

Highland Community Broadband



<http://www.hcbroadband.co.uk/>

Business Plan v1.0

Contents

1. Executive Summary

2. Background

3. Project Proposal

3.1 People

4. Network Design

5. Project Costs

5.1 CAPEX

5.2 OPEX

6. Project Funding

6.1 Connection fee and service charges

6.2 Grant Funding

Appendix 1 – Budget spreadsheet

Appendix 2 – Coverage Post Codes

Appendix 3 – Housing and Population Figures

Appendix 3 – Equipment Specifications.

1. Executive Summary

Loch Broom, Little Loch Broom, Coigach and Gruinard Bay suffer from poor broadband speeds and reliability. Upgrading this will be expensive and time consuming considering the sparse population and awkward terrain. Although the Scottish Government has promised superfast broadband for all by 2021 we think in the end this will depend on Satellite for the final 5%. Only Ullapool village will receive superfast broadband under current BT plans.

While various community groups have considered solutions with help from Community Broadband Scotland (CBS), it swiftly becomes apparent that due to the cost of Backhaul (i.e. the local network connection to the greater Internet) any community network requires a minimum of 300 subscribers. To achieve that take-up we need to include Ullapool Village which gives us 1375 premises overall. However serving Ullapool means that we cannot seek funding from CBS as they have already awarded money to BT for Ullapool Village and they are not allowed double fund.

We are proposing a Wireless Network which could connect every premise in Ullapool, Lochbroom, Little Lochbroom, Coigach and Gruinard Bay. As a Standard (including Home Business) subscriber this will cost £100 for the installation and £25 per month. The service will be up to 50Mbps down and up to 20Mbps up with unlimited downloads. A phone line is not required.

Our total budget for a 50% take up is £164,500 and we are seeking to raise £75,000 which will cover the cost of building our network and connecting the first 190 premises. Further connections will be paid for from revenues. Our operating costs will be £78,600pa by the end of Year 2 which includes a budget for 2 full time employees and the Tech Hub / Business Incubator which will also serve as our office.

We propose to raise this by appealing to 190 founder subscribers to pay for their installation and first year's service in a lump sum (while getting 14 months service for the price of 12) a total of £400. They will also help those in the community who would like to subscribe but can only afford a monthly charge once the network is built.

It will take 3 – 5 months to install our backhaul access in Ullapool (i.e. November to January). Meanwhile from October – December we will install services in Ullapool Village and then move onto Lochbroom in late January & February, Little Lochbroom & Gruinard Bay in March and Coigach in April. Some subscribers may decide to self-install and their equipment will be active as soon as our network goes live.

Highland Community Broadband is structured as a Community Interest Company which means that profits we make will be distributed to community organisations and each subscriber will be allocated one share each, there are no dividends. There are three current directors; Nick Lampen, Kim Tunsley and Duncan Cook.

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 UK Government had made a commitment, the “Universal Service Commitment” (USC) which states that all properties in the UK will get a minimum of 10Mbs broadband service however this was dropped in May 2016. They also wish the UK to be at the leading edge of broadband across the EU. 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 30Mbs upwards¹. Broadband Delivery UK (BDUK) defines Superfast Broadband as 30Mbs and local councils have taken their lead from BDUK. Meanwhile the Scottish Government gave a commitment that by 2021 every property should have access to “fibre broadband”² unfortunately there are no further details on what speed this will be or how this will be achieved and paid for. We expect that the target will be quietly lowered when faced with the financial and practical obstacles.

Ullapool will receive Fibre to the Cabinet (FTTC) technically known as VDSL, and commercially as BT Infinity, which will provide a maximum download of 78Mbps and a maximum upload of 19Mbps. Fibre is run from exchanges out to street cabinets and from the cabinets to properties over the existing copper wires. 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. VDSL is only suitable for distance up to 2km from the cabinet. Long Range VDSL (LR-VDSL) has just been tested on Lewis but it only adds 1km to the distance. This also assumes that the local copper wires are in good condition, not something that can be relied on throughout this area.

The Scottish Government, via Digital Scotland Superfast Broadband (DSSB) have already funded the extension of the Fibre Backhaul laid around the Highlands by £126.4m (BT also put in £19.4m (13.28%) for a total of £146m) and Community Broadband Scotland (CBS), part of Highlands and Islands Enterprise (HIE) have £5m to fund projects. BT has to confirm that they will not provide a FTTC service in each postcode before CBS can grant funding and as long as one property is connected in a postcode that area is considered covered.

Whilst there had been tentative community plans to install Fibre to the Premises (FTTP) in Little Lochbroom (with funding from CBS) it quickly became apparent that there were two potential issues.

¹ <http://www.ispreview.co.uk/index.php/2014/08/lets-stop-different-uk-definitions-superfast-broadband.html>

