The Superfast South Yorkshire Programme

Digital Connectivity Strategy

September 2019

Executive Summary

Digital Connectivity

Digital Connectivity is the means by which electronic devices and 'things' communicate with each other, with private networks and with the internet. There are 14 billion electronic devices and 'things' connected to the internet today including computers, smart phones, tablets, TVs, smart speakers, wearables, vehicles, traffic signals, smart meters, buildings, data centres, medical equipment, sensors, industrial equipment etc. Digital Connectivity consists of fixed line networks (legacy copper networks and modern full fibre), mobile networks (legacy 4G and modern 5G) and wireless networks (Wi-Fi, Internet of Things Networks).

Our Vision

By 2021 South Yorkshire will be recognised as one of the best connected Regions in the country: where coverage, choice and speed of communication stays ahead of demand; and where connectivity enables residents and businesses to use digital solutions to improve their lives and to sustain, grow and create new business.

Why We Need This Strategy

During the last five years, the South Yorkshire Local Authorities have played a key role in ensuring that businesses and residents are able to access the best digital connectivity services available:

- Coverage of superfast broadband has increased from 80% to over 95% and will reach c99% by 2021;
- The take-up of superfast broadband has increased from 18% to over 45%;
- Business parks in South Yorkshire were amongst the first to access gigabit full fibre broadband;
- Business development programmes have helped businesses to use digital to sustain and grow;
- Voucher schemes have covered 50% of our SMEs digital connection and innovation costs; and,
- Sheffield city centre now benefits from arguably the best public access Wi-Fi network in the country.

However, we cannot afford to stand still. As South Yorkshire develops and grows over the next 3-5 years, there will become an increased demand on high speed, ubiquitous connectivity. The Region must document and share its Vision for Digital Connectivity in order to give residents and businesses confidence that their future connectivity needs will be met. It will help to demonstrate that South Yorkshire is a pro-investment Region that is open for business and to encourage the market to invest here ahead of other less ambitious areas. This strategy will ensure that the Region has the infrastructure in place to meet the following connectivity requirements:

- To enable businesses to be more productive and more competitive, to grow through digitisation;
- To sustain and grow the digital sector, in new and emerging technologies;
- To provide ubiquitous coverage, so that residents, workers and visitors are always connected;
- To facilitate rapid adoption of smart services such as 5G, Internet of Things (IoT), Connected Vehicles;
- To enable public services to be delivered more efficiently, more effectively, and to be accessible online;
- To create jobs, to learn and apply the skills needed for the infrastructure, products and services;
- To meet the demands from an increasing resident population, ensuring sufficient network capacity;
- For smart city solutions that improve energy use, public safety, traffic management and air quality;
- To ensure that no one is excluded from the digital age and the socio-economic benefits of being online;
- To establish a reputation as a 'go to' place for innovators, researchers and investors;
- To gain a competitive advantage from ensuring supply is available ahead of demand; and,
- To meet consumer demand for higher bandwidth for video streaming, gaming, home working.

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1. The Vision

Digital Connectivity

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Our Strategic Themes

SOUTH YORKS

ENABLER
- Inclusion, Skills & Training
- Start Ups
- Smart City

ACCESS
- 100% Superfast Coverage
- Full Fibre Broadband
- Free Internet Access

ASSETS
- Reuse of Public Assets
- Concession Contracts
- Connected Transport

GROWTH
- Business Support
- Full Fibre for Business
- Barrier Busting

INNOVATION
- 5G Ready Region
- Region Wide IoT Network
- IoT Demonstrators

Access for All
Increase coverage and take-up across the whole of the Region

Economic Growth
Business connectivity and support for competitive advantage

Innovation
Adopt the latest technology innovations at an early stage

Exploit Public Assets
Reuse infrastructure to deliver quickly and economically

Enables Wider Benefits
Support and enable digital inclusion, public service transformation and 'smart city' initiatives

2. The Benefits of Digital Connectivity

2.1 Being Economically Competitive

The 2018 Digital Economy and Society Index (DESI) found that, overall, the UK is ranked 7th in the European Union for digital connectivity. However, this assessment is based largely on the use of current generation technology that is fast reaching end of life such as Fibre to the Cabinet (FTTC), Cable Broadband and 4G. The UK is not so well placed where the next generation of digital connectivity is concerned. For example, it is currently ranked 26th for Fibre to the Premise (FTTP). According to broadband comparison website, Think Broadband, coverage of Superfast Broadband in South Yorkshire is 97.02% but coverage of Full Fibre is only 1.5% (https://labs.thinkbroadband.com/local/south-yorkshire).

Analysis commissioned by Ofcom from Dr Pantelis Koutroumpis of Oxford University has proven that investment in broadband has had a positive impact on economic growth, increasing UK GDP by 0.37% pa from 2002 to 2016 (a cumulative increase of 5.3% over the period). Investments in coverage, speed and take-up are each proven to increase economic growth. The Ofcom report establishes an empirical basis for how broadband has impacted on the UK economy and supports a strategy of continuing to encourage broadband investment, improving coverage and speed, and increasing take-up.

Business benefits enabled by digital connectivity include:

- Access to, and use of, products, services and resources that are increasingly digitally enabled;
- Increased efficiency and effectiveness, increasing productivity and reducing costs;
- Growth of existing markets and entry to new global markets;
- Innovation and the creation of new products and services; and,
- Workstyles that attract skilled employees.

South Yorkshire has a thriving and growing creative, digital and tech sector, including: WANdisco, Sumo Digital, Jaywing and Pimoroni. There are over 60 thriving digital and cross-sector collaborative communities, meetups and digital skills initiatives, including: Barnsley TechTown, dotSHF, Smart Sheffield and Sheffield Digital.

The Region is also proactively looking to position itself to respond to the opportunities and challenges that the digitisation agenda presents. One example of this is the Barnsley Digital Campus where working in partnership, Barnsley Council, Barnsley College and Sheffield Hallam University will bring digital skills and learning together with digital business. The campus also provides a framework for digital innovation through the provision of maker and demonstrator spaces.

Digital industry is growing faster in Sheffield than any other sector, creating new jobs and new wealth for the Region. The 2018 Tech Nation Report described the growth in digital industry and jobs in Sheffield. Sheffield's tech industry turnover grew by £82m in 2016-17 to £745m, an increase of more 12% - the largest increase of all major UK cities. For this to continue, the supply of full fibre, 5G and other forms of digital connectivity must remain ahead of demand. A Region that is responsive to advances in digital connectivity technology will retain and grow its digital sector and the other sectors of its economy that are increasingly dependent on connectivity and technology for their competitive advantage.

Digital connectivity also drives growth through innovation and the development of new products and services, many of which are inconceivable at the time that next advance in technology is first deployed. A connected Region can support testbeds, trials and collaborations between public, private and academic partners to further drive innovation and growth. It enables South Yorkshire to become a more digitally enabled and interactable Region to drive new kinds of business and relationships with consumers.

The Government's Future Telecoms Infrastructure Review supports this, stating that "it is important that network supply stays ahead of demand, otherwise it risks becoming a constraint on the potential for future innovation, productivity and growth."

Analysis commissioned by the National Infrastructure Commission (NIC) from Frontier Economics has estimated that the benefits of full fibre to consumers from being able to access new innovative services (Premium Audio Visual, Virtual and Augmented Reality and Smart Home) and from cost savings in the delivery of public services (Telehealthcare, Online Classrooms and 5G) could reach £33.3Bn by 2050. This analysis makes no allowance for wider economic benefits associated with productivity improvements, greater scope for innovation, enhanced labour force participation, or 'externality' impacts related to improved health, wellbeing, inclusion or environmental benefits.

Analysis commissioned by City Fibre based on a wide range of national and international research and evidence does account for these wider impacts and has predicted that the total economic impact of deploying full fibre broadband networks in South Yorkshire, when combined with investment in smart city technologies, IoT, 5G mobile networks and new telehealth technologies, could be as high as £2.771Bn over 15 years. These potential benefits are summarised in the following table.

Economic Benefit	(£m)
Direct Impacts	99
Up to 150 jobs created in construction, civil engineering & the professional services associated with network construction in each local authority area.	
Productivity	78
Business processes based on faster upload & download speeds, uncontended services, ultra-low latency, superior resilience & reliability.	
Innovation	77
Develop new & richer products & services, access new markets across the globe, innovate in collaboration with international online communities.	
Business Start-Ups	92
Starting a business is easier & less expensive, powerful cloud based solutions are accessible on subscription, businesses are leaner & more productive, flexibility supports their sustainability.	
Worker Flexibility	82
New working practices, access to a wider labour pool, lower premises overheads, work-life balance improves motivation/productivity, reduced barriers to work for carers, single parents etc.	
Housing Wealth	244
Digital connectivity is a priority feature for an increasing number of home buyers, gigabit connectivity has increased house prices by 4% in the United States.	
Health	49
New forms of outreach, person centred care, remote diagnosis, prevention & patient monitoring through e-patient records, apps, wearable devices, telehealth & assistive living technologies.	
5G	1,326
The features of 5G mobile communication will create new business models, products & services that increase growth in transport & logistics, finance, health & social care, manufacturing & retail.	
Smart Cities	244
Enable the roll-out of connected & interactive technologies & data to make a wide range of services & urban infrastructures better adapted to user needs & more efficient.	
Industry 4.0 / IoT	480
Industry 4.0 & IoT (industrial robots, networked machinery, data simulation, 3D printing, big data & analytics, augmented reality etc.) will revolutionise manufacturing & drive economic growth.	
Total	**2,771**

2.2 Enjoying a Better Quality of Life

Digital connectivity improves our quality of life. If the people of South Yorkshire understand the benefits of the internet for them personally and if they have the skills and the means to get online; then they will be happier, healthier and better off financially. The socio-economic benefits of being online include:

- The ability to access public services which are increasingly available online;
- Improved education outcomes through the use of web-based learning materials;
- Better employability through more effective job hunting and the ability to work remotely;
- Improved health and well-being through remote health monitoring, better communications and access to health services;
- Reduced isolation as access to the internet can help improve communication and social engagement;
- Access to streaming services which are increasingly replacing physical methods of distributing recreational content such as TV, movies and music;
- Access to savings and discounts offered through online shopping; and,
- More opportunities to interact with new digital services and experiences in the environment, both urban and rural.

South Yorkshire has an ambition to be recognised as a leading digitally inclusive Region where everyone who wants to be online is able to benefit from the advantages of the digital world. The South Yorkshire Local Authorities will continue to work with their partners to reduce digital exclusion.

The potential socio-economic impact of improved digital skills and digital connectivity in South Yorkshire is huge. Sheffield City Region is the 7th most deprived of the 39 Local Enterprise Partnership geographies according to the 2015 English Index of Multiple Deprivation. The following table shows how the City Region ranks across a range of measures.

Sheffield City Region Area: Rank of Average Score (1 is Most Deprived, 326 is Least Deprived)

Index of Multiple Deprivation	Income	Employment	Education, Skills, Training	Health Deprivation & Disability	Crime	Barriers To Housing & Services	Living Environment	Income Deprivation Affecting Children Index	Income Deprivation Affecting Older People
7	8	6	2	6	8	34	27	9	8

Those who would benefit the most from being online are precisely those who are digitally excluded. The following table, based on the 2017 Good Things Foundation Digital Nation Report, compares characteristics of the digitally excluded to corresponding quality of life benefits experienced by regular internet users.

Characteristics of Non Users	Benefits Experienced by Regular Users
90% are disadvantaged in some way	74% use public service web sites
39% are older than 75	66% feel happier & 51% less isolated due to more social contact
78% left school before the age of 16	90% progress to further learning
50% are in social class DE	52% are more confident managing money
48% are chronically ill or disabled	67% feel more confident managing their health
45% earn less than £11.5k	£516 to £744 saved each year
19% are unemployed	64% find paid or voluntary work, or look for work

The impact of improved digital skills and connectivity in South Yorkshire will be felt most by the Region's 'digitally excluded'. For example:

Financial Impact

Universal Credit is a single monthly payment for people on a low income or who are out of work that replaces six 'legacy' benefits and tax credits. In most cases, Universal Credit should be applied for online, so new claimants will need digital skills and connectivity. However, in a 2019 survey, 50% of organisations involved in delivering Universal Credit in Sheffield reported that the supply of online access is not enough to meet current and/or future demand. This places up to 8,400 people in Sheffield currently claiming the out of work benefits covered by Universal Credit at financial risk (Nomis Jan 2019).

Health Impact

In Sheffield in 2014-15 almost 100,000 days were lost to work-related stress, depression or anxiety. Currently 1 in 3 people of working age have a long-term health condition. By 2030, on current trends, 40% of working age people will be affected by poor health. The distribution of this barrier is not equal, with the poorest populations of the City having a 60% higher level of long term conditions. Digital skills and connectivity can help those affected by physical or mental health conditions to access health and social care services and to manage their own conditions, to keep socially active with friends and relatives, to feel better faster and to return to work sooner.

The impact of improved connectivity in South Yorkshire will also be felt by those who have long since embraced the benefits of internet access. Full fibre and 5G networks offer far faster, far more reliable, far more responsive connectivity than superfast fibre to the cabinet networks. This technology is required to meet the demands of greater bandwidth for consumer services. For example:

Video on Demand

Video on Demand is a massive growth area in the US and the UK. High Definition content streams at 8Mbps and 4k Ultra High Definition content streams at 32 Mbps which exceeds the UK definition of Superfast Broadband. Also where 4G connections tend to offer download speeds of around 20Mbps (which is fast enough to download a HD movie in 30 minutes), 5G is expected to surpass that by orders or magnitude: 500 to 1,500 Mbps (fast enough to download the same film in 25 seconds).

Traffic Growth and Future Proofing

Domestic internet traffic will continue to grow in the future as multiple family members use increasing numbers of internet services in their daily lives. For example, on line gaming in high definition; streaming of music, video and catch up TV; voice calling, video calling, wearables, smart speakers and other connected devices combine to create ever increasing demands on bandwidth.

In a 2018 study for Ofcom, WIK Consult assessed the applications that require ultrafast broadband and how demand for bandwidth might evolve in the years to 2025. WIK found that high definition video, consumer cloud traffic, gaming, 'tactile internet' (e.g. remote diagnostics and autonomous driving) and 'immersive media' (e.g. virtual and augmented reality) would drive the demand for greater bandwidth. WIK found that up to 40% of UK households could demand at least 1Gbps download speeds and 600Mbps upload speeds by 2025. Under a less aggressive scenario, WIK estimated that 8% of households would require Gigabit bandwidth by 2025, and that more than 50% would require download speeds of at least 300Mbps.

2.3 Delivering Better Public Services

Digital Connectivity enables public services to be delivered in ways that are increasingly more innovative, more effective and more efficient. It enables public services to be targeted and to be tailored to the needs of individuals. Digital Connectivity also enables these new personalised public services to be accessed electronically, rather than in person or through a telephone contact centre.

The benefits of electronic public service delivery are described below:

- Enables the public sector to deliver services electronically to the public who are then able to access them 'any time, any place, anywhere';
- Delivering access to public sector services electronically online is often more efficient than delivering them through face-to-face or telephone contact centre channels. The 2016 LGA 'Engaging Citizens Online' report estimated the initial costs per transaction of face-to-face contact at £8.21, £2.59 for a telephone contact and £0.09 for an online transaction;
- Enables the public sector to improve its business processes, to take advantage of digital products and services to improve efficiency and effectiveness, to innovate and be responsive to changes in demand;
- Enables the public sector to reduce costs by using lower cost cloud based services rather than more expensive on premise alternatives;
- Enables the public sector to share information, to deliver joined up services, and to implement alternative organisational models such as shared services;
- Enables the delivery of other organisational strategies. For example: public service transformation; education and skills; and, economic development; and,
- Enables the public sector to use modern ways of working which offer employees better work/life balance, helps attract new recruits, and helps retain skilled and experienced employees.

Local Authority Transformation

The South Yorkshire Local Authorities are equipping Council Departments with the technology, skills and tools required to deliver consistent, flexible and responsive public services. We put customers at the centre of service design; we will make it easier for customers to contact, access and receive services whenever and however they prefer to.

The Local Authorities want to ensure that when customers contact them, they can get what they need in that first point of contact, or in as few as possible, and that the Councils keeps them regularly updated along the way. The Local Authorities also want to support customers to do more general tasks online.

Local Authority transformation programmes will develop modern, flexible, responsive and digitally enabled services based on the needs of customers. Using service and customer insight they will identify new and exciting ways of working and deliver the tools needed to be more modern and customer focussed organisations. The following table illustrates customer's preferred ways of accessing Local Authority services (taken from a recent Sheffield City Council survey).

Access Method	How Do Customers Access Services Now?	How Do They Want To Access Services In The Future?
On Line	22%	58%
eMail	25%	15%
'Phone	43%	20%
Face To Face	1%	5%
Paper Forms & Post	20%	2%

A Long Term Plan for the National Health Service

The NHS Long Term Plan, published in January 2019, describes how the NHS will become fit for the future and how it will get the most value for patients from its limited funding. The plan describes how technology will play a central role in realising the Long Term Plan, helping clinicians use the full range of their skills, reducing bureaucracy, stimulating research and enabling service transformation.

The NHS will establish a wide-ranging and funded programme to upgrade technology and digitally enabled care across the NHS. Over the next 10 years, this programme will result in an NHS:

- Where digital access to services is widespread;
- Where patients and their carers can better manage their health and condition;
- Where clinicians can access and interact with patient records and care plans wherever they are, with ready access to decision support and AI, and without the administrative hassle of today;
- Where predictive techniques support local Integrated Care Systems to plan and optimise care for their populations; and,
- Where secure linked clinical, genomic and other data support new medical breakthroughs and consistent quality of care.

The Emergency Services Network

The Emergency Services Network (ESN) is a critical communications system that will replace the current Airwave service used by the emergency services.

The ESN will be used by the police, fire and rescue, and ambulance services as well as a range of other users stretching from local authorities and utility services to first responders like inshore rescue. There are potentially around 300,000 individuals who will depend on ESN, using handheld devices or operating equipment in 50,000 vehicles, 115 aircraft and 200 control rooms.

The ESN software is being provided by Motorola Solutions and the infrastructure is being built by EE; who will upgrade and extend its existing 4G network. Around 500 new sites will be built, 300 in the most rural areas of the country. The new sites can be shared with other mobile network operators in order to maximise coverage for both the emergency services and to bring much commercial coverage to unserved areas.

3. Aims and Objectives

3.1 Deliver Access to Superfast Broadband for 100% of South Yorkshire

Superfast Broadband is a broadband connection able to download data at speeds of 30Mbps or above. Superfast Broadband can be provided using a range of different technologies including Fibre to the Cabinet, Fibre to the Premise, Cable and Wireless. A single superfast connection can support multiple computers, tablets, games consoles, and phones, meaning more people can be online at the same time. By 2021, we want every business and every resident in South Yorkshire to be able to access broadband services that offer speeds of 30Mbps and above.

The Current Position

In 2014 Superfast Broadband (30Mbps) reached only 80% of premises in South Yorkshire. The broadband providers in the UK had no plans to extend their networks, so the Barnsley, Doncaster, Rotherham and Sheffield Local Authorities formed the Superfast South Yorkshire Programme. Collectively, the South Yorkshire Authorities applied for funding to Central Government and to Sheffield City Region. They secured £15m and established a project to extend connectivity to c100,000 residential and commercial premises across the Region through an almost entirely Fibre to the Cabinet (FTTC) infrastructure.

The Superfast South Yorkshire Programme has long recognised that Fibre to the Cabinet infrastructure has limited capacity and is incapable of meeting future demands for speed, bandwidth and reliability. Therefore, it has targeted public sector investment at Fibre to the Premise infrastructure (FTTP) since 2016. Fibre to the Premise is the gold standard for residential and business telecommunications; therefore our longer term ambition is for 100% of the Region to have access to Fibre to the Premise Gigabit Broadband.

In 2018, The South Yorkshire Local Authorities invested a further £4m to connect up to 10,000 premises that are currently unable to access superfast broadband with an almost entirely Fibre To The Premise infrastructure. This will extend coverage of Superfast, Ultrafast or Gigabit broadband to almost 99% of South Yorkshire by 2021.

How We Will Do It

01: Further Investment in the Superfast South Yorkshire Programme [Medium Term]

The South Yorkshire Local Authorities will continue to seek further investment in the Superfast South Yorkshire Programme. Additional public funding, together with further commercial investment, will extend coverage from 99% to 100% of the Region.

3.2 Deliver Access to Full Fibre at Every Major Business Location

Full Fibre Broadband connections provide the fastest and the most reliable speeds available, capable of transferring data at 1,000Mbps and above. Full Fibre Broadband is delivered by Fibre to the Premise technology – a glass fibre connection directly from the exchange to the home or business, an infrastructure that has a lifetime of many decades. South Yorkshire has very little coverage of full fibre at the moment. However, a number of infrastructure providers have recently announced plans to increase coverage and in 2018 the Government set a target for national coverage by 2033. We believe that access to full fibre is essential for our future economic success. Therefore, our second objective is that by 2021 it is possible to access gigabit fibre broadband at every Major Growth Area, Major Business Park and Business District in the Region.

In March 2016, £5m of Central Government and Sheffield City Region funding was invested to bring speeds of 100Mbps and above to South Yorkshire Enterprise Zones and key Business Parks through Fibre to the Premise infrastructure.

In March 2018 the Government launched a Gigabit Voucher scheme to help businesses (or clusters of businesses) to buy gigabit-capable connectivity. It is anticipated that this demand will encourage operators to invest in new infrastructure to extend their coverage in the Region. By March 2019, 177 Gigabit Vouchers had been issued in South Yorkshire with a further 80 in the pipeline, attracting a total of £577k government funding into the Region.

How We Will Do It

02: Connection Vouchers [Short Term]

The South Yorkshire Local Authorities will promote Government Voucher Schemes that subsidise the costs of full fibre connectivity. We will aggregate and communicate demand from businesses to digital infrastructure providers who will extend their coverage to meet this need.

3.3 Digitally Connected Public and Private Transport Networks

A digitally connected transport network offers many benefits. It enables commuters to access personal and business networks on their commute to and from work, and during their working day as they move around the Region. It enables commuters to access up-to-date information about the performance of the public transport system and the travel choices that they have - regardless of whether they are at home planning a journey or at a bus stop, tram stop or train station. It ensures that public transport is a safe place to be, that it has the connectivity needed for lighting, CCTV monitoring and for calling the emergency services. It enables Connected and Autonomous Vehicles to traverse the Region's roads. It enables the highway network to be managed more efficiently and effectively; improving road safety, managing traffic flows, minimising congestion, reducing pollution and improving air quality.

The Current Position

A range of improvements to the Regions transport network are planned for the next three years, many of which are dependent upon 5G, wireless or full fibre connectivity. Projects include the Clean Air Zone (a £50m system that charges owners of the most polluting vehicles to enter Sheffield City Centre) and an Internet of Things Programme to be implemented by Amey LG. Initially this will see sensors installed in litter bins, grit bins and drainage gullies. The Programme also has the potential to improve the maintenance of: roads; pavements; street lights; street signs; traffic signals; street furniture; grass verges; bridges and highway structures; waste collection; and, the gritting of roads and pavements.

The South Yorkshire Local Authorities must also now plan for the introduction of electrical vehicle charging; for connected and autonomous vehicles; and for the implementation of the Sheffield City Region Transport Strategy 2018-2040.

03: The Transport Network Digital Connectivity Plan [Medium Term]

The South Yorkshire Local Authorities will define the digital connectivity requirements of all of their major transport initiatives in order to ensure that these needs are met in the most efficient and effective manner, and that opportunities to add value, reduce cost, disruption and environmental impact are seized.

3.4 Stimulate Demand and Encourage Innovation

Extending coverage of digital connectivity will not in itself achieve the economic and social benefits that we want to realise. We must be proactive in stimulating demand and in encouraging citizens and businesses to use superfast, ultrafast and gigabit broadband as well as 5G and wireless networks such as Wi-Fi and IoT. Our fourth objective is to stimulate demand and encourage innovation amongst residential and business users.

The Current Position

In 2015, the Superfast South Yorkshire Programme developed a Demand Stimulation Strategy and obtained £1m funding from the South Yorkshire Local Authorities and from the European Regional Development Fund (ERDF) for its implementation.

In 2017 The Digital Growth Programme was launched which supported businesses to adopt new technology enabled by superfast broadband. It provided inspirational presentations from companies such as Rolls Royce, it raised awareness of the 'art of the possible', and it provided practical sessions to help local businesses put in place plans to implement what they had seen. 112 South Yorkshire SMEs each received over 12 hours of support from the Digital Growth Programme.

In 2015 the South Yorkshire Local Authorities joined the government funded Connection Voucher Scheme. This 6 month programme offered grants of up to £3,000 to cover the installation costs of connecting to superfast or ultrafast broadband. 750 South Yorkshire businesses took advantage of the scheme, attracting over £1m government funding into the Region, with many of the superfast or ultrafast broadband connections being provided by local suppliers.

In 2017 the Superfast South Yorkshire Programme established its own ERDF funded Connection and Innovation Voucher Scheme. The vouchers covered 50% of a business's connection costs up to £2,500 and 50% of a business's ICT enabled innovation costs up to £12,500. Over 150 South Yorkshire businesses took advantage of the scheme, attracting £1.2m government funding into the Region.

In March 2018, DCMS launched a national Gigabit Broadband Voucher Scheme. This offers vouchers worth up to £2,500 to support the capital costs of new gigabit capable connections for businesses in the Region. By March 2019, 177 Gigabit Vouchers had been issued in South Yorkshire with a further 80 in the pipeline, attracting a total of £577k government funding into the Region.

Take-up of Superfast Broadband was 18% in 2015. In January 2018 take-up in the Intervention Area (the coverage funded by the SFSY Programme) had reached 26%, by June 2019 it had reached 45%, and by 2021 it is expected to reach 50%.

04: Business Support Programme [Short Term]

The South Yorkshire Local Authorities will continue to stimulate demand and encourage innovation through the Superfast South Yorkshire Programme, and to bid for additional funding for business support. Each Local Authority will continue to provide targeted support to start-ups and SMEs with growth potential. This will include explaining how technology and connectivity can improve productivity - regardless of the size, nature or IT maturity of the business. Business Support is also available from the Sheffield City Region Growth Hub.

05: An Accessible Innovation Test Bed [Medium Term]

The digital connectivity infrastructure to be established through this strategy represents an 'innovation platform' that can act as a testbed for research and development and for the development of new products and services; accessible by the universities, technology start-up incubators, and the Region's broader digital eco-system. The 'innovation platform' could potentially be used by National Partners such as the Connected Places Catapult and the DCMS 5G Test Beds and Trials Programme.

3.5 Exploit Publicly Owned Assets and Infrastructure

The South Yorkshire Local Authorities own thousands of assets including street light columns, CCTV columns, underground duct, administrative buildings and social housing. Our fifth objective is to exploit publicly owned assets and infrastructure in order to improve the supply of full fibre and 5G telecommunications services and to foster innovation and growth.

The Current Position

In November 2017, Sheffield City Council entered into a concession contract that offered exclusive use of its city centre assets to a telecommunications company in exchange for a rental income, profit share and the provision of a free of charge public access Wi-Fi network. The rental income and profit share helps the Council to fund its digital activities. The free of charge public access Wi-Fi network makes the city centre a more vibrant and attractive places for citizens, visitors, businesses and shoppers. This will increase footfall and help local businesses thrive and grow.

Barnsley, Doncaster and Rotherham have similar aspirations and hope to provide free of charge internet access through future concessionary projects.

All of the South Yorkshire Local Authorities will make their assets available for reuse to help deliver the aims and objectives described in this Digital Connectivity Strategy. Potential applications include the use of council owned duct to extend full fibre networks, the use of council owned street assets to mount small cell radios for 5G, and the use of council rooftops to host Radio Gateways for IoT networks. Council assets could also be used by tech and digital industry to innovate, develop new products and services, and to get to market quickly.

06: Asset Register [Medium Term]

The South Yorkshire Local Authorities will establish a Region wide inventory of publicly owned assets, ensuring that data such as location and condition is accurate and well maintained. The asset register will be used to support the delivery of the Digital Connectivity Strategy, and to stimulate further innovation through the reuse of public sector assets.

07: Single Point of Contact [Short Term]

The South Yorkshire Local Authorities will make it easier for digital infrastructure providers and the technology and digital industries to reuse public sector assets where this delivers the Digital Connectivity Strategy or stimulates further innovation. We have established a network of Digital Infrastructure Champions responsible for granting access to assets and infrastructure to support the rollout of full fibre and mobile networks throughout South Yorkshire.

08: Maintain and Extend the Infrastructure [Long Term]

The South Yorkshire Local Authorities will adopt a 'dig once' approach so that publicly owned duct is laid under highways whenever there is a major development in the Region. The duct can then be used by the Local Authorities to provide connectivity for traffic signals, ANPR cameras, CCTV etc. The new duct increases the assets available for reuse by partners and the private sector to extend and improve digital connectivity in the Region. Private sector partners will also be invited to lay their own duct during these developments.

3.6 A 5G-Ready Region

This objective is to stimulate market development and deployment of 5G technology and infrastructure in South Yorkshire. This will create new opportunities for businesses, developing capability and skills, and encouraging inward investment; and it will ensure that the Region secures an 'early mover advantage' in the investment and development of capability and skills as future 5G products, services and applications evolve.

The Current Position

It is understood that the Mobile Network Operators plan to upgrade their existing 4G cellular infrastructure to meet the short to medium term demands of 5G, but do not plan to invest in the infrastructure required for longer term, higher levels of demand, known as 'densification'.

The South Yorkshire Local Authorities collectively own thousands of assets including street light columns, CCTV columns, underground duct, administrative buildings and social housing. These assets could be used by a telecommunications company to provide, ahead of demand, a wholesale 5G network ready for densification.

A densified 5G infrastructure (assumed to be based on a fibre to the street light, fibre to the small cell solution) is most appropriately provided on a shared basis, thus enabling choice and completion of 5G services to the customer, and minimising the amount of civil construction, disruption and environmental impact of each MNO implementing its own competing small cell network.

09: 5G Ready South Yorkshire [Medium Term]

Sheffield City Council will procure a concession contract (or other appropriate form of agreement) that will offer use of city assets for small cell networks in exchange for a rental income and the creation of an open access fully managed densified 5G infrastructure. Sheffield City Council will collaborate with its South Yorkshire Local Authority Partners to ensure that if possible, their assets are included in scope of the contract and that the preferred supplier is also able to extend its 5G infrastructure into Barnsley, Doncaster and Rotherham should it wish to do so. By ensuring that the 5G network supply stays ahead of demand, South Yorkshire will be well placed to respond quickly to the opportunities it will present for future innovation, productivity and growth.

3.7 An Industry Recognised, Pro-Investment, Barrier Busting Region

This objective is to ensure that South Yorkshire is recognised by the telecommunications industry as an attractive place to invest, where the Local Authorities proactively support operators and remove barriers to the deployment of infrastructure.

The Current Position

The South Yorkshire Local Authorities have long recognised that digital communications infrastructure is vitally important for social and economic well-being. The current levels of fixed line, mobile and wireless coverage could not have been achieved without the support of council services such as planning, highways and property. Some of our processes are recognised as industry best practice and are quoted in government publications. For example, The Yorkshire & Humber Common Permit Scheme (YHCPS) which minimises delay and reduces disruption to road users from street works. However, we do not receive the recognition that we deserve; that would enhance the Region's reputation, attract suppliers to South Yorkshire, and ensure that collectively we gain competitive advantage from being an early adopter of new technology.

How We Will Do It

10: Planning Policy [Short Term]

The South Yorkshire Local Authorities will seek to introduce policies that require developers to provide full fibre access at new sites (superfast only if it can demonstrate that full fibre is not feasible). This will mean that the gaps in commercial coverage do not grow in size, and that additional public funding is not required to help fill those gaps. Developers will be asked to consider installing multiple full fibre suppliers in order to provide choice and competition.

11: Barrier Busting [Short Term]

The South Yorkshire Local Authorities will publish a Digital Connectivity Charter. This will describe how we will adopt a pro-investment, barrier busting approach to wayleaves, planning and highways to provide the conditions required by network operators to install full fibre, 5G and other telecommunications infrastructure efficiently and effectively. It will describe how the local authorities will establish and maintain relationships with the market, and how they will manage and govern digital connectivity internally.

3.8 A Region-Wide Internet of Things Network

Our eighth objective is to establish a Region-wide, open access IoT network that supports all major long range wireless communication protocols. The South Yorkshire Local Authorities own administrative buildings and social housing that are ideal locations for IoT radio gateways.

<u>The Current Position</u>

By 2020 it is estimated that there will be 13 billion things in the home, 3.5 billion things in vehicles, 411 million wearable things, 646 million things in the hospital and 9.7 million other things in the city connected to the internet. A Region-wide, technology agnostic and open access IoT communications network is required to provide connectivity and backhaul for South Yorkshire.

This is not just about meeting current and future demand, it is also about gaining competitive advantage for the Region, its businesses and its citizens as 66% of early movers in manufacturing say IoT is critical to competitive advantage, 88% report a return in investment, and 77% of leaders say that IoT will transform business as we know it.

<u>How We Will Do It</u>

12: A Region Wide IoT Network [Medium Term]

Sheffield City Council will procure a concession contract (or other appropriate form of agreement) that will offer use of council owned buildings for IoT radio gateways in exchange for a rental income and the creation of an open access fully managed IoT infrastructure. Sheffield City Council will collaborate with its South Yorkshire Local Authority Partners to ensure that if possible, their assets are included in scope of the contract and that the preferred supplier is also able to extend its IoT infrastructure into Barnsley, Doncaster and Rotherham should it wish to do so. By ensuring that IoT networks are in place ahead of demand, South Yorkshire will be well placed to respond quickly to the opportunities that IoT presents for future innovation, productivity and growth.

13: IoT Demonstrators [Long Term]

The South Yorkshire Local Authorities will fund IoT demonstrators and proof of concept projects that illustrate the art of the possible and that can then be deployed further by the private sector to improve productivity, and by the public sector to improve efficiency and effectiveness.

3.9 Free Internet Access

We live in an increasingly digital world where many people are already benefitting from the internet, digital TV and mobile communications. City Regions are some of the most digitally advanced, digitally driven places on the planet. This creates a huge range of business and social opportunities with rapidly changing products, services and ideas. It also offers further opportunities to learn, save money and keep in touch. When individuals are digitally active it can improve the accessibility of services and support to people who find themselves physically and emotionally isolated, whilst also providing employment opportunities both in digital careers and other industries that make use of digital technology.

The South Yorkshire Local Authorities are committed to tackling inequalities by supporting those with the greatest needs and helping and enabling people to achieve their full potential. We all recognise that affordable safe access to the internet and the ability to use it can save people money and increase their ability to search for and apply for work, develop skills and access the services they need.

Therefore this objective is to regard access to the internet as a human right, and to provide free of charge internet access wherever we can – in our public buildings, in our open spaces and in our social housing, so that those who wish to access the internet are able to do so (we recognise, and respect, that some people choose not to be digitally connected).

The Current Position

In 1856 Sheffield Public Library opened its doors for the first time, offering the public free of charge access to a selection of newspapers and books. 163 years later and the citizens of Sheffield are still visiting their local libraries in order to access information and services that they would otherwise not be able to, not just through printed media, but increasingly electronically.

The South Yorkshire Local Authorities currently provide free of charge access to computing devices and to the internet at libraries, first stop shops, outdoor spaces and public buildings.

However, we want to go beyond this and to provide free of charge internet access in public buildings, in more outdoor areas, and in the homes of our social housing tenants. This will help to bring the internet closer to the 20% of the overall population, and 40% of social housing tenants, that are digitally excluded.

How We Will Do It

14: Free Wi-Fi Service - Phase 2 [Medium Term]

Sheffield City Council will procure a concession contract (or other appropriate form of agreement) that will offer use of council owned street lights, CCTV columns and buildings for the provision of residential and commercial Wi-Fi services in exchange for a rental income and a free of charge public access Wi-Fi service. Phase 2 is expected to cover outdoor spaces and non-residential public buildings in densely populated areas of Sheffield outside the city centre. Sheffield City Council will collaborate with its South Yorkshire Local Authority Partners to ensure that if possible, their assets are included in scope of the contract and that the preferred supplier is also able to extend its Wi-Fi infrastructure into Barnsley, Doncaster and Rotherham should it wish to do so.

15: Free of Charge Basic Internet Access in Social Housing [Medium Term]

The South Yorkshire Local Authorities will attempt to find a way of providing social housing tenants with basic internet access that is free of charge to the tenant and free of charge to the Councils. The Local Authorities will investigate whether it is possible for a digital infrastructure provider to offset the costs of providing a basic free of charge service through the profit generated by sales of paid for services to those tenants able to afford a commercial service. If it is not possible to find a way of providing basic internet access that is free of charge, then we will try to find a way of providing internet access at a reduced cost.

4. Digital Connectivity Strategy: Summary of Activity

Strategic Objective and Activity	Phasing (Months)	Lead Organisation
1. Deliver Access to Superfast Broadband for 100% of South Yorkshire		
01: Further Investment in the Superfast South Yorkshire Programme	*M: 10-18*	*SFSY*
2. Deliver Access to Full Fibre at Every Major Business Location		
02: Connection Vouchers	*S: 6-10*	*SFSY*
3. Digitally Connected Public and Private Transport Networks		
03: The Transport Network Digital Connectivity Plan	*M: 10-18*	*SY LAs*
4. Stimulate Demand and Encourage Innovation		
04: Business Support Programme	*S: 6-10*	*SFSY, SCR, SY LAs*
05: An Accessible Innovation Test Bed	*M: 10-18*	*SCC, SY LAs*
5. Exploit Publicly Owned Assets and Infrastructure		
06: Asset Register	*M: 10-18*	*SY LAs*
07: Single Point of Contact	*S: 6-10*	*SY LAs*
08: Maintain and Extend the Infrastructure	*L: 18 Plus*	*SY LAs*
6. A 5G-Ready Region		
09: 5G Ready South Yorkshire	*M: 10-18*	*SCC*
7. An Industry Recognised, Pro-Investment, Barrier Busting Region		
10: Planning Policy	*S: 6-10*	*SY LAs*
11: Barrier Busting	*S: 6-10*	*SY LAs*
8. A Region-Wide Internet of Things Network		
12: A Region Wide IoT Network	*M: 10-18*	*SCC*
13: IoT Demonstrators	*L: 18 Plus*	*SY LAs*
9. Free Internet Access		
14: Free Wi-Fi Service - Phase 2	*M: 10-18*	*SCC*
15: Free of Charge Basic Internet Access in Social Housing	*M: 10-18*	*SY LAs*

This strategy describes a range of activities and projects that the South Yorkshire Local Authorities plan to implement in order to deliver their objectives for digital connectivity. These activities and projects will be developed in greater detail in the months ahead. We will take account of developments in technology and changes in market conditions as we progress.

5. Our Strategic Approach

5.1 Our Strategic Approach To Funding

Following almost a decade of austerity and year on year reductions in central government funding, combined with rising pressures for both children's and adult's social care; the South Yorkshire Local Authorities' ability to fund digital connectivity from its core budgets is limited. Therefore, we will find alternative sources of funding to deliver our objectives. This includes:

- Concession contracts (or other appropriate forms of agreement) that will offer use of council owned assets in exchange for a rental income and some form of digital connectivity service;
- Applications for funding from Government, Sheffield City Region and other external sources; and,
- Publicising and promoting our strengths and achievements because an enhanced profile and reputation based on world class digital connectivity will help attract business and inward investment to the Region.

5.2 Our Strategic Approach To Working With The Private Sector

The South Yorkshire Local Authorities will work with digital infrastructure providers, and residential/commercial developers, to establish and maintain a shared understanding of one another's plans, ensuring that public sector interventions complement those of the private sector.

In addition, we will adopt a pro investment, barrier busting approach to wayleaves, planning and highways to provide the conditions required by network operators to install full fibre, 5G and other telecommunications infrastructure efficiently and effectively in the Region.

5.3 Our Strategic Approach To Working With Partners

The majority of our achievements to date have been delivered in partnership through the Superfast South Yorkshire programme. The South Yorkshire Local Authorities will continue to collaborate in this way where this helps to deliver our strategic objectives.

The purpose of the Digital Connectivity Strategy is to ensure that the citizens and businesses of South Yorkshire have access to full fibre, wireless, mobile and IoT connectivity. Digital connectivity is a pre requisite for other Regional strategy such as economic growth, skills and training, digital inclusion and smart cities. We will continue to collaborate with partner organisations to help deliver all of our Regional strategic objectives.

We will also collaborate with our Regional partners in Local Government, Academia, Health, Police, Commerce and other sectors in order to implement the aims and objectives of this strategy, to enable further downstream benefits to be delivered, and to ensure that South Yorkshire is recognised as one of the country's best connected Regions by 2021.

5.4 Our Strategic Approach To Standards

5G networks will need to comply with government technical standards and health and safety legislation. Public Health England is responsible for advising the UK Government on 5G. Its guidance note entitled "Mobile phone base stations: radio waves and health" was updated in May 2019. This guidance note explains that Public Health England, along with the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the European Commission's Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), and the World Health Organisation all share the view that the results of current scientific research show that there are no evident adverse health effects if exposure remains below the levels set by current standards.