



Broadband for the Rural North Ltd

WWW.B4RN.ORG.UK



Business Plan

V4.1

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1. Executive Summary

Most rural areas in the UK suffer from poor or non-existent broadband and Internet services. Upgrading existing equipment is very time consuming and expensive. Under the constraints that the telecommunication industry finds itself today, it's unlikely that rural areas will receive the necessary investment to upgrade the necessary infrastructure in the foreseeable future.

The UK government has set a target of 90% of the UK to have superfast broadband with the remaining 10% (the rural areas) getting at least 2Mbs by 2017¹. It has established Broadband UK (BDUK) to manage this process and is making £530M available to them to help industry undertake additional investments. The EU in their "A Digital Agenda for Europe"² policy have set an even higher and more demanding target with a minimum of 30Mbs for everyone and thereafter, at least half of the county getting 100Mbs by 2020.

Public sector interventions coupled with the private sector finance of the existing telecom corporations does not appear to have at this point either the available funding, or the will, to provide futurist broadband speeds to the rural community.

Existing copper cables cannot physically supply reliable speeds to the standards being targeted by either the UK Government or the EU – neither can satellite or mobile broadband. To ensure that the rural communities attain a true high speed broadband which is future proofed – installed once and capable of all know future speed requirements the only answer is fibre optics to the home (FTTH). Not to the exchange; not to the village but directly into your home.

Giving each home a reliable super fast supply of **1000 Mbs**

Broadband for the Rural North Ltd has been establish as a "not for profit" Community Benefit Society to undertake the supply and installation of fibre directly into every property in the eight parishes detailed in section 4.1 of this plan. No exclusions because it's too far away or it's too difficult to reach – it will be available to everyone. This is world class broadband and will jump our rural community from the slow lane to the leading edge of technology and keep it there for decades to come.

This dramatic increase in speed and reliability will allow, in addition to the basic broadband service, alarm system monitoring, remote CCTV, high quality VoIP telephone services (ceasing existing land line charges whilst retaining existing numbers) and down the line supply of HD television which will change substantially over the coming years with the enlargement of Freeview services, on- demand TV and of course 3-D etc.

Some examples of the difference between standard broadband and FTTH are given below³

Downloading a full length DVD movie (4.7GB)

- with 2Mbs takes 5 hours 13 minutes,
- with 1000Mbs fibre takes 38 seconds.

Sending 200 pictures (600MB)

- with 2Mbs takes 40 minutes
- with 1000Mbs fibre takes 5 seconds

¹ <http://www.parliament.uk/business/publications/research/key-issues-for-the-new-parliament/social-reform/broadband-access/>

² <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0245:FIN:EN:PDF>

³ <http://www.ftthcouncil.eu/about-us/about-ftth/fibre-speed-tool>

Broadband for the Rural North Ltd has been registered as a Community Benefit Society within the Industrial and Provident Societies Act 1965 (IPS), and is controlled by the Financial Services Authority. Shares will be issued to provide funding for the project and members of the community will be encouraged to subscribe to the share issue. The share issue will comply with the Enterprise Initiative Scheme established by HMRC to encourage individual share holdings in new and developing companies. Under certain circumstances investors could reclaim 30% of the value of shares produced.

As a community company, the project will be funded and to a greater extent built by the community for the community. Our ambition is to keep expenditure, where possible, within the community. In addition to purchasing shares, the community will have the opportunity to “purchase” shares in exchange for labour and materials during the project build.

The initial share offer will be £2,000,000 of shares with a face value of £1, to be launched in late 2011 and open for 1 year. The project is expected to commence on site in early 2012 and completed by the year end. The initial network will be progressively added to over subsequent years until approximately 15000 properties in adjoining rural parishes are completely connected to the FTTH network.

2. Background

The provision of good quality broadband to properties in the rural areas of the UK has been a long standing problem. Current technology that uses existing copper phone lines has both range and speed limitations leaving many rural properties unable to access service at above the basic minimum speed of 512Kbs. There are also many properties which cannot get any service at all due to their excessive distance or the quality of the line from the telephone exchange.

The Government has made a commitment, the “Universal Service Commitment” (USC) which states that all properties in the UK will get a minimum of 2Mbs broadband service by 2015. They also wish the UK to be at the leading edge of broadband across the EU by the same date. To do this means not only delivering the USC but ensuring a substantial percentage of the population will get Next Generation Broadband (NGB) which is generally considered to be 100Mbs upwards. However the definition of NGB tends to get shifted depending on who is making it and how it's to be paid for. BDUK define Super Fast Broadband as 24Mbs upwards which seems to be about the lowest level envisaged. Most other organisations set the lower limit at 50Mbs upwards. However it must be remembered that these are usually asymmetrical with much lower upload than download speeds. For current broadband applications this is not too important but for next generation applications upload speed will become progressively more critical. Cloud applications for instance need you to be able to not just download files but upload them too, so both directions need high speed. The Government believes that two thirds of the population will get NGB via standard commercial operators who can make a business case to invest in the required infrastructure.

The Government has set up a team “Broadband Delivery UK” tasked with ensuring that all properties will get at least the USC by 2015. It has been allocated £530M initially with another £300M proposed for the following three years from 2015-2018. It intends to use this money to not only achieve the USC 2Mbs but wherever possible NGB as well. However due to the geographical realities getting more than USC to the deeply rural areas is a huge challenge and the funding available to them is unlikely to be sufficient. In all probability the last 10-20% will get no more than the USC without some novel approaches and/or substantial additional investment. B4RN's interest lies in helping solve this problem in the rural parts of the North of England where many properties fall into the last 20% category.

BT is in the process of spending £2.5B to upgrade its network and offer higher speeds than the existing 8Mbs service. It is doing this by taking the existing ADSL2 equipment in exchanges up to ADSL2+ standard which can offer up to 24Mbs. Unfortunately the rural properties which are currently in bad service areas will not benefit at all from this upgrade as the long line lengths will still limit service to no more than that currently available. BT's second method of upgrading their network is known as FTTC or Fibre to the Cabinet. Here they run fibre from exchanges out to street cabinets and then run VDSL2 from there to properties over the existing copper circuits. The fibre part of the network can be run at very high speeds and because the copper section has been reduced in length it should be possible to increase the speed offered over it. However to achieve this increased speed there has to be a suitably located cabinet to upgrade and in many rural locations the cabinet is still too far from the property to sustain the higher speeds. The final option being used by BT is known as Fibre to the Property (FTTP) and this requires new fibre to be laid the whole way from the exchange to the property without falling back onto copper along the route. This is very costly to BT and hence very little FTTP has been scheduled so far, although BT do say that one third of the investment in NGB will be FTTP with the remainder being FTTC. The general consensus is that the FTTP rollout will be restricted to more urbanised areas where it is possible to make a business case for deploying it to commercial rather than domestic premises.

With a limited budget BT is going to concentrate on upgrading those exchanges with high user counts which will give a better ROI than smaller ones. With BDUK support it is expected that the proportion of

the population which will get FTTC upgrades will increase from 60% to around 75%, possibly 80% as some of these smaller exchanges get upgrades. However this still leaves around 20% of properties unable to get high speed broadband. Alternative broadband providers such as Virgin Media and new entrant Fujitsu will also be focused on the more profitable areas in the same way that BT will. It is therefore quite likely that within the 80% zone one or more companies will fight for market share but if you live in the last 20% there's not only no competition but no service either. The only way that rural properties are going to get true Next Generation Broadband (NGB) is by laying fibre all the way out to them. This is a costly process, the Broadband Stakeholders Group report quoted figures from Analysis Mason of over £10,000 per property to service deeply rural properties. Neither BT nor the cable companies can make any commercial case to invest these sums. The BDUK subsidy will amount to between £100 and £250 per property. Even with other public sector support in the way of anchor tenants and aggregation of services the subsidy on offer will only extend service to a limited number of additional properties. It is generally agreed that the last 10% are going to have to live with a mixture of basic 2Mbs service via copper, 10Mbs via satellite or possibly LTE/4G mobile service coverage which will also be of limited speed and availability. The rural population will remain disadvantaged and unable to access existing and emerging services dependant on NGB.