² <http://news.scotland.gov.uk/News/A-precious-opportunity-24f7.aspx>

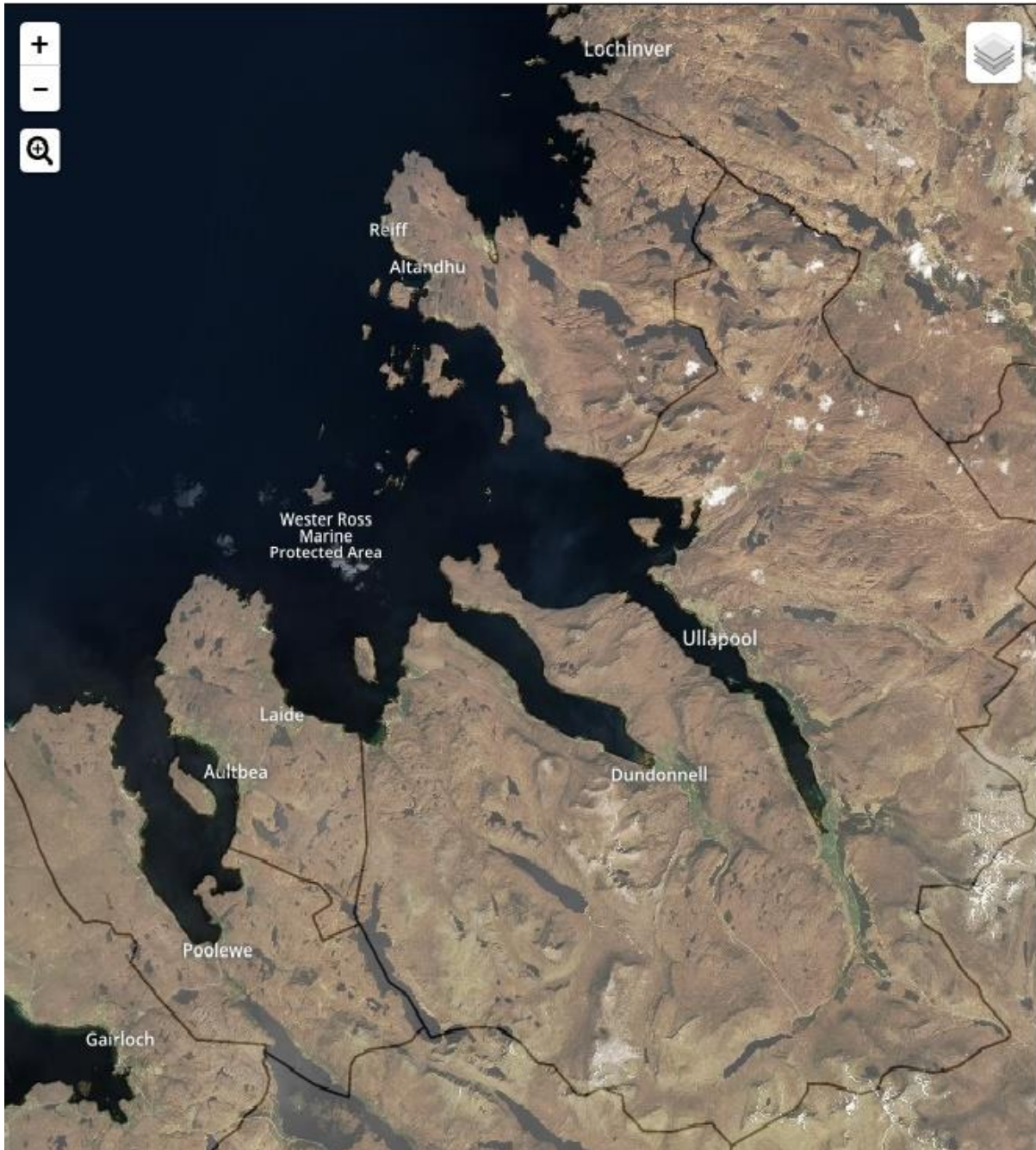
Firstly, it would be uneconomic if BT claimed funding for postcodes near the exchange and secondly there had been the ongoing physical and financial question of backhaul access, which is our network's connection to the wider Internet.

The nearest POP (Point of Presence) is the Ullapool Exchange and it is unlikely that Achiltibuie (Coigach) or Dundonnell (Little Lochbroom) exchanges will be connected to the Highlands Backhaul so these areas need a connection to Ullapool. Even in Ullapool BT is unable or unwilling to provide backhaul access so we have had to approach Commsworld who agreed to install their equipment in the Ullapool Exchange. A Leased line for the backhaul access is £13,000 installation and £1500 per month. This requires us to have at least 100 subscribers to cover this core cost. Little Lochbroom and Coigach only have a 133 and 147 properties each and expecting a signup rate of 75% and 68% respectively was considered too ambitious. Even combining these areas, given the logistical difficulties and the time needed, a subscriber rate of 36% would not be achieved rapidly enough to support backhaul access charges.

Therefore it became apparent that we needed to combine Ullapool, Lochbroom, Little Lochbroom, Coigach and Gruinard Bay. Combining these areas gives us 1375 premises and we are aiming for a 50% take-up over the first year. These 688 subscribers will cover our operating costs and enable us to have a contingency fund and afford future upgrades and provide fringe community benefits.

3. Project Proposal

Our plan is to offer a wireless connection to the 1375 (1434 if Elphin, Ledmore and Knockan are included) properties in the project area using Ubiquiti airMAX equipment (specification of which is in Appendix 3). The network will run at 450Mbps with individual connections at 150Mbps, although premises will initially be limited to 50Mbps to ensure a steady and reliable service.



The Pilot Project will focus on Ullapool Village. Initially a 78Mbps (BT Business Broadband with a 1:1 contention rate) service will be used for Backhaul access and the signal transmitted to a station above Altnaharrie. This station will cover Ullapool and we will connect the UCT Hub, Lochbroom FM, Ullapool Harbour Trust, Ullapool High School and a number of other locations to test the equipment and service.

Having proof of concept, reliability and cost will allow us to concentrate on connecting premises across Ullapool. Should there be any service issues these can be fixed quickly and simply as we are not spread over a large geographical area.

We will then undertake four service installations:

Installation One: Ullapool Village.

The Glac Bheithe Station (above Altnaharrie) will broadcast to Ullapool Village and relay a signal to Leckmelm

Installation Two: Loch Broom

The Leckmelm Station will broadcast to the rest of Lochside and up to Braemore Junction.

Installation Three: Little Lochbroom and Gruinard Bay.

A relay station at Altnaharrie Junction will broadcast the signal to three stations in Little Lochbroom at Creag na Ceapaich, Carn Dearg an Droma and Torr Mor to cover Little Lochbroom and Gruinard Bay

Installation Four: Coigach

The Glac Bheithe Station will broadcast to Culfacraig, Polglass, Achiltibuie, Polbain and Archnahaird. Additional stations will be required to serve Altandhu and Reiff.

Certain locations will require relay stations and this will be installed on an ad hoc basis.

When the Leased Line is installed at Lochbroom FM we will retire the FTTC service, switch to a 1Gbps leased line and use this as a transmission base. The connection to the hub will also allow potential customers to use and see a fast connection in use.

There will be with a program of rolling upgrades offered as equipment becomes obsolete. In addition this will ensure that climate related equipment failure is limited.

We require 100 residential premises to cover core costs and 300 to cover both core and operating costs. Thereafter we will devote cash flow from additional connections to employing staff assuming 1 FTE £25K/pa.

The standard installation charge will be £100 and monthly residential charge will be £20 for low users and £25 for standard users. Business installation will be the same but the charge will be from £50. Downloads will be uncapped and we will attempt to avoid throttling where possible. We will also provide self-installation for those who feel able at £25 however, should they then require help they will be charged the standard installation fee of £100 on top of the £25.

Once we have reached the 300 residential customers in Ullapool (or the equivalent revenue i.e. £6k) we will roll out the service to Loch Broom. We will install additional stations as required but we will try to ensure that Little Lochbroom and Coigach will have their own contractors who will install the residential receivers, unless individuals decide to do their own.

We have based our calculations on a total 50% take up rate i.e. 688 residential subscribers, but can survive on a total of 22% (300) over the full area. Other community broadband schemes, such as B4RN, have experienced an initial take up of 50% rising 10% each year with some areas having 90% of residential premises³. There are 158 business lines in the area (103 in Ullapool alone) and we aim for a 30% take-up rate amongst business

The overall project cost will be £164,500. This includes all transmitters at a total of £25,000 and £175 per household installation. Obviously any houses in excess of the 50% rate will increase the cost of the scheme but this will be covered by the installation charge and subsequent revenue. Additional stations may be required for certain townships so the number and therefore cost of the stations may increase. Assuming we can achieve 300 connections in Ullapool, expansion can be achieved via cashflow however should the number be lower than that we will focus on low cost / high return connection areas until we reach 300 connections. Even when the contractor cost is included, at £175 cost per installation, the £100 installation fee and 12 months service at £20/month yields us £340 which allows us to recoup the cost in 4 months.

We envisage that 20% (using the standard 80/20 rule) of subscribers will sign up to self-install giving us an immediate revenue stream. The cost of their equipment will be recouped in 3 months.

We will be using Insightly for our CRM, this also has a project management feature which will be used for scheduling station placement and individual installations.

We will publicise our plans and service via the UCT website, our own website Facebook, Twitter as well as a press and public launch and school launch. The UCT hub will have a public connection so that potential customers can “try before they buy” and we will run a 4K feed from <http://www.ustream.tv/> or <http://www.hdontap.com/> and have a dedicated monitor displaying this. Each Township will have a broadband evangeliser with the exception of Coigach which also have the Coigach Community Development Company (CCDC). We will also be listed on “Sam Knows” for the postcodes we cover.

Once we are operating and we need to expand beyond the space available in the UCT hub we will look for space which can be used not only for us but as an area Tech Hub, Business Incubator and Workspace.

³ <http://b4rn.org.uk/wp-content/uploads/2011/11/B4RN-Business-Plan-v5-2.pdf> Page 4, Paragraph 8.

3.1 People

Behind this project is an initial triumvirate of people:

Nicholas Lampen is the Broadband Director for Ullapool Community Trust with a background in Strategic Information Systems, Online Retail and Digital Marketing. Nick performs all the tasks associated with running the front end of HCB and general administration.

Kim Tunsley has been in the engineering, electronics and automated control system industries for many years, working in supervisory positions worldwide for various multinational companies in the medical, food, explosives and subsea industries. Kim will look after deploying the network and managing all hardware involved, his and Duncan's duties overlap to some degree as they both must work closely to achieve a balanced network infrastructure.

After more than 25 years in the IT sector Duncan Cook is highly experienced in all aspects of network deployment and administration. A self-confessed computer geek since childhood he has been involved in writing bespoke apps for a number of North Sea clients, he has installed Wi-Fi solutions all over the highlands and currently works with Dulcie at the Ullapool Computer Shop. Duncan will be responsible for the administration of the network, handling traffic management and user access to the wider internet. His duties will overlap with Kims to provide the best possible service.

We have the following Community Co-ordinators who are taken from those who have attended Community Broadband meetings:

- Rhue: Flick Hawkins 01854 612460
- Ardmair & Strathkanaird: Sue Agnew 01854 666225
- Drumrunie: Nigel Carr 01854 666276
- Coigach: Julia Campbell 01854 622379
- Lochside: Jonny Reid 01854 655364
- Letters: Mike Stanners 01854 655335
- Dundonnell: Phil Wild 01854 633704
- Badcaul & Durnamuck: Jeannette Richardson 01854 633213
- Badlurach: Gael Morris 01854 633218
- Badrallach: Gerry O'Neil 01854 633307
- Scoraig: Hugh Piggott 01854 633286
- Gruinard Bay: Nick Lampen 01854 633225
- Elphin, Ledmore & Knockan: Brendan O'Hanrahan 01854 666207

4. Network Design

We plan to cover 1375 properties in the project area (with potential to expand to 59 in Elphin, Ledmore & Knockan)⁴. This figure only includes residential premises. However there are also 158 (103 in the Ullapool exchange area) business lines in the area⁵.

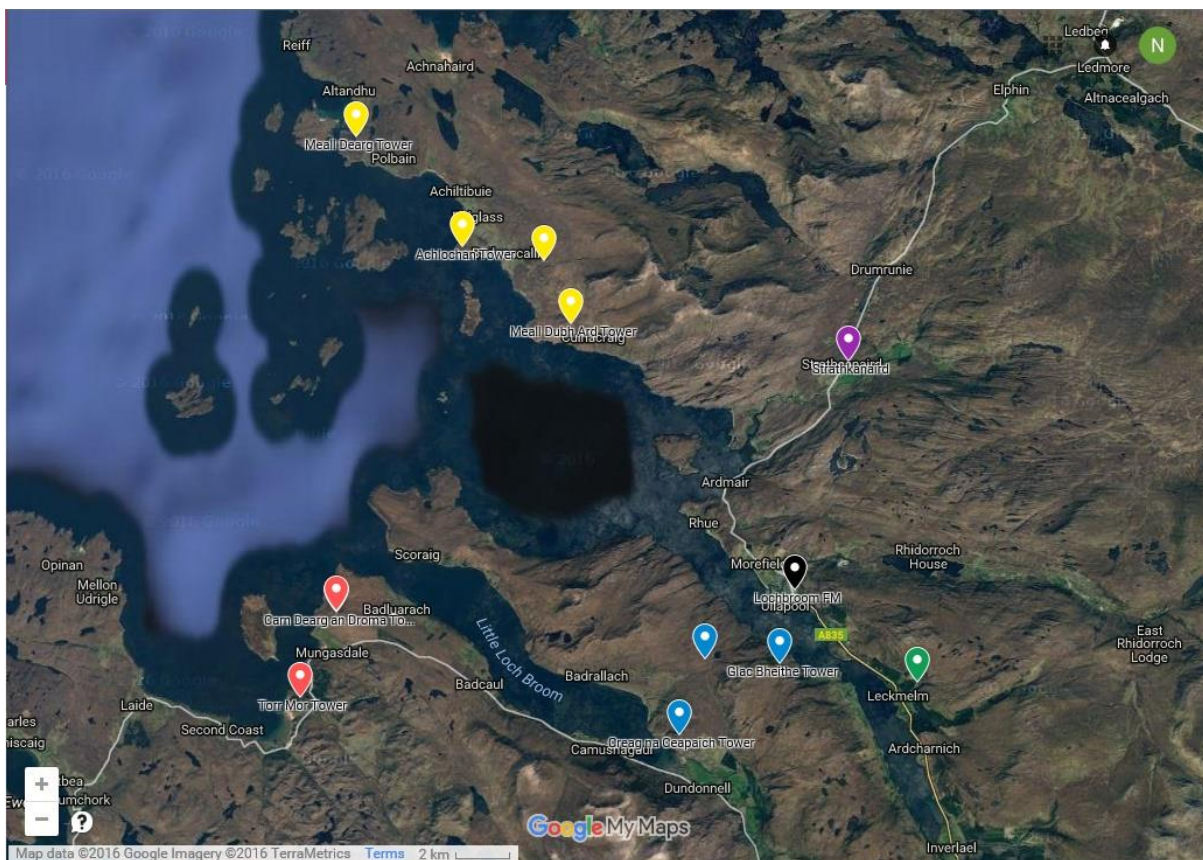
| Township | Properties |
|-------------------------------------------------------|-------------|
| Braes of Ullapool | 63 |
| Ullapool (East of North Street) | 64 |
| Ullapool (Garve Road) | 60 |
| Ullapool (Shore Street & Quay Street) | 82 |
| Ullapool (Ladysmith Street) | 103 |
| Ullapool (Seaforth Road & West Terrace) | 72 |
| Ullapool (St Valery Place) | 65 |
| Ullapool (Riverside Terrace & Moss Road) | 51 |
| Morefield Place | 51 |
| Vyner Place | 61 |
| SUB TOTAL | 672 |
| Letters & Lochside | 91 |
| Braemore & Leckmelm | 99 |
| Rhue, Ardmair, Strathkanaird | 97 |
| SUB TOTAL | 287 |
| Badlurach, Durnamuck, Badcaul, Ardessie & Camusnagaul | 72 |
| Gruinard, The Coasts & Sand Passage | 55 |
| Dundonnell, Badrallach, Scouraig & Altnaharrie | 67 |
| SUB TOTAL | 194 |
| Reiff, Altandhu, Polbain & The Summer Isles | 64 |
| Achiltibuie, Achnaherd & Culnacraig | 83 |
| SUB TOTAL | 147 |
| Laide and Mellon Udrigle | 75 |
| SUB TOTAL | 75 |
| Elphin | 59 |
| SUBTOTAL | 59 |
| GRAND TOTAL | 1434 |

⁴ collated from <https://www.streetcheck.co.uk/postcode/>

⁵ collated from <http://www.samknows.com/>

Appendix 2 has a full list of postcodes for Highland Community Broadband and any property in those postcodes will be able to request a connection to the network (except Elphin, Ledmore & Knockan). We will connect all premises at a standard rate although those on the extremes may have to wait for network infill. Any premises that are a spur from our initial postcodes can be connected but they will have to pay for additional stations which will then become part of our network.

The following map has our provisional station and relay locations on it. The link to Elphin, Ledmore and Knockan is not shown as we have not undertaken survey or produced a cost analysis. This omission has no bearing on the general viability or financial projections of the current project.



Our backhaul access (i.e. our network's connection to the greater Internet) will be supplied by Fluency (part of Commsworld). They will install equipment in the BT exchange in Ullapool and run a fibre link to Lochbroom FM where we will install our server and main transmission equipment. Fluency have experience in supplying backhaul access to Community Broadband Schemes in Scotland and are supplying access to the West Coast Backbone which connect many of these out of Mallaig.

Given that there would have to be a local network to support Backhaul Access to areas beyond those where FTTC is available we have decided to install a 450Mbps Wireless Network across the area, including Ullapool, with 100% coverage. This is easily upgradeable to 1Gbps when required. The individual connections will have equipment rated to 150Mbps however we will be promoting a service of up to 50Mbps in the initial stages of operation. Equally we will aim for synchronous

connection in the medium term but initially we will offer an up to 50Mbps download and up to 20Mbps upload for residential premises. Our transmission stations will be built as a circuit to ensure resilience should one station fail.

We will be using Ubiquiti equipment across our network which is a current standard for Wireless Community Broadband Schemes throughout Scotland. Furthermore Ubiquiti supply networking software along with the hardware so ensuring ease of operation and future expansion. Although we offer both self-install and paid for installation, we will keep ownership of the networking kit. This will enable us to monitor the network end-to-end. We will install our own specified CPE (Consumer Premises Equipment) and end users can connect whatever equipment they wish but we will not allow consumers to use their own routers. This may sound prescriptive but it will allow us to keep to a level of customer service that we would otherwise not be able to achieve. Our standard router is the Ubiquiti AirRouter HP Indoor 802.11n WiFi Router which has four 10/100 LAN Ethernet ports and one 10/100 WAN Ethernet port uses 802.11 b/g/n.

Since the technology is cheap and quick to install in additional premises (£100 equipment cost and on average two hours labour) we expect a rapid deployment which will only be limited by the time taken to install additional transmission stations and the manpower available. Assuming we start in October 2016 we should have the bulk completed by June 2017. The network will be able to handle all current and future demands for at least the next ten years including Cloud Services, VOIP, Video on Demand and 4K TV, Health Services and Alarm Systems (both personal and buildings).

The main Glac Bheithe Station will be run on renewables with a mains backup fed from the Altnaharrie Inn. The Pilot deployment will demonstrate whether we can rely on renewables (a solar / wind combination with 48 hour battery backup) or whether we will have to consider a mains connection, which is feasible if awkward! If renewables prove unreliable this will have a bearing on where future stations can be placed.

Our pilot scheme will connect via a transmitter station at Glac Bheithe, overlooking Ullapool, to UCT's Hub, Lochbroom FM and certain other locations using a standard 78Mbps FTTC Business Line and will allow for testing hardware, software network speeds and user demand. As soon as we have 100 paid consumer premises installed we can cover core costs (£20k). By the time we have the leased line installed at LochbroomFM we will already have connected 300 residential premises and we can cover both core costs and operating costs. The network will go live as soon as the Leased Line is connected. This will represent a 45% take up rate in just Ullapool but should we not be able to meet this target a small additional expenditure (£2000) will allow us to cover the rest of Lochbroom and 300 of that represents a 31% subscription rate which is in line with the most modest community broadband schemes (i.e. offering an 8Mbps service) and well below those offering 30Mbps+ Next Generation Access (NGA). We expect Ullapool installation to take up to four months, which each additional area taking one month to fully install.

As we continue to operate we will start a series of rolling upgrades both to our own backhaul and to consumer connections on a five yearly basis. This will ensure that

our network keeps up with speed demands that we do not suffer from unexpected failures.

The network will have a 48hour backup in case of power failure so that consumers can continue to use their equipment, assuming they have their own power supply. This means that should they have a VOIP service, having given up their POTS, they can still use their landline phone in an emergency. We will not offer a VOIP service as there are many companies that already do this however we will recommend Vonage.

The total build cost will be £164,500. We need to raise £75,000 to build and install our backhaul, build our broadcast stations and install consumer premises equipment in 190 houses. Further expansion and installations will come from cashflow.

Initially it has been agreed that although all contractors will bill at their full hourly rate for work we will only have to pay 50% until either our cashflow or cumulative balance is positive whereupon we will pay the outstanding 50% in stages. Once we have settled outstanding balances we will pay the contractors an hourly rate as well as mileage and travel time.

Once we have 450 subscribers we will appoint a full time office administrator for support, installation scheduling, and accounts. We estimate that we will need 1 full time member of staff to operate the network once we have more than 450 subscribers and this will cost £25K/pa. Should we exceed 688 subscribers we will take on additional staff.

Excess income will be used to create a contingency fund that could also be used for further expansion. Subsequent excess will be distributed via a Community Benefit Fund.

We would like to find a way to offer femtocells for improved cellular access however the legal position is complicated and it may be beyond our resources at present. Femtocells from third party suppliers (Vodafone, o2, T-Mobile and Orange) can be used with our network.

Each subscriber will automatically be a voting shareholder in Highland Community Broadband Community Interest Company.

We envisage being able to offer local children work experience and holiday / weekend employment in both the office and field.

Key Dates:

- September - Fundraising
- October - Ullapool Village (Alpha Testing)
- November - Ullapool Village (Beta Testing)
- December - Ullapool Village
- January – Ullapool Village & Southern Loch Broom / Lochside. Our network goes live.
- February - Northern Loch Broom including Ardmair and Strathcanaird
- March - Little Lochbroom & Gruinard Bay
- April - Coigach
- May - 2nd wave installations
- June onwards - ad hoc installations.
- There is a self-installation option that will mean that many will be able to subscribe as soon as the network goes live.

5. Project Costs

5.1 CAPEX

Based on our initial estimates, using existing community wireless broadband schemes, the full cost for a build out to 688 properties (50% of the 1375 total) will be £164,500.

£20,000 for central equipment, office etc.

£25,000 for the wireless backhaul

- £20,000 for the materials
- £5,000 for the installation

£119,500 for the connections to properties

- £68,800 for the materials
- £51,600 for the labour

For the initial build out to 100 properties in Ullapool (which would cover our core costs) will be £52,500

£20,000 for central equipment

£15,000 for the wireless backhaul station

- £13,000 for the materials
- £2,000 for the installation

£17,500 for the connections.

- £10,000 for the materials
- £7,500 for the labour

For the initial build out to 300 properties in Ullapool and other locations that can be reached from the Glac Bheithe station (which would cover our operating costs) will be £87,500

£20,000 for central equipment

£15,000 for the wireless backhaul station

- £13,000 for the materials
- £2,000 for the installation

£52,500 for the connections

- £30,000 for the materials
- £22,500 for the labour

Any installations above the 50% figure will be connections cost only. Installations cost us £175 per property but those that are self-install equipment only cost us £75.

If we wanted 100% coverage and connect all 1375 premises across the project area the total budget would be £285,625⁶.

5.2 OPEX

Our operating costs are made up of our backhaul leasing as well as general company costs such as office space, insurance and day to day expenses.

These amount to £45,600 pa in Year One excluding staffing costs. At 300 residential properties we can cover operating costs including a 1 FTE (full time equivalent) administrators / technical support. We will increase the numbers of office staff to two full time, one as administrator and another as an assistant also dealing with technical support once we are up to 688 premises.

Only the office staff will be full time, all other staff will be contractors. We envisage that once the equipment is up and running there will be ongoing maintenance but due to the geography it is easier to have local contractors in the four areas to undertake this.

We have allocated £1000 per month for ongoing maintenance which includes parts and labour. We will also have a £30,000 contingency fund by December 2017 which allows us the finances to replace the full backbone in an emergency.

⁶Comprised of Backhaul Installation £20,000, Wireless Backhaul Network £25,000, 1375 Installations at £175 each, £227,500 = £240,625.

6. Project Funding

We aim to raise £75,000. This amount enables us to cover our operating costs by installing a transmission station at Glac Bheithe and the building the rest of our network as well as connecting those Founder Subscribers.

We propose to raise this by appealing to 190 founder subscribers to pay for their installation and first year's service in a lump sum, and getting fourteen months service for the price of twelve, for a total of £400. They will also help those in the community who would like to subscribe but can only afford a monthly charge once the network is built. Other subscriber tiers are available but we have based our calculations on what we believe will be the most popular service.

If we do not meet the funding target we will approach Community Broadband Scotland for funding. However we will only be able to apply for areas outside beyond Ullapool, Braes of Ullapool, Rhue and Laide. We expect applying to CBS for funding will add an extra 12 months to the start date; October 2017 rather than October 2016.

Supporter:

- £50 - show your support and receive our "I'm a supporter" car sticker.

Residential & Home Business Subscriber:

- £100 - Phase Two Standard Tariff : Free Installation in Phase Two
- £265 - Self-Install Low Usage Tariff : Receive an installation kit in Phase One with free connection for 14 months
- £325 - Self-Install Standard Tariff : Receive an installation kit in Phase One with free connection for 14 months
- £340 - Phase One Low Usage Tariff : Free Installation in Phase One and free connection for 14 months
- £400 - Phase One Standard Tariff : Free Installation in Phase One and free connection for 14 months

Business Subscriber:

- £100 - Phase One Large Business : Free Installation in Phase One and free connection for 14 months
- £200 - Phase One Medium Business : Free Installation in Phase One and free connection for 14 months
- £700 - Phase One Small Business : Free Installation in Phase One and free connection for 14 months

- £1300 – Phase One Medium Business : Free Installation in Phase One and free connection for 14 months
- £2600 – Phase One Large Business : Free Installation in Phase One and free connection for 14 months

Sponsor:

- £2000 - Sponsor a Station : Found a relay station and get a Standard Tariff Residential Package in Phase One, free installation, free connection for 2 years and name the Station (if you wish and within the bounds of taste and decency!)
- £4000 - Sponsor Two Stations : Found two relay stations and get a Standard Tariff Residential Package in Phase One, free installation, free connection for 3 years and name the Stations (if you wish and within the bounds of taste and decency!)
- £6000 - Sponsor Three Stations : Found three relay stations and get a Standard Tariff Residential Package in Phase One, free installation, free connection for 5 years and name the Stations (if you wish and within the bounds of taste and decency!)
- £10000 – Sponsor the Glac Beithe Base Station : Found the most important part of the HCB network, the base transmitter and relay hub that is the foundation of our networks backbone, your name will be credited on the station name plate (if you wish!) and you can choose any Tariff Package up to Medium Business in Phase One with free installation and free connection for 10 years
- £15000 – Backbone Founder : You will be the founder of the outlying wireless network enabling us to reach people that never imagined they would get superfast broadband, as a small token of our appreciation you will be able to choose any Tariff Package up to Medium Business in Phase One with free installation, free connection for 12 years and the network will be named after you (if you wish!)

6.1 Connection fees and service charges

Based on our build out spread over the next six months we will have covered 1375 premises. At a 50% take-up rate we will have 688 premises connected in total which should take us a total of six months.

Low User Tariff:

- £20 per month
- £100 Installation (£25 Self-Installation)
- 10GB monthly cap
- 50Mbps Download
- 20Mbps Upload

Standard User Tariff (includes Home Business)

- £25 per month
- £100 Installation (£25 Self-Installation)
- Unlimited download
- 50Mbps Download
- 20Mbps Upload

Small Business

- £50 per month
- £100 installation
- 40Mbps Download
- 20Mbps Upload
- Priority support

Medium Business

- £100 per month
- £100 installation
- 80Mbps Download
- 20Mbps Upload
- Priority support

Large Business

- £200 per month
- £200 installation
- 120Mbps Download
- 20Mbps Upload
- Priority support

As we can connect up each subscriber we get the connection fee of £100 (including VAT) and we aim to install 100 premises per month. Once connected we expect the majority to pay £25pm which generates £300pa (including VAT). At the very least they will pay £20pm which will generate £240pa (including VAT). We estimate that with our backbone built out and with a 50% subscription rate our annual yield will be £156,000. Every 5% increase in subscription gives us an additional yield of £15,600.

We believe that additional subscribers will join as they see neighbours use our service or as they experience problems with their ADSL. Our greatest marketing will be the recommendation of others, closely followed by experience of our service. This is why we will have a “try before you buy” experience in the UCT hub specifically set up so that users can experience UHD and 360° videos as well as cloud services.

Furthermore it is unlikely that BT Openreach has the will to expand their fibre service the existing to communities on the periphery and neither does the government have the capital to subsidise this. Satellite suffers from both latency, contention, bandwidth and download cap issues and it is unlikely that 4G/5G will be available here anytime soon when most of the area still only has 2G and the existing 3G network in Ullapool is overloaded and frequently grinds to a halt.

We expect that we will be able to help provide NHS Scotland supported living service⁷ to the elderly and infirm to enable them to stay in their own home. Although they may not initially be subscribers it is possible that we can work with NHS Scotland to provide a connection purely to be used with these services.

Therefore we expect the subscription rate to increase as we can provide a far superior service, we are local and we are Community Interest Company whose “profits” will be distributed in our service area.

6.2 Grant Funding

We understand that the Better Broadband Scheme in Scotland will be opened up in January 2017 from solely Satellite ISPs at present to Wireless ISPs. The maximum amount available per household will be £350 which must include the installation and the first year’s subscription. This will only be available to premises with less than 2Mbps service.⁸

We will help neighbouring areas to prepare and submit proposals to Community Broadband Scotland for further expansion if the areas express interest and they so wish.

⁷ <http://www.nhs.uk/Conditions/social-care-and-support-guide/Pages/supported-living-services.aspx>

⁸ <https://www.scotlandsuperfast.com/where-when/the-programme/better-broadband-scheme/>

Appendix 1 – Budget spreadsheet

| | Sep-16 | Oct-16 | Nov-16 | Dec-16 | Jan-17 | Feb-17 | Mar-17 | Apr-17 | May-17 | Jun-17 | Jul-17 | Aug-17 | Sep-17 |
|---------------------------------------------------------|--------|---------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|---------|
| Take up | | 1% | 7% | 14% | 20% | 27% | 33% | 39% | 41% | 43% | 45% | 47% | 48% |
| Total properties passed | | 609 | 609 | 609 | 609 | 953 | 1,153 | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 |
| Properties connected | | 13 | 101 | 190 | 280 | 365 | 450 | 535 | 565 | 591 | 616 | 641 | 666 |
| New Property connections (Home@£100) | | 5 | 75 | 75 | 75 | 75 | 75 | 75 | 20 | 20 | 20 | 20 | 20 |
| New Property connections (Home Self Install@£25) | | 0 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 |
| New Property connections (Small Business@£100) | | 5 | 6 | 6 | 7 | 3 | 4 | 4 | 4 | 1 | 1 | 1 | 1 |
| New Property connections (Medium Business@£100) | | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| New Property connections (Large Business@£200) | | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Build cost - Core (2016) 50% in first year | | £10,000 | £10,000 | £5,000 | | | | | | | | | |
| Build cost - Core (2017) 50% in second year | | | | | | | | | | | | | |
| Costs of connecting properties (@£100) | | £1,300 | £8,400 | £8,400 | £8,500 | £8,000 | £8,000 | £8,000 | £2,500 | £2,100 | £2,100 | £2,100 | £2,100 |
| CAPEX = | | £11,300 | £18,400 | £13,400 | £8,500 | £8,000 | £8,000 | £8,000 | £2,500 | £2,100 | £2,100 | £2,100 | £2,100 |
| Core Costs | | £500 | £500 | £500 | £17,100 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 |
| Staffing Costs | | | £0 | £0 | £0 | £2,000 | £2,000 | £2,000 | £2,000 | £2,000 | £2,000 | £2,000 | £2,000 |
| Contractor Costs (@25pr) | | £2,500 | £2,100 | £2,100 | £2,125 | £2,000 | £2,000 | £2,000 | £625 | £525 | £3,150 | £3,175 | £3,050 |
| OPEX = | | £3,000 | £2,600 | £2,600 | £19,225 | £7,000 | £7,000 | £7,000 | £5,625 | £5,525 | £8,150 | £8,175 | £8,050 |
| Expenditure = | | £14,300 | £21,000 | £16,000 | £27,725 | £15,000 | £15,000 | £15,000 | £8,125 | £7,625 | £10,250 | £10,275 | £10,150 |
| Income from connection fees (Home@£100) | | £0 | £0 | £0 | £7,500 | £7,500 | £7,500 | £7,500 | £2,000 | £2,000 | £2,000 | £2,000 | £2,000 |
| Income from connection fees (Home Self Install@£25) | | £0 | £0 | £0 | £125 | £125 | £125 | £125 | £125 | £125 | £100 | £100 | £100 |
| Income from connection fees (Small Business @ £100) | | £0 | £0 | £0 | £700 | £300 | £400 | £400 | £400 | £100 | £100 | £100 | £100 |
| Income from connection fees (Medium Business@ £100) | | £0 | £0 | £0 | £200 | £100 | £100 | £100 | £100 | £0 | £0 | £0 | £0 |
| Income from connection fees (Large Business@ £200) | | £0 | £0 | £0 | £200 | £200 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| Income from monthly service fees (Home Low User@£20) | | £0 | £0 | £0 | £320 | £640 | £960 | £1,280 | £1,380 | £1,480 | £1,576 | £1,672 | £1,768 |
| Income from monthly service fees (Home Standard@£25) | | £0 | £0 | £0 | £1,600 | £3,200 | £4,800 | £6,400 | £6,900 | £7,400 | £7,880 | £8,360 | £8,840 |
| Income from monthly service fees (Small Business@£50) | | £0 | £0 | £0 | £350 | £500 | £700 | £900 | £1,100 | £1,150 | £1,200 | £1,250 | £1,300 |
| Income from monthly service fees (Medium Business@£100) | | £0 | £0 | £0 | £200 | £300 | £400 | £500 | £600 | £600 | £600 | £600 | £600 |
| Income from monthly service fees (Large Business@£200) | | £0 | £0 | £0 | £200 | £400 | £400 | £400 | £400 | £400 | £400 | £400 | £400 |
| Income = | | £75,000 | £0 | £0 | £11,395 | £13,265 | £15,385 | £17,605 | £13,005 | £13,255 | £13,856 | £14,482 | £15,108 |
| Cash flow = | | £75,000 | £-14,300 | £-21,000 | £-16,000 | £-16,330 | £-1,735 | £385 | £2,605 | £4,880 | £5,630 | £3,606 | £4,958 |
| Cumulative Balance = | | £75,000 | £60,700 | £39,700 | £23,700 | £7,370 | £5,635 | £6,020 | £8,625 | £13,505 | £19,135 | £22,741 | £26,948 |

| Oct-17 | Nov-17 | Dec-17 | Jan-18 | Feb-18 | Mar-18 | Apr-18 | May-18 | Jun-18 | Jul-18 | Aug-18 | Sep-18 |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|
| 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% | 50% |
| 1,375 | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 | 1,375 | 1,300 | 1,300 | 1,300 | 1,300 |
| 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 |
| 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | |
| £1,800 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| £1,800 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| £3,000 | £4,600 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 | £3,000 |
| £2,000 | £2,000 | £2,000 | £4,000 | £4,000 | £4,000 | £4,000 | £4,000 | £4,000 | £4,000 | £4,000 | £4,000 |
| £2,900 | £3,000 | £1,625 | £3,625 | £3,625 | £3,650 | £3,525 | £3,450 | £3,000 | £1,625 | £1,000 | £1,000 |
| £7,900 | £9,600 | £6,625 | £10,625 | £10,625 | £10,650 | £10,525 | £10,450 | £10,000 | £8,625 | £8,000 | £8,000 |
| £9,700 | £9,600 | £6,625 | £10,625 | £10,625 | £10,650 | £10,525 | £10,450 | £10,000 | £8,625 | £8,000 | £8,000 |
| £1,700 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| £100 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| £100 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 |
| £1,852 | £1,852 | £1,852 | £1,852 | £1,852 | £2,508 | £2,508 | £2,508 | £2,508 | £2,508 | £2,508 | £2,508 |
| £9,260 | £9,260 | £9,260 | £9,260 | £9,260 | £12,540 | £12,540 | £12,540 | £12,540 | £12,540 | £12,540 | £12,540 |
| £1,350 | £1,350 | £1,350 | £1,350 | £1,350 | £2,200 | £2,200 | £2,200 | £2,200 | £2,200 | £2,200 | £2,200 |
| £600 | £600 | £600 | £600 | £600 | £1,200 | £1,200 | £1,200 | £1,200 | £1,200 | £1,200 | £1,200 |
| £400 | £400 | £400 | £400 | £400 | £700 | £700 | £700 | £700 | £700 | £700 | £700 |
| £15,362 | £13,462 | £13,462 | £13,462 | £13,462 | £19,148 | £19,148 | £19,148 | £19,148 | £19,148 | £19,148 | £19,148 |
| £5,662 | £3,862 | £6,837 | £2,837 | £2,837 | £8,498 | £8,623 | £8,698 | £9,148 | £10,523 | £11,148 | £11,148 |
| £37,568 | £41,430 | £48,267 | £51,104 | £53,941 | £62,439 | £71,062 | £79,760 | £88,908 | £99,431 | £110,579 | £121,727 |

Appendix 2 – Coverage Post Codes

IV22

[First Coast, Laide, Achnasheen, Scotland, IV22 2NE](#)
[Second Coast, Laide, Achnasheen, Scotland, IV22 2NF](#)
[Laide, Achnasheen, Scotland, IV22 2NG](#)
[Gruinard, Laide, Achnasheen, Scotland, IV22 2NH](#)
[Gruinard, Laide, Achnasheen, Scotland, IV22 2NQ](#)
[Laide, Achnasheen, Scotland, IV22 2NB](#)
[Sand Laide, Achnasheen, Scotland, IV22 2ND](#)
[Columba Court, Laide, Achnasheen, Scotland, IV22 2NL](#)
[Laide, Achnasheen, Scotland, IV22 2NP](#)
[Udrigle, Laide, Achnasheen, Scotland, IV22 2NR](#)
[Achgarve, Laide, Achnasheen, Scotland, IV22 2NS](#)
[Mellon Udrigle, Laide, Achnasheen, Scotland, IV22 2NT](#)
[Opinan, Laide, Achnasheen, Scotland, IV22 2NU](#)

IV23

[Dundonnell, Garve, Scotland, IV23 2QN](#)
[Badralloch, Dundonnell, Garve, Scotland, IV23 2QP](#)
[Dundonnell, Garve, Scotland, IV23 2QR](#)
[Camusnagaul, Dundonnell, Garve, Scotland, IV23 2QT](#)
[Ardessie, Dundonnell, Garve, Scotland, IV23 2QU](#)
[Dundonnell, Garve, Scotland, IV23 2QW](#)
[Badbea, