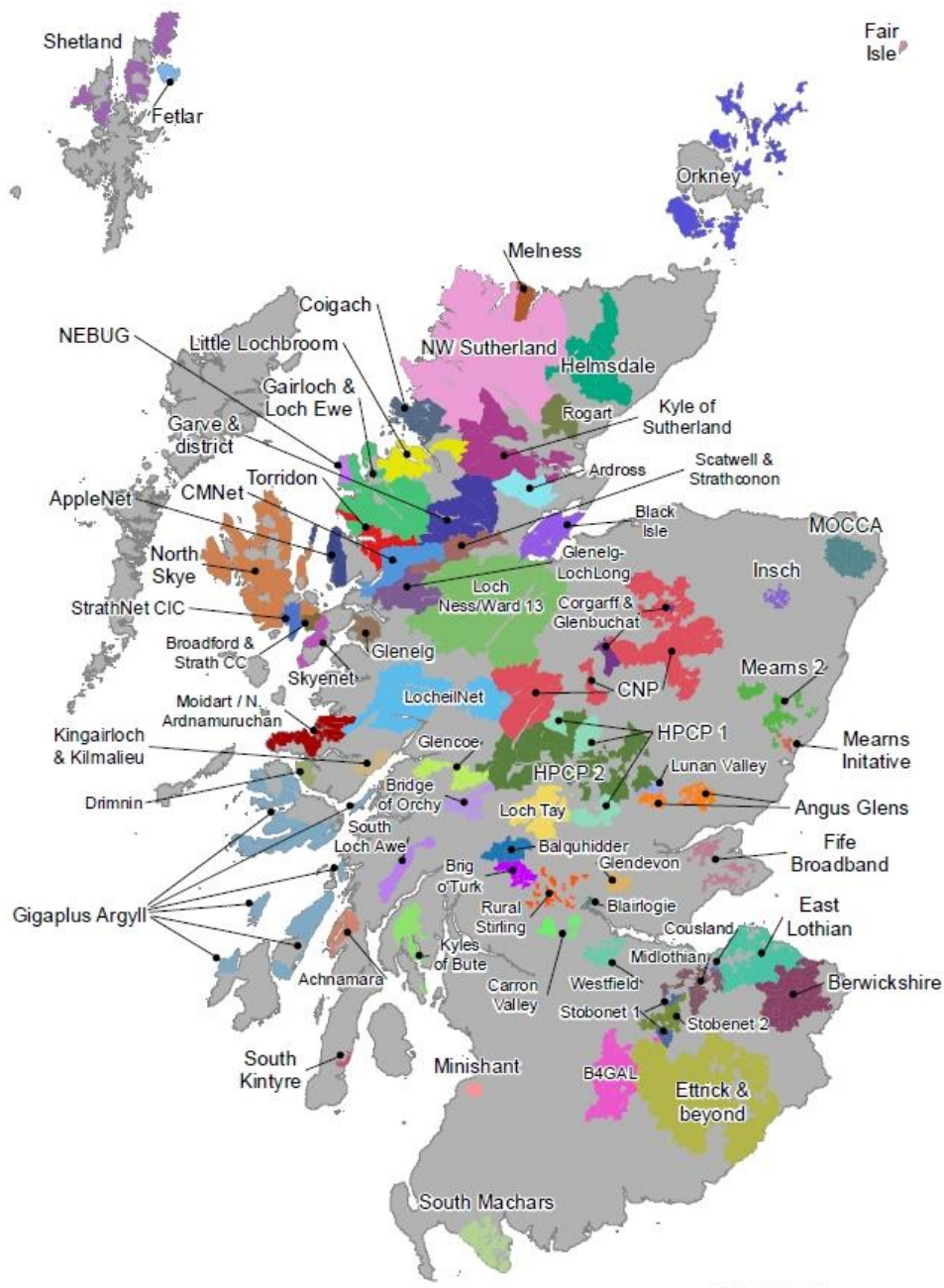
CBS had six community projects as pioneers, representing a diverse range of situations and challenges. Each community has received targeted support from CBS and the learning from these projects has influenced the development of the support CBS offers. Figure 1 shows CBS projects as of September 2016 and Table 8 shows the CBS pioneer projects.

Table 7: HIE and CBS funded projects

Date of details	Project and area	Description
4 March 2016	Connecting villages in remote areas around Fort William.	A community broadband company has doubled its capacity, reaching 270 customers after a second cable connection was installed to meet demand. Not-for-profit Locheilnet CIC, which is run by local volunteers, was set up in October 2012 and received support and funding from various sponsors and £91,500 from CBS. The original aim was connecting 50 households.
23 March 2016	Local communities around Loch Tay in Perthshire covering around 350 people in more than 150 premises.	Telegraph poles have been installed by Loch Tay Internet. CBS provided £109,078 of funding which enabled a contract with AB Internet to build the FWA solution.
7 June 2016	Local group North Skye Broadband (NSB) has been exploring a potential community-led project to deliver superfast broadband.	A State aid consultation has been launched to assess commercials plans for broadband rollout. Postcode areas have been identified. The consultation finished on 8 July 2016.
20 June 2016	Community Initiative North East Fife (CoINEF) was established to address poor connectivity in the areas of North-East Fife.	A State aid consultation was launched on 20 June 2016 and closes on 22nd July 2016. CoINFF is aiming to deliver broadband speeds of 30Mbps or more to 100 per cent of premises within the project area.
22 June 2016	Cairngorm Community Broadband (CCB) confirmed the next steps in building a community broadband project in the area, which it is hoped will connect around 900 premises.	One of the key decisions made was the type of legal entity that will be formed in order to take the community broadband project forward, a necessary step in order for the group to receive funding from CBS. A small working group will now establish the legal entity before a State aid public consultation is issued.
5 July 2016	Mearns Internet Initiative has received additional funding of £30,400 from CBS to extend its marykirk.com fixed wireless broadband network.	More than 80 premises in the Howe of the Mearns area are set to receive an increase in broadband speeds of up to 25Mbps. The already successful marykirk.com project will be able to use funding to connect more customers in the area, which lies in South Aberdeenshire and North Angus.

Figure 1: Map showing Community Broadband Scotland projects, September 2016

Table 8: Community Broadband Scotland six pioneer projects

Project	Description
Ewes Valley (Dumfries and Galloway)	A small rural community at a very early stage in its broadband development plans. Not currently able to receive a standard broadband service due to distance from the serving BT exchange
Tomintoul and Glenlivet (Moray)	Remote, inland mountain communities located within the Moray area of the Cairngorm National Park. Includes the highest village (Tomintoul) in the Highlands. Area remote from many services
Elvanfoot (South Lanarkshire)	A community at an advanced stage in their broadband plans (Elvanfoot) and with scope to provide a service to a neighbouring community. Community has combined with nine other area villages and formed B4GAL - broadband for Glencaple and Lowther. Potential access to funding from area renewable energy projects
Colonsay (Argyll and Bute)	An island with a low population. Active local group has identified improved broadband provision as a key component for supporting development and retaining population
Corgarff and Glenbuchat (Aberdeenshire)	Small dispersed settlements within glens at the edge of the Cairngorms. Area remote from serving BT exchanges with many residents having to rely on a satellite broadband provision
Applecross (Highland)	A remote coastal community with a low population and heavily dependent on tourism. No users are currently able to receive a standard broadband service in excess of 0.5Mbps. No standard broadband service possible along the north coast

8.3 Northern Ireland has 250,000 FTTx subscribers

On 9 May 2016 it was announced that over 250,000 homes and businesses in Northern Ireland were connected to superfast fibre-based broadband. Back in March 2015 BT announced that over 200,000 homes and businesses in Northern Ireland subscribe to its open-access fibre network.

A new campaign has also been launched called 'Life's Easier with Superfast' to raise awareness of the benefits of superfast broadband and to encourage all those who can receive it, to upgrade to the service. The Superfast NI initiative represents all communication providers and is managed by BT, which is leading this latest campaign.

The Northern Ireland Broadband Improvement Project (NIBIP), aimed at providing for the first time, increasing or improving broadband services in certain areas, was completed in March 2016. Work began in February 2014 to enable street cabinets to provide more choice and improved speeds to over 45,000 premises.

The Superfast Extension Programme (SEP) is a scheme to provide improved superfast broadband speeds of more than 24Mbps across Northern Ireland. Work began in January 2016 and will be completed in December 2017. It was announced on 2 March 2015 by then Enterprise, Trade and Investment Minister (DETI), Arlene Foster, as a £17 million project to improve speeds to over 38,000 premises across Northern Ireland, to be delivered by BT. It represents a joint investment of £17 million by DETI, DCMS and BT. DETI and DCMS are contributing £7 million each. BT is putting £3 million towards the project.

In April 2016 BT announced it is working with local property developers, HBH Developments, a joint venture between Hilmark Homes and Blue Horizon Developments, to install FTTP technology in a new 140 unit property development under construction at Harberton BT9 on the Malone Road, Belfast. This is the first time BT has worked with developers in Northern Ireland to ensure property buyers have access to fibre connections as standard in a new residential development.

On the rural front, in June 2015 rural areas in Northern Ireland received a boost with the announcement of a further investment of £1 million to be taken from the Tackling Rural Poverty and Social Isolation (TRPSI) budget to aid expansion of broadband coverage and promote take-up.

8.4 Superfast Cymru covers over 590,000 premises

By early July 2016 Superfast Cymru had provided coverage to over 590,000 premises in Wales which would not otherwise have received a superfast connection. This compares with 500,000 homes and businesses as of 27 December 2015, as announced by the UK Government on 30 December 2015 and 482,000 properties in August 2015. The initiative covers over half of all premises in Wales. It involves deployment of around 3,000 new fibre broadband cabinets and is using a mix of technologies to reach the final few per cent of premises where fibre technologies are not currently planned to be rolled out.

The extension contract to the original Superfast Cymru scheme was announced on 7 July 2015 to provide over 42,000 more premises in business parks and industrial estates with superfast connectivity. The programme will now run until June 2017 in order to cover the additional premises that have been identified since the project began. The expansion is backed by £19 million of funding made up of contributions from DCMS, the EU and BT.

The project is shared between BT and Airband, with the fixed wireless provider winning the Superfast Cymru Infill Project contract to supply superfast broadband to some 2,000 premises. These are premises in business parks and industrial estates which are not part of the Superfast Cymru or commercial rollout.

Two Welsh Government schemes have been expanded to increase the availability of superfast broadband to all homes and businesses across Wales. From 4 January 2016, for a two-year period, the Access Broadband Cymru scheme is available to all premises across Wales which currently do not have a superfast connection. This scheme will fund, or part-fund, the installation costs of new broadband connections for homes and businesses in Wales which deliver a step change in download speeds. The original scheme was announced back in September 2013 based on a £4 million Broadband Support Scheme providing grants of up to £1,000 to those living in rural parts of Wales where broadband connectivity was below 2Mbps. An effectively second Access Broadband Cymru scheme went live on 1 October 2013, also providing grants of up to £1,000 per premises with slow broadband connections.

On the business front, the second scheme is the Ultrafast Connectivity Voucher which is being opened up to businesses across Wales to help them meet initial capital costs involved with installing ultrafast broadband services. The maximum grant available is £10,000. This scheme was previously only available to businesses located in the Enterprise and Local Growth Zones. The first £3,000 of

eligible costs are 100 per cent funded by Welsh Government, between £3,000 and £17,000 is 50 per cent funded, and above £17,000 no additional funding is provided. Both schemes will run from 4 January 2016 until March 2018.

Businesses are also being offered Business Wales workshops taking place across the country, starting in March 2016. And on 22 September 2015 the Welsh Government pledged a further £12.5 million to help businesses across Wales take advantage of superfast broadband, helping them understand, adopt and exploit the superfast infrastructure. The package is being funded by the Welsh Government, local authorities and £7 million from the ERDF, and comes under the Superfast Cymru programme.

BT was awarded the contract for delivery of the Next Generation Broadband for Wales (NGBW) rolled out in 2013 and 2014. The Superfast Cymru programme was extended to all of Wales in 2014 and 2015 with the aim of making the network available to 96 per cent of Welsh premises by spring 2016. Under the £425 million initiative announced on 24 July 2012, public funding of £205 million including £56.9 million from BDUK and £89.5 million from the ERDF is being provided. A take-up target for superfast broadband of 50 per cent by 2024 has also been declared by the Government.