Having spent £830M the government will be reluctant to provide more funding as they are likely to feel they have already done their bit. The options for rural communities will be do nothing and live with the consequences, or as B4RN is proposing solve the problem with a true NGB solution by mobilising both the ingenuity and resources of the local community.

Martha Lane-Fox, the Government's UK Digital Champion published a document "Manifesto for a networked Nation"⁴ in July 2010 which gives some useful insights on the effects of exclusion from the Internet.

- *The economic and social case for a networked nation is overwhelming. Access to the internet can create benefits through higher educational attainment for children, access to employment opportunities for workless adults, improved standards of living for older people and increased democratic engagement and access to information. Furthermore, it can provide a lifeline from social isolation for the 3.1m people in the UK aged over 65 who go longer than a week without seeing a friend, neighbour or family member.*
- *PwC estimates that the total economic benefits of getting everyone in the UK online is in excess of £22bn*
- *Offline households are missing out on average consumer savings of £560 per year*
- *If the 1.6 million children who live in families without the internet got online at home, it could boost their total lifetime earnings by over £10bn.*
- *If just 3½% of unemployed non-internet users found a job by getting online it would deliver a net economic benefit of £560m.*
- *People with good ICT skills earn between 3% and 10% more than people without such skills. If every non-internet user in employment got online, each of them could increase their earnings by an average of over £8,300 in their lifetime and deliver between £560m and £1,680m of overall economic benefit.*
- *Each contact and transaction with government switched online could generate savings of between £3.30 and £12. There are an estimated 1.8 billion contacts with public services every year of which only about 20% are online.*
- *If all offline adults began using the internet and made just one online contact each month with government instead of a telephone or face-to-face contact it would save an estimated £900m per annum*

⁴ http://raceonline2012.org/sites/default/files/resources/manifesto_text_version.pdf

3. Proposal

Laying new fibre optic cables all the way to remote rural properties is an expensive exercise. However if a different ownership, funding and operating model is used instead of that traditionally deployed by the telecommunications companies and ISPs, the costs can be much reduced from the £10K headline figure per property quoted by the BSG in their report⁵ to around £1K per property.

The vast majority of the cost of the fibre laying is for digging trenches, installing duct and fibre and then making good. Traditionally telecommunications companies have used their code powers and installed duct under the highway or associated verges. This is expensive for several reasons not least the high costs associated with complying with health and safety and the street works act. However from their point of view this is a manageable process as issues around access and wayleaves are solved for them without having to negotiate with hundreds of landlords and regulatory bodies.

B4RN will adopt a different approach; we will lay the duct not on the highway but across the farmland on the other side of the wall. Digging a narrow trench and installing a duct within it is dramatically less expensive across private farmland than along the highway. The work can be done by agricultural workers and the farmers themselves; it's not high technology, similar to laying a simple water or drainage pipe which they do all the time. The combination of lower cost labour and simple installation without the regulatory burden of the street works act and similar impediments results in a dramatic reduction in cost per metre installed. Of course the costs of the materials will actually be rather higher than those paid by telecommunications companies due to our smaller scale of operations; however this is much more than offset by the reduced laying costs. Where necessary we will use the highways but this should be for a small proportion of the duct length, mainly for road crossings and short sections where the farmland is either not available to us or unsuitable. We will be applying to OFCOM for Code Powers to permit us to do this in the same way as any other telecommunications company.

The big problem is that for this model to work the land owners must be prepared to grant free wayleaves to lay duct across their land. Clearly they would refuse to do this if the applicant were a traditional telecommunications company out to make a profit, but if it were a community owned cooperative run for the benefit of the community the story is different.

B4RN is registered under the 1965 Industrial and Provident Society Act taking the Community Benefit option rather than the pure cooperative one. This reflects the fact that it will operate for the benefit of the community rather than its shareholders. However it will need to issue shares to raise the capital needed. These would be withdrawable shares with a face value of £1 and only redeemable at par, there is no route for a capital gain. However the shares will attract annual interest and offer tax relief where applicable, this should make them attractive to community investors. The community benefit route also means there is an asset lock which ensures that the network and any other company assets cannot just be sold off to another company but must be held for the benefit of the community. Given this structure and asset lock the majority of landowners contacted so far are prepared to grant free wayleaves as it clearly benefits the community and they see no risk of anyone making a profit out of them.

In addition the community cooperative model is one where we can expect members of the community to volunteer labour to help establish the network. As mentioned above the work involved in laying fibre duct in a trench is well within the skill set of many members of our community. Our detailed planning work has shown that around 60% of the project costs will be for materials but the remaining 40% is labour. So as well as granting wayleaves we will be able to ask the farmers and landowners to dig the sections across their land by way of supporting the project. In return for them doing this work we will

⁵ <http://www.analysismason.com/Consulting/Sectors-we-cover/Fixed-operators/Digital-Britain/Press-releases/BSG-publishes-Analysys-Mason-report-on-costs-of-deploying-fibre-based-broadband/>

pay them according to an agreed piece work table and they then use this to buy an equivalent number of B4RN shares in a back to back transaction. As well as reducing the amount of cash we need to raise this allows members of the community to become actively involved with the project and take a long term interest as stakeholders.

As a starting point we are looking to provide network coverage to eight rural parishes around Lancaster in the north of the county of Lancashire. These have been picked because they clearly fall into the category of poor network availability with only a few telephone exchanges serving a large rural area. There are many long lines to contend with leaving many properties with vestigial or no network service. We have plenty of evidence of a substantial pent up demand by members of the community and a willingness to support the project with both money and effort.

Providing 100% coverage in those eight parishes plus spill over areas will deliver service to 1452 properties. It will cost £1.723M and take twelve months to deliver. A detailed design has been completed.

We have established a web site⁶ and done a leaflet drop to every home and business in the area inviting people to sign up for service and indicate their willingness to buy shares. This has been backed up with a series of meetings across the parishes where B4RN gave a presentation of the project and answered questions. We have had a good response and are confident that there is a viable customer base to make the project sustainable once built. Also there is a clear appetite for buying shares making us confident that the funding can be raised by a mix of shares purchase, donated labour and grants.

The intention is to initiate a shares offer amounting to £2M beginning in late 2011 and running for a 12 months period. Assuming an acceptable level of take up we anticipate starting the build out in early 2012 with the whole network delivered by the end of that year.

A 100% build out would cost £2M but we are working on the assumption of a take up rate of 50% in year 1 costing £1.723M broken down as £1.2M for materials and third party costs and £500K for labour. This funding will allow us to establish a fully operational network, connect 725 users (50%) and run the network for the first year.

Once up and running people will be able to see the service and experience the terrific speed and quality. We are confident that the take up rate will climb rapidly and we are therefore assuming 60% in year 2, 70% in year 3 topping out at 80% in year 4. Should funding fall short of target then the build rate would be slowed whilst additional funding was sought.

Our financial modelling shows that we can operate the network very profitably with an 80% take-up of service, 1162 customers out of 1452 properties passed. This will give us an estimated free cash flow of £235K. This will enable us to pay 5% interest on the outstanding shares and to set aside money to start buying back shares from members wishing to withdraw their investment.

As a community benefit society any surplus/profit would be used for the benefit of the community firstly by extending the reach of the network to service other rural properties with poor connectivity, and secondly to promote the take up of internet use by those not currently making use of it. Of course an amount would also be put into reserves to cover contingencies and share withdrawals.

In the future if the surplus exceeded that needed to cover the above then other community projects, apart from broadband provision and Internet access, could be funded.

⁶ www.b4rn.org.uk

3.1 People

Behind B4RN is a team of people who have over the last two years put in a huge amount of time and effort to get the project off the ground. We are local people who care deeply about the lack of quality broadband in our communities and are determined to do something about it. Between us there is a range of skills spanning everything from network design, engineering, IT, community engagement, marketing, management and business development. Below are short biographies of the main people who form the interim management committee tasked with getting the project off the blocks. There are many other people who offer very valuable specialist advice and contribute their time and effort and whose input we are very grateful for.

Barry Forde (B4RN Chief Executive)

is a networking expert with many years experience of designing, building and operating high performance networks. He was responsible for the CLEO network which provides connectivity to over 1000 schools and public sector sites across Lancashire and Cumbria. He was the founding Technical Director of LUNS Ltd a telecommunications company which was one of the earliest independent companies to undertake local loop unbundling and which deployed equipment into 157 BT exchanges across the North West to offer private ADSL2+ and symmetrical broadband services. During his career at Lancaster University he was head of networking, head of technical services and Deputy Director of Information Systems Services. In these roles he was responsible for the University's networking and IT systems as well as overseeing the regional academic network C&NLMAN. He was a member of the JISC Joint Committee on Networking which oversees the JANET academic network which provides links to thousands of college and University sites. He was a member of the NWDA Broadband Advisory Group and sits on a number of committees involved with networking at a national level. Apart from providing the technical input for B4RN he also acts as a consultant to a number of local authorities establishing local high speed broadband plans. He holds a Professorial Fellowship in computer networking within the Department of Computing, Lancaster University.

Christine Conder

has lived in the Lune Valley for many years and is married to a farmer in Wray. She has been involved with the community in many roles over the years; for instance school governor and chair of Wray Endowed school during the eighties and early nineties and more recently supporter of a number of rural broadband projects. In 2002 she began campaigning for rural broadband and over the next few years helped establish a wireless network around Wray and a satellite network for rural farms. A founder member of Wray Com Com in 2003 (<http://www.wraycomcom.org.uk/>) and Wennet CIC in 2005 (<http://wrayvillage.co.uk/wennet.htm>). She is a pioneer of self installation fibre and a regular speaker at broadband events on the topic of rural broadband and DIY fibre build.

Christopher May

is the Associate Dean, Enterprise, for the Faculty of Arts and Social Sciences at Lancaster University, and lives in Arkholme. Before becoming part of the university education sector, Chris worked in the music business and was for a time Managing Director of his family's small international specialist library supply booksellers. He has acted as a business consultant in the retail sector, and as a research consultant for the National Consumer Council. He is now leading the Faculty's business/enterprise engagement strategy and is part of a local community music promotions group who are working to further develop the Lune Valley's music scene.

Lindsey Annison

Self-employed mother of twins, who has campaigned for rural broadband since 1994/5 in order to competitively, effectively and productively run her Internet marketing businesses. Organiser of the first broadband events in UK and speaker at many national and international conferences, Lindsey was a co-founder of the Access to Broadband Campaign (Winner of the ZDNet Outstanding Contribution to Technology Award in 2003) and formed the Association of Broadband Communities in 2000/1 (which

then became CBN, and now has regenerated as INCA). She has been responsible for coining and evangelising the term 'FiWi' (Fibre To Wireless), introducing the concept of JFDI to community broadband, and was one of the earliest proponents of Fibre To Every Home. Author of the JFDI Community broadband series of books (<http://www.lulu.com/lannison>) and three others on Internet marketing and Endurance Rallying, she has been involved in broadband in Lancashire since 2003; however, Barry Forde was the keynote speaker at her first event organised in the Yorkshire Dales at the start of the millennium. Currently residing at the end of a sub 2Mbps connection in a small village in the Big Society vanguard area of Eden in Cumbria, where she is a Parish Councillor.

Monica Lee

brings additional management expertise to the team. She came to academe from the business world where she was Managing Director of a development consultancy and worked with a wide portfolio of organisations. She has worked extensively in Central Europe, CIS and the USA coordinating and collaborating in management development, research and teaching initiatives. She is Visiting Professor to Newcastle Business School and has been awarded Life-Membership of Lancaster University. She is a Chartered Psychologist, and is a Fellow of CIPD. She is Founding Editor in Chief of *'Human Resource Development International (1998 to 2002)* and Editor of the Routledge monograph series *'Studies in HRD'*, and is Executive Secretary to the *University Forum for HRD*. She has published over 100 articles and books in this area. She is also actively involved in the local community. Amongst other activities, she is Chair of Governors of Cawthorne's Endowed School, Abbeystead, and a Trustee of the Cawthorne Educational Foundation, and of the Over Wyresdale Parish Hall. She is also a Director of L&K Group plc. which comprises a group of companies that serve the agricultural communities in the North West. She believes that this project will be of particular benefit to such communities.

Martyn Dews

has been involved in IT ever since receiving a Sinclair ZX Spectrum for Christmas as a child. This sparked an interest that has never gone away. Having studied computer technology and programming at college he has worked in various areas of IT throughout his career such as hardware support on large mainframes, peripheral support, networking and software support. For the past 15 years he has worked for global IT services provider [CSC](#) and has been involved in managing systems for accounts with several thousand users. Due to his deep interest in IT he is aware what can be achieved when the community has the access to the best IT services and is why he has become involved in B4RN. He lives in the Lune Valley, (fortunately for him, the better connected part in terms of broadband) and an ex "townie" now fully converted to country living and so is keen to help the community get the best connectivity possible.

Tim Dawson

is Clinical Professor and Consultant in Neuropathology at Lancashire Teaching Hospitals. With his wife Hazel and two "digital native" teenage daughters, he developed his own family home barn conversion in the village of Quernmore in 2003. As a self-confessed techie he designed in many cutting edge features including ground source heating, heat recovery ventilation, digital lighting, remote home automation/security, Cat5e networking, house server with terabyte RAID storage and robotic webcam monitoring. As an intensive internet user for work, including telepathology (which allows internet remote diagnosis of intraoperative surgical tumours), virtual slide microscopy quality assurance schemes, teleconferencing and science literature research, he knows the future is digital and that future needs fibre connectivity.

Bruce Alexander

has lived in Quernmore since 1986 and ran the village Post Office until its closure in 2008. He still works part-time in Bowerham Post Office and is Clerk to both Quernmore and Caton-with-Littledale Parish Councils. He has a degree in Engineering Science and previously worked for Leyland

Vehicles. He is closely involved with a number of village groups and sees the success of this project as vital to the rural infrastructure

Thomas Hartley

has lived and worked in the Lune Valley for all his life. For the last 23 years has run a small engineering company in partnership with his wife. He became involved with B4RN through his work as the installer for the Wray and Wennet wireless networks. Thomas brings his extensive knowledge of the local area to the project. Because of his work on farms he is aware of installation issues, topography and engineering issues. Thomas is a mechanical engineer.

Carl Hunter

has worked for the NHS for the past 30 years. He is a Registered Nurse and a Member of the Chartered Institute of Personnel and Development; he is currently employed by the University Hospitals of Morecambe Bay NHS Foundation Trust as a Learning & Development Specialist. His special interest is in clinical leadership & management development. Carl has worked on several regional and national working groups related to NHS staff development.

Outside of his day job, Carl worked as a school Governor of 8 years and is also a Local Parish Councillor (Wennington). He has a keen interest (and some basic skills – all self-taught!) in information & communication technology and is regularly called upon by his immediate and extended family, as well friends, to help resolve their PC and computer network related issues. Carl is passionate about helping deliver super-fast broadband to rural communities who, from a business and political perspective, are all too often forgotten or ignored.

Ian Threlfall

has been employed as a Network Architect by a large US based company for the last 11 years. Prior to that he worked for a UK bank, helping support what was then one of the largest Internet banking systems in Europe. His specialist area of expertise is Network Security and he holds a CISSP Information Security accreditation. He started his career as a Civil Engineer working on projects around the UK and then went onto complete a M.S. degree in the US. Whilst there he funded his education by working as Network Administrator in the Engineering School which then resulted in retiring the "hard hat" in pursuit of fame and fortune in IT. He grew up in the Lune Valley and returned 7 years ago. Since then he has been involved with rural broadband, in particular with helping Wennet CIC a local community wireless broadband service.

4. Network Design

The vision is to deliver true future proofed next generation broadband and this can only be done via fibre optic cables. We will create five network nodes across the coverage area and from them run a two fibre single mode G652d cable to every property around the node; this is Point to Point (PtP) Fibre to the Home (FTTH).

There are 40 trunk routes radiating out from the five village nodes which between them pass optimally all properties in the coverage area. Each trunk will have between 1 and 6 HDPE ducts of 16mm OD, 12mm ID installed into which we will blow 144 or 96 fibre cables. At suitable locations along the trunk routes we will install access chambers where the trunk cable can be broken into and sufficient pairs of fibre split out for local distribution. We will then run 7mm OD, 3.5mm ID duct from the chamber to each local property and then finally blow in a 2 fibre cable. This is then spliced into the dropped pairs in the splice bucket and terminated in the property on a fibre terminating unit with two LC connectors ready for the CPE to be installed.

Because we have made provision for 100% of properties we can accurately size the number of fibres needed on each trunk route. However we are ensuring sufficient spare fibres to allow for potential new builds and property splits.

The five network hubs are distributed around the area with each serving one or more parishes depending on geography and property numbers in the parish.

Currently every Internet Service Provider (ISP) offers broadband customers a range of different services which are differentiated by various “up to” speeds. These are theoretical figures based on short line lengths and good quality copper and in practice the number of customer lines delivering speeds approaching the number quoted is small. In rural areas where lines are generally longer than in urban areas the numbers achieving the “up to” figures is very small. It must also be remembered that the speeds quoted are not both way speeds but the maximum download speed, the upload speed will be very much slower, this is why the service is called asymmetrical, upload and download are not the same.

B4RN will offer a single service which is 1Gbs symmetrical, i.e. upload and download speeds both at 1Gbs. The differential cost of deploying 1Gbs as opposed to 100Mbs is negligible and in fact slightly cheaper as 1Gbs components are used around the world in much greater quantities than 100Mbs and hence the benefits of scale give cheaper pricing.

Having a symmetrical service rather than an asymmetrical one is vital as we move to next generation applications. There is a fundamental shift under way towards a world where users are not only consumers of data but also providers. For instance Cloud computing means that rather than using a local disc for storage it is all held on virtual storage out there somewhere in the Internet. But to use Cloud services you need to be able to upload your files as quickly as you could to your hard disc, not just download them, otherwise the whole exercise becomes painful and unusable. Similarly applications like voice and video conferencing are two way processes. With Skype a voice call takes little bandwidth and can probably fit into an asynchronous pipe’s upload capacity, but move to their new video conferencing and use an HD camera on your PC or Mac and suddenly the load shifts up a gear and you need symmetry. As more and more people realise that HD quality video conferencing will let them get together with family and friends around the world demand for bandwidth will soar.

There are no range limitations to get round. The standard optics⁷ we are going to use can reach out to properties up to 10Km from the local hubs and our design does not have any properties further out

⁷ 1000Base-LX 1310nm, SM, 8dB, 10Km

than that. However there are 40Km, 80Km and 120Km optics available at steadily increasing prices if ever required. Unlike broadband over copper we will not suffer from any range limitations.

The fibre we are laying to each property can operate at 1Gbs and 10Gbs today and 100Gbs shortly when cheaper optics begins to emerge. It is impossible to envisage any applications emerging over the next 25 years which we could not support with at most a change of optical drivers. This is true future proofing.

The duct being installed is HDPE which also has a very long service life, exactly how long seems to be a matter of argument, but at least 25 years and probably much longer, over 100 years has been claimed by some manufacturers.

At the customer end we will install a CPE which links to the fibre cable and to which any user equipment can be connected. OFCOM are doing a consultation over a recommendation that fibre delivered high speed broadband has a battery backup in the customer's premises capable of maintaining service for up to an hour should mains power fail⁸. This is so that those who wish to use VoIP telephony services can still access them when the power fails in the same way as standard BT landline phones. This in turn will allow users to give up their landlines. Although this has not yet become a requirement of OFCOM, B4RN will include it as part of our standard service so that those wishing to relinquish their landlines and save the £14.60/pm rental can do so. We will also offer a VoIP telephony service and can move your existing landline number across to our system. There are also a number of commercial telephony providers who offer attractive packages of inclusive calls using VoIP systems and these will all operate reliably over our network.

As well as the standard CPE a range of alternative CPEs will be offered at additional cost which will add functionality such as WiFi access, VoIP ports, firewalls, routing, NAT and other services. We are also looking at the possibility of offering FemtoCells for enhanced cellular phone access within properties.

At the network hubs we will have one or more sets of equipment each capable of supporting up to 192 properties with 1Gbs links. Each hub is then connected with fibre optic cables to one of two core nodes via geographically separated fibre routes both running at 10Gbs. Under normal operating conditions each hub will connect to the core node in Quernmore. Should that node fail or there be a fibre break on the primary route then traffic will fall over to the secondary node located in Arkholme and service will continue with only a momentary disruption to service.

If there are more than 192 properties to be served by the hub then an additional 192 port stack will be used giving up to 384 property connections, or two more stacks to make 576 and etc. Each stack would get the dual 10Gbs links to the core so avoiding cascading loads and points of failure. Each 192 port stack is a self contained entity with no dependencies on other co-located stacks.

Each stack will operate its own IPv4/IPv6 routing domain and will provide connectivity both locally and to the Internet. Traffic within the parish served will be contained within the stack and that destined for other stacks in other parishes will flow into the core router and then out again to the destination parish. In both instances the traffic stays local to B4RN's network and puts no load on the backhaul or Internet feed.

From our core node B4RN will lease a fibre optic cable to Telecity in Manchester, 128Km away. This fibre cable will utilise DWDM⁹ technology to support up to 32 circuits running at 1, 10 or 100Gbs each. Initially we will use just two of these, one to link to the EDGE-IX¹⁰ router and the other to link to a Tier 1 Internet provider. EDGE-IX is a peering point where most service providers interconnect and

⁸ <http://stakeholders.ofcom.org.uk/consultations/superfast-broadband/summary>

⁹ http://en.wikipedia.org/wiki/DWDM#Dense_WDM

¹⁰ <http://www.edge-ix.net/>

exchange traffic. By peering they avoid the costs associated with sending data out to the internet, for which they pay on a usage basis, and instead have a static cost of running a simple link to the peering router. By agreeing a peering policy with other providers at EDGE-IX we benefit from this model as well. For instance the BBC and Google have peering connections at EDGE-IX so traffic from iPlayer, BBC.Co.Uk, Google and YouTube would all come down the peering link. Another peering organisation is JANET¹¹ which provides the connections to the education networks such as CLEO¹² which links Lancashire and Cumbria's schools. It also provides connections into Lancashire County Council's services including libraries and corporate systems. So students can come home from school and use their home internet links to get very high speed connections to their school networks whilst their parents can access local government services equally easily. New services about to emerge include YouView¹³ which is the new Internet equivalent of FreeView/FreeSat and will carry all UK free to air TV channels as well as subscription channels and pay per view services. They will also be offering a Video on Demand service and a full range of High Definition and 3D channels. Users in our network accessing these will get superb quality as there is more than enough capacity in our peering channel backhaul to support every user pulling a 3D/HD video at the same time without any congestion. They will also not need an aerial or dish to access these services. B4RN will be the first production service able to support it.

The target is to have more than 50% of our B4RN traffic coming from the peering point and we will monitor traffic flows to identify high traffic sites not coming via the peering and try to arrange a peering relationship. The remaining Internet traffic will be passed over the second 10Gbs link to a Tier 1 Internet provider and this is charged on a monthly per megabit rate dependant on usage. By going to Telecity and using a Tier 1 provider the cost is dramatically lower then capacity delivered locally in Lancaster. This ability to make use of statically charged peering traffic and wholesale Telecity Internet transit is key to keeping costs down and making the project sustainable with modest monthly charges.

4.1 Phase 1 Coverage

In phase 1 we are looking to provide 100% coverage to 8 rural parishes in Lancaster district with partial coverage for a ninth; Caton with Littledale where only the Littledale part is included. There is also some spill over beyond parish boundaries where close by properties are more sensibly connected to this phase of the build out. This adds up to 1452 properties and the parishes are:-

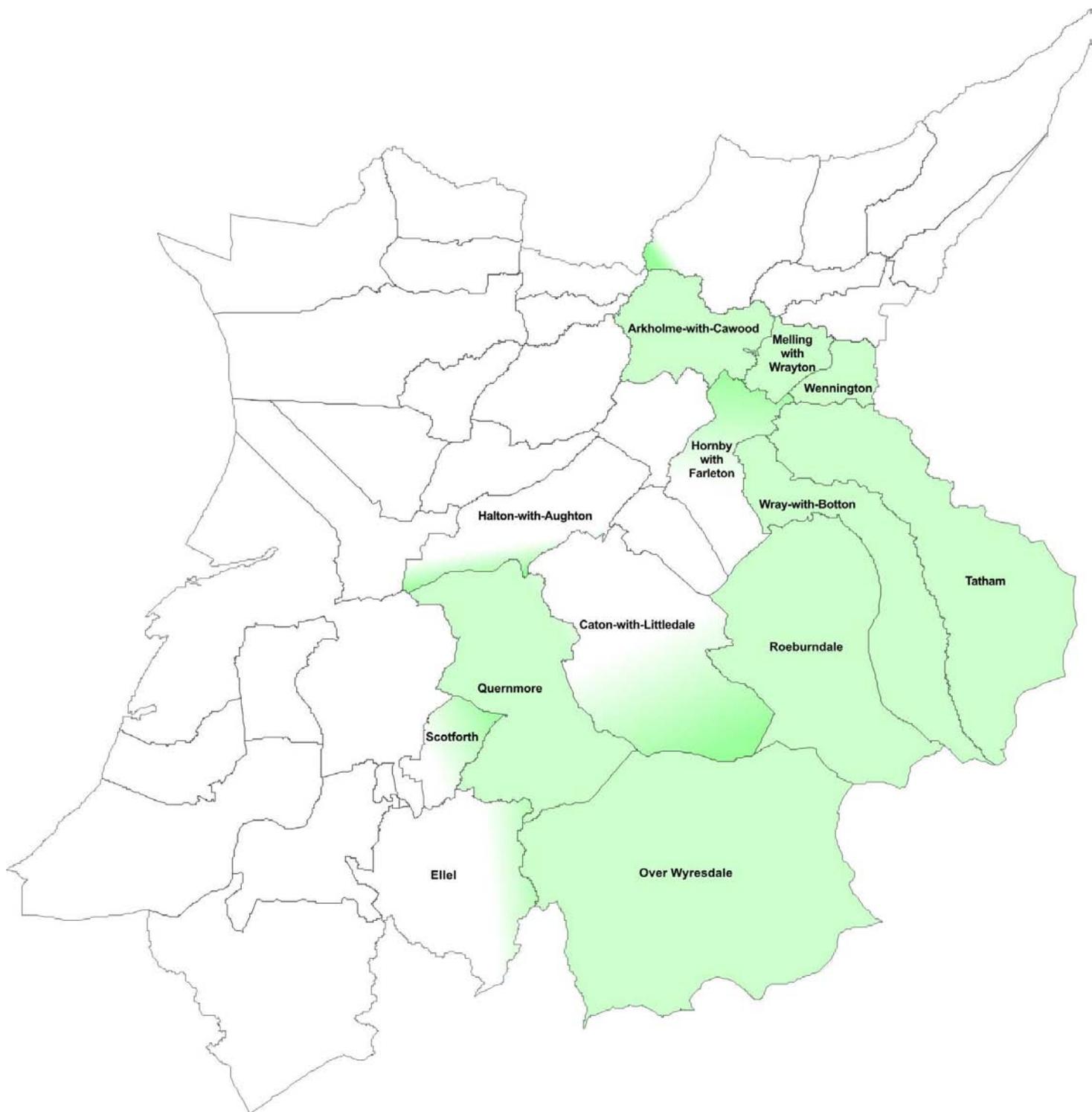
- Over Wyresdale 136 properties (100% of parish)
- Quernmore 370 properties (100% of parish)
- Roeburndale 26 properties (100% of parish)
- Wray with Botton 231 properties (100% of parish)
- Tatham 188 properties (100% of parish)
- Wennington 36 properties (100% of parish)
- Melling with Wrayton 189 properties (100% of parish)
- Arkhome with Cawood 175 properties (100% of parish)
- Littledale 32 properties (sub area of Caton with Littledale parish)
- Hornby 69 properties (partial coverage)

The map below shows the whole of the Lancaster District with parish boundaries and the phase 1 coverage area in green. Parishes with some green along the edges are those we are calling spill over areas.

¹¹ JANET Joint Academic NETWORK see <http://www.ja.net/>

¹² CLEO= Cumbria and Lancashire Education Online see <http://www.cleo.net.uk/>

¹³ You View is at <http://www.youview.com/>



Phase 1 coverage map

The first five village network nodes will be located in:-

- Quernmore 402 properties (3x192 port stacks)
 - Serves Quernmore, Littledale, parts of Caton and Scotforth
- Over Wyresdale 136 properties (1x192 port stack)
- Wray with Botton 445 properties (3x192 port stacks)
 - Serves Wray, Tatham, Roeburndale and bottom of Hornby
- Melling with Wrayton 294 properties (2x192 port stacks)
 - Serves Melling, Wennington and top part of Hornby
- Arkholme with Cawood 175 properties (1x192 port stack))

There are a total of 40 routes radiating out from these five hub points and each route has one or more ducts along it into which we install multicore fibre optic cables of appropriate size. For instance if a route has 35 properties along it we need 70 fibres so we would install a 96 fibre cable from the hub and at a series of branch points drop off a pair of fibres for each property connected back to that spur point. If there are more than 48 properties then we would increase the cable size to 144 fibres which could handle 72 properties. If more than 72 fibres then we would use two ducts and install a 144 fibre in the first to do properties 1-72 and then another cable of either 96 or 144 fibres in duct two to service properties 73 upwards. Industry standard cables come in 144, 96, 48,24,12,8,4 or 2 fibre variants so we would stick with these standard sizes to keep costs down.

Note that on all routes there will be spare fibres (at least 10%) to allow for future builds and any unforeseen requirements.

4.2 Phase 1 core

To establish the primary core network we need to lay fibre cables along 12 routes that provide interconnections between the five hubs, the B4RN core in Quernmore and the resilient link back from Arkholme. These core routes are:

<u>Parish</u>	<u>Route</u>	<u>Properties</u>
Quernmore	1	64
Quernmore	2	12
Quernmore	9	32
Abbeystead	1	37
Littledale	1	32
Roeburndale	1	16
Wray	1	24
Wray	5	74
Tatham	1	16
Melling	1	48
Arkholme	3	35
Arkholme	1	51
		441

This will involve digging 75Km of trench and installing appropriate fibre optic cables in them on the trunk routes. The total cost of the phase 1 core will be £364K. Note the costs include not just main duct costs but access chambers, splice bullets, road crossings, a directional drill under the river Lune and all associated materials and labour. There are 441 properties located along those routes which can be connected at the same time as the trunk routes are established.

4.3 Phase 1 other routes

To complete the build out along the remaining 28 routes to reach 100% of properties in the 8 parishes will involve a further 200Km of digging and network build at a cost of £704K.

<u>Parish</u>	<u>Route</u>	<u>Properties</u>
Quernmore	3	33
Quernmore	4	75
Quernmore	5	33
Quernmore	6	40
Quernmore	7	25
Quernmore	8	56
Abbeystead	2	49
Abbeystead	3	26
Abbeystead	4	16
Abbeystead	5	8
Roeburndale	2	10
Wray	2	22
Wray	3	34
Wray	4	14
Wray	6	63
Tatham	2	22
Tatham	3	13
Tatham	4	66
Tatham	5	54
Tatham	6	17
Melling & Wennington	2	36
Melling & Wennington	3	16
Melling & Wennington	4	57
Melling & Wennington	5	68
Hornby	1	69
Arkholme	2	39
Arkholme	4	39
Arkholme	5	11
		1011

4.4 Central costs

As well as the £1,068,000 of costs associated with the fibre build out of the 40 trunk routes and spurs to 1452 properties, there are central costs to be factored in.

- **Head end**

We need to establish a space in Quernmore to take the core equipment and make it power failure proof with standby batteries and a generator set to ensure unlimited availability even in the event of a prolonged power failure.

- **Parish Nodes**

One of the nodes is collocated with the head end but there are a further four locations where we need to create a network node. Each will need some work done to build or commission suitable space to hold our equipment including racking and a UPS to hold up the equipment should mains power be lost

- **Active routing and switching equipment**

A core router is required in the central head end and some Ethernet equipment in each of the parish nodes. Note that the core router is a high availability carrier grade unit, fully redundant with no single point of failure.

- **Dual VoIP PABX**

We will install a pair of exchanges running in a dual redundant configuration with either able to support the full telephony load.

- **Dark fibre to Manchester**

The fibre to Manchester needs breaking out in Quernmore and Arkholme and we need to install DWDM equipment on it and light the fibre. We also need to take space in Telecity to allow for the DWDM equipment at that end.

- **B4RN setup costs**

There are costs associated with the setting up of the company such as registration with the FSA, joining RIPE, EDGE-IX and NOMINET, applying to OFCOM for a CUPID code and code powers, legal costs and accountancy advice.

- **Training and Equipment**

The whole concept behind B4RN is that the community will fund, build and operate the network. To do this we have to ensure that the right skills are in place and available. Digging and laying the ducting is one aspect and we are confident we have both the right skills in place and sufficient to rollout the fibre in a reasonable time frame.

The installation of the fibre has two components. Firstly we are using blown fibre technology so we need to put some people through a suitable training course to get them certified as competent to install the fibre. We need to buy in fibre blowing equipment and material handling kit such a drum laying trailers, fleeting kits and a number of miscellaneous bits and pieces. The second part of the installation is fusion splicing the fibres once installed in the ducts. Again we would put four community members through the C&G fibre course at the end of which they would have the industry recognised fibre splicing qualification. As with the blowing side we would need to buy some fusion splicing equipment and associated tools, ODTR etc.

With both laying and splicing the fibre we have allowed for labour costs within the build figures and so we have the option of either buying in external people to do the work or use our own

internal. We can adopt a pragmatic approach and where possible use our own but where load exceeds supply use external contractors.

The agreement with our own people would be that in return for being trained up they would have to provide some agreed amount of installation effort in return for shares rather than money and once the network is completed agree to maintain a rota to ensure any faults can be rapidly repaired. Clearly using local people within the community should give us much faster repair times as spares would be held locally and travel to the fault minimised.

As far as the switching and routing equipment is concerned we do have members of the community with the relevant expertise to configure and install this already. They too can agree to subscribe for shares with payment in kind contributing to the overall funding mix.

The central costs amount to £235K and in addition we are factoring in the full OPEX for year 1 within the initial funding which adds a further £131K.

4.5 Summary

The total cost for creating the company and building the network will come to £1,313,450. Additionally we have a cost associated with each customer connection which pays for the active equipment and labour involved. This is £250/connection of which £50 is labour the remainder materials. The connection cost has been separated out of the build cost as it only falls due at the point where a customer requests a connection whereas the build costs for the rest of the network have to be taken on as a single hit. If we include the connection costs in the overall total we will need £1.723M of funding.

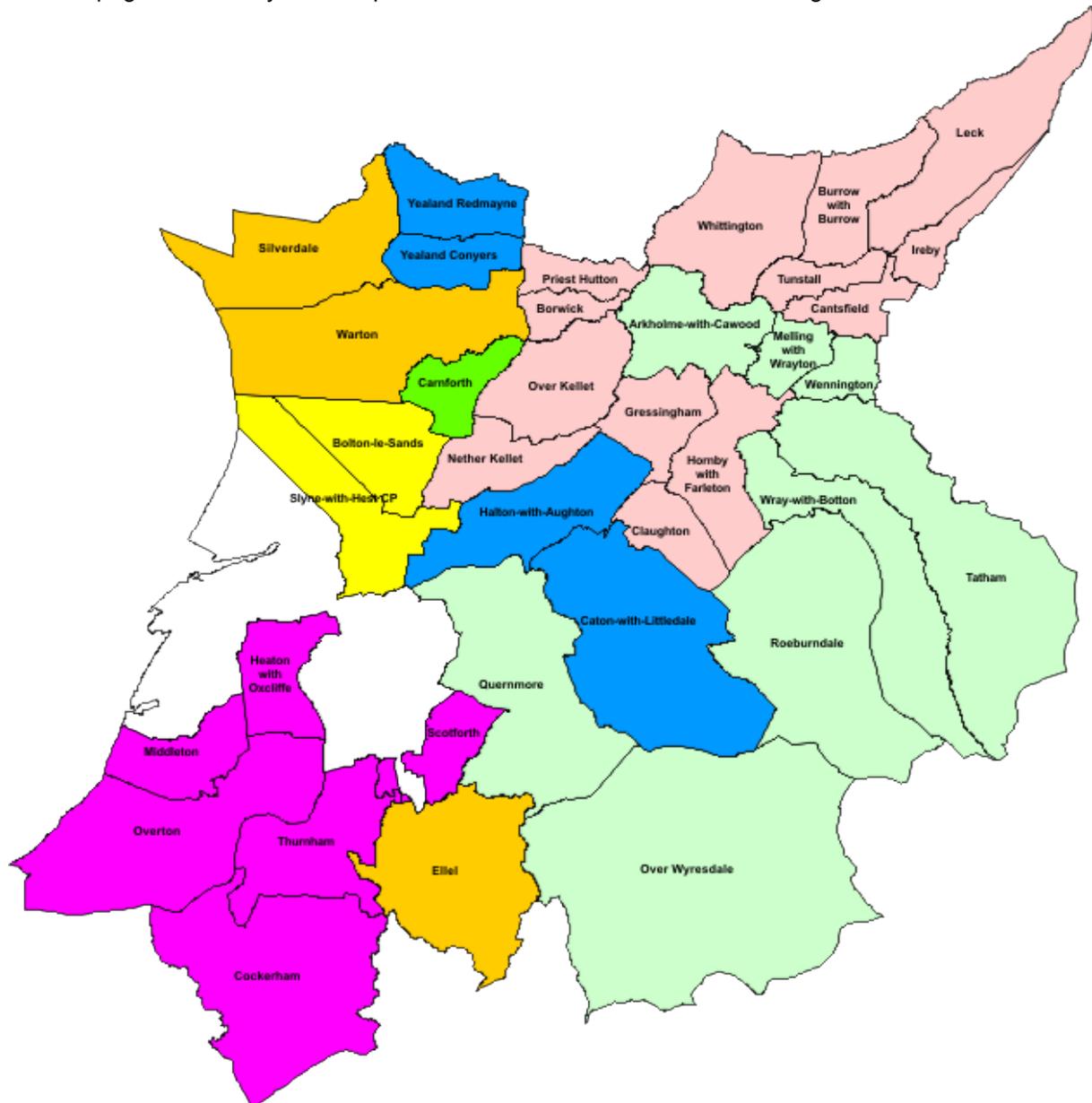
	12 Core routes build out	£364,000
	28 non-core routes build out	£704,030
	Central Costs	£235,450
	Network Build sub Total =	£1,313,480
	Cost for connecting 726 properties (50%)	£288,208
	Provision for year 1 OPEX	£131,544
	Network Build and year 1 OPEX =	£1,723,232

5. Phases 2 through 7

In phase 1 we will have built out 1452 properties and established the network core and external connectivity. This should be completed by the end of December 2012.

However there are over 15000 properties located in the rural parishes around Lancaster and the intention is for B4RN to progressively add to its network to provide fibre connectivity to all of them. We propose to do this in a further six stages of around 2000-3000 properties per phase. Each phase will need an associated shares issue to raise the capital needed and is scheduled to take one year.

The following map shows the parishes to be connected colour coded to show the phase. The table on the next page numerically lists the parishes and uses the same colour coding.



Parish	Properties	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7
Arkholme with Cawood	124	175						
Bolton le Sands	1762						1762	
Borwick	84		84					
Burrow with Burrow	73		73					
Cantsfield	29		29					
Carnforth	2221							2221
Caton with Littledale	1186							
Littledale		32						
Caton and Brookhouse			300	854				
Cockerham	218					218		
Cloughton	57		57					
Ellel	1064							
Dolphinholme			150					
Galgate					914			
Gressingham	68		68					
Halton with Aughton	957			957				
Heaton with Oxcliffe	932					932		
Hornby with Farleton	319	69	250					
Ireby	30		30					
Leck	76		76					
Melling with Wrayton	122	157						
Middleton	232					232		
Nether Kellet	281		281					
Over Kellet	344		344					
Over Wyresdale	120	136						
Overton	451					451		
Priest hutton	77		77					
Quemmore	221	370						
Roeburndale	23	26						
Scotforth	96					96		
Silverdale	687				687			
Slyne with Hest	1344						1344	
Tatham	160	188						
Thurnham	249					249		
Tunstall	43		43					
Warton	996				996			
Wennington	43	68						
Whittington	150		150					
Wray with Botton	200	231						
Yealand Conyers	87			87				
Yealand Redmayne	130			130				
	15256	1452	2012	2028	2597	2178	3106	2221

6. Funding

The first phase covers 1452 properties and will cost £1.723M to deliver and operate for the first year, January to December 2012. We therefore need to raise this amount during year 1 but it does not all have to be available on day 1. Some is needed up front to build the fibre network, some is needed as and when connection requests are received and some is the first year's OPEX and will be required across the year.

The main fund raising mechanism is going to be through issuing shares to prospective investors. We see these as being mainly members of the local community. However if the financial side of the scheme can be made attractive there is the possibility of also securing external investors. We have had quite a number of out of area registrations on the web site who have indicated an interest in buying shares.

To give a funding margin we will look to issue £2M of shares.

As well as income from shares we will receive payments from connection charges and the monthly £30 service charge. There are also a range of other types of service which we will look to receive income from such as telephony, security and leased line links to Manchester.

6.1 Shares

We will issue two types of shares:- £1.5M of type "A" shares and £500K of type "B" shares.

Both types of shares will have a face value of £1 and are withdrawable not transferrable shares and hence cannot be sold to a third party, only back to B4RN. When the investor applies to cash in or withdraw their investment B4RN will pay the £1 face value, there is no potential for any capital gains.

The shares cannot be withdrawn during the first three years nor will we pay any interest on them. In year 4 and onwards we are proposing to pay interest at a rate of 5%/pa on the outstanding shares but this will depend upon us having sufficient income and will be at the discretion of the board of directors. We also intend to put aside an amount each year towards meeting requests from members to withdraw their capital. Again the amount will depend on our trading position and the board will need to decide the amount to be set aside for this purpose once the financial position is clear.

Each member will have a share account setup for them which will be credited with the number of shares they purchase. In year 4 and annually thereafter we will pay interest at the agreed rate by adding shares of an equivalent value to the shares account after allowing for any tax deductions required by HMRC. So assuming the interest rate was 5%, as currently planned, then a member with £1000 of shares would receive gross interest of £50 worth of shares less tax deducted at source as required by HMRC.

The minimum investment permitted is £100 and the maximum, set by the IPS rules is £20,000. Any investor with at least the minimum shareholding is a member of B4RN and eligible to vote at meetings. As a Community Benefit Society the rule is that each member gets one vote irrespective of the number of shares held and the company has to operate for the benefit of the community not of its shareholders. So we can pay interest on the issued shares but this must be at a rate appropriate to attract and keep investment only. As mentioned previously the intention is to pay interest at a rate of 5%/pa from year 4 but this will be at the discretion of the directors once the year 4 accounts are available. Any surplus income has to be reinvested in the community.

6.1.1 EIS Compatibility

This shares offer is intended to be compatible with the Enterprise Initiative Scheme which will allow tax payers to receive a rebate of 30% of the value of the shares bought. This of course is subject to them paying that amount of tax in the first place, either in the current or previous tax years. An investment must be between £500 and £500,000 to be eligible for EIS relief but in our case the upper limit is locked at the £20K individual cap on any one personal member. So on investments between £500 and £20000 the investor would get an Inland Revenue rebate of between £150 and £6000.

One restriction is that shares must be held for a minimum of three years during which the investor cannot withdraw their shares without losing the tax relief. As part of the shares issue we are including a three year lock in anyway and during that period no shares can be withdrawn so this is not really an EIS issue.

6.1.2 Share Types

Type “A” shares can be bought by anyone wishing to invest in the society.

Type “B” shares are a special case because they are reserved for purchase by members of the community who wish to contribute time, labour and skills to building and running the network during the first twelve months. Anyone offering to do work will enter into an agreement with B4RN which details the type, amount, value and timescales of the work. Once completed B4RN will pay the person the amount agreed BUT the person will then buy Type “B” shares of the same amount as the payment they have just received for the work done. At the point B4RN pays the community member for their effort he/she will incur a tax liability and will need to sort this out with HMRC. However at the same time by purchasing an equivalent value of shares they will attract an EIS rebate of 30% of the face value of the shares purchased. (Note that the value of the work done and the shares purchased must be at least £500 to meet the minimum for EIS compatibility). At current tax rates a basic rate tax payer would incur a 20% liability on the payment from B4RN but will be able to offset this with a 30% EIS rebate from HMRC which cancels out the tax due and leaves a small surplus of 10% of the payment.

Out of the total build cost of £1.723M there is rather more than £500K directly attributable to labour which can be done by community workers. The tranche of type “B” shares has been sized to match this labour element.

All work will be offered first to members of the community who are willing to sign up for type “B” shares. If there is any work left over then it will be offered to people from outside the community who will take shares. Only if all volunteer labour is exhausted without covering our total needs will we offer work to people and organisations that require straight payment without them buying matching shares.

If this happens we may well find ourselves with an under subscription for the type “B” shares and if this occurs the board can decide to transfer the un-needed shares into type “A” and add them to the type “A” pot offered to general subscribers.

6.1.3 Founder Members

As an incentive for members of the community to invest more than the minimum of £100 needed to become a member or the £500 needed to attract EIS tax relief, we are offering an additional incentive in the form of foundation member status.

Anyone investing a minimum of £1500 will be able to nominate a property which will be connected free of charge and will have a year's free service. Given that the £1500 will attract tax relief of

£450 and that the connection and service fees during the offer period amount to £510 this effectively reduces the cost of the shares to £540.

If a member is willing to invest more than £1500 then they can nominate additional properties to receive the free connection and twelve months service at the rate of one per additional complete £1500. It is hoped that wealthier members of the community might opt to subscribe for multiples of £1500 and nominate less affluent members of the community who might struggle with funding to get service.

6.2 Connection fee and monthly charge

Our anticipated take up rate of 50% gives us a year 1 customer base of 726 properties. It would be nice if all of those were foundation members but realistically half of that is more likely so 363 would be ordinary customers who will pay connection and service charges. We can factor this into the year 1 income with £45,375 for connection fees and if the take up was spread evenly across the year we would get £54,450 in monthly charges. So that gives us £100k of income.

6.3 Additional Services

At present we have identified several sources of income other than the standard broadband service fees.

6.3.1 Telephony

We are offering a VoIP based full telephony service and encouraging subscribers to cease their landlines moving all telephony to us. Our telephony system will include a battery backup on the customer's telephony equipment and we will support location provision with 999 calls. We are not proposing to make any monthly charges for telephony provision but only bill for calls made. We expect to make a modest profit on these calls.

6.3.2 Leased line services

As well as the standard £30/month for our broadband service we will offer a range of managed bandwidth and leased line services.

Within the B4RN fibre area customers will be offered point to point links at both 100Mbps and 1Gbps as a managed service.

Additionally we will offer dark fibre service between any two points within the B4RN fibre area.

Finally we will also offer leased line managed services to Manchester Telecity over our DWDM link with capacities of 100Mbps, 1Gbps and 10Gbps..

It is anticipated that there will be a reasonable demand for these services both from new customers setting up for the first time and from existing users looking for a diverse/resilient service to backup an existing one.

6.3.3 Security Services

We are looking to enter into a partnership agreement with a security company so as to be able to offer CCTV and other security services to farms and properties in our coverage areas. With the increase in thefts of animals, diesel and equipment from farms we anticipate an interest in having a facility where a combination of motion sensing HD cameras and a central

monitoring station will provide much needed security. This will be via a third party but we can generate income via a profit sharing arrangement.

6.3.4 Innovative Services

There are considerable possibilities for new and innovative services around supporting the elderly and those with medical problems within their homes. Also breaking down isolation and supporting carers within the community. We will be looking to work with a number of agencies with similar agendas and they may be prepared to put funding into pilot and then operational schemes.

6.4 Grant funding

Originally it looked like we were going to be able to access £750K of grant funding from the RDPE. Regrettably the city council decided not to pursue the project independently but instead work with a wider project being promoted by the County Council.

There are however other sources of funding such as the DEFRA Rural Communities Broadband Fund¹⁴ which announced £20M for broadband projects in the rural and uplands areas which includes our phase 1 parishes. Also the Community Development Fund¹⁵ which has £80M available for projects.

Once we have a clear understanding of how much funding is available from the community through shares and what the committed take up of service is we can investigate whether and where to seek additional money.

6.5 Funding Summary

On the B4RN web site we have included a registration form which we invite potential investors or users to fill in. One of the questions we have asked them is whether, if we went with a shares offer, they would be interested in buying some. So far over 600 people have registered with the majority indicating an interest in buying shares. Based on a mix of the number of people registered and the amounts that some have entered we are reasonably optimistic that the shares issue will be well supported.

We are also confident that as we build the network out we will get a good sign up for service and the target of 50% take up in year 1 is probably conservative. Once we have established the network and have a reasonable number taking service that the rest can see and will hear about, the take up rate should increase steadily. In years 2 through 4 we expect the rate to increase by 10% per annum topping out at 80% by the end of year 4.

So adding the contributions from investors buying type "A" shares with those working for type "B" shares and then including the income from connection charges and service we should raise enough to build out the network.

¹⁴ <http://www.defra.gov.uk/news/2011/03/10/uplands/>

¹⁵ <http://www.cabinetoffice.gov.uk/news/community-development-foundation-deliver-%C2%A3380m-community-first-programme>

7. B4RN Budget

Appendix 1 below contains a spreadsheet showing the budget for the first 60 months of the project based on building out phase 1 only. A number of assumptions have been made of which the main ones are:-

- No interest will be paid on the shares during the first 36 months (EIS eligible subscribers will get their 30% tax rebate during year 1)
- Build out will be done in 12 months
- By month three all core and village hubs are operational and the link to Manchester is live
- The build will be roughly linear with one twelfth of the build done each month
- Properties will come within the service area at a linear rate of 121/month
- Members will take service when network passes them
- 50% of the properties passed take service giving us 61 connections per month in year 1
- However once the others see the quality of service we expect this to grow to 60% take up by the end of year 2, 70% by the end of year 3 and 80% by the end of year 4
- Foundation members will comprise half of the year 1 connections, 363 total
- Their connection will be linear in the same way as the dig.
- We anticipate that of the £552,952 year 1 labour component of the project about 90% or £500,000 will be done by the community in return for type "B" shares.
- The fact that foundation members do not pay a connection fee or for service during their first twelve months connected is factored into the budget.
- Central support will be provided by volunteers against payment in type "B" shares for the first 12 months but cash thereafter.

The year 1 CAPEX and OPEX costs amount to £1,723,232. We anticipate generating income of £1,625,000 from the sale of shares and £109,669 from other charges leaving us with an end of year balance of £11,437.

The shares issue will be for £2M and if we get take up higher than the £1,625,000 needed for the phase 1 rollout as planned then the surplus will be used to extend the network into phase 2 areas. In particular we note a strong demand from Cantsfield. Other possibilities would be parts of Caton and Dolphinholme.

In year 2 the big capital spend building the core finishes leaving us with just the costs of connecting properties to the core. We expect in years 2, 3 and 4 that the take up rate will increase by 10% per annum peaking at 80% at the end of year 4.

From the spreadsheet it can be seen that whilst just about breaking even in year 1 the position improves dramatically in each subsequent year with free cash of £39K in year 2, £131K in year 3, £175K in year 4 and £235K in year 5 and onwards.

During the first three years we will neither pay interest nor allow shares to be withdrawn. From year 4 we need to allow for both eventualities. With £1,625,000 of shares outstanding and paying interest at 5% interest we need to allocate £81,250. This has been included in the year 4 budget. Allowing for free cash flow and retained surpluses from years 1 to 3 we can afford to allocate £200K for the redemptions pool. Similarly for years 5 and onwards we can continue to pay interest at 5% and fund £200k per annum of redemptions.

At this rate of redemption we can redeem all our outstanding shares by year 11 or 12 of the project.

Appendix 1

Budget years 1 – 5

	<u>Year 1 - 2012</u>		<u>Year 2 - 2013</u>		<u>Year 3 - 2014</u>		<u>Year 4 - 2015</u>		<u>Year 5 - 2016</u>	
	Takeup = 50%		Takeup = 60%		Takeup = 70%		Takeup = 80%		Takeup = 80%	
	total passed = 1452		total passed = 1452		total passed = 1452		total passed = 1452		total passed = 1452	
	new connections = 726		new connections = 145		new connections = 145		new connections = 145		new connections = 0	
	total connections = 726		total connections = 871		total connections = 1016		total connections = 1162		total connections = 1162	
	<u>CAPEX</u>	<u>OPEX</u>	<u>CAPEX</u>	<u>OPEX</u>	<u>CAPEX</u>	<u>OPEX</u>	<u>CAPEX</u>	<u>OPEX</u>	<u>CAPEX</u>	<u>OPEX</u>
B4RN Central Costs - Non labour	£ 235,450	£ 81,544	£ -	£ 85,432	£ -	£ 103,049	£ -	£ 108,714	£ -	£ 111,310
B4RN Central Costs - labour		£ 50,000		£ 50,000		£ 50,000		£ 50,000		£ 50,000
Core Network Build out cost - materials	£ 682,502		£ -				£ -		£ -	
Core Network Build out cost - Labour	£ 385,528		£ -				£ -		£ -	
costs for new connection - Materials	£ 164,540		£ 57,642		£ 57,642		£ 57,642		£ -	
costs for new connection - Labour	£ 123,668									
Interest on outstanding shares @ 5%								£ 81,250		£ 71,250
Shares redemption pool								£ 200,000		£ 200,000
	£ 1,591,689	£ 131,544	£ 57,642	£ 135,432	£ 57,642	£ 153,049	£ 57,642	£ 439,964	£ -	£ 432,560
Foundation members	400									
Type "A" shares - standard		£ 1,125,000								
Type "B" shares - shares for labour		£ 500,000								
Income from connections charges		£ 45,531		£ 18,213		£ 18,213		£ 18,213		£ -
Income from monthly subscription		£ 50,084		£ 179,393		£ 282,294		£ 329,646		£ 349,680
Income from telephony services		£ 2,003		£ 4,845		£ 5,719		£ 6,593		£ 6,994
Income from security/new services		£ 1,800		£ 4,346		£ 5,844		£ 7,860		£ 10,571
Income from lease line services		£ 10,250		£ 26,250		£ 30,000		£ 30,000		£ 30,000
		£ 1,734,669		£ 233,046		£ 342,069		£ 392,312		£ 397,244
Annual balance		£11,437		£39,973		£131,379		-£105,294		-£35,316
Running balance		£11,437		£51,409		£182,788		£77,494		£42,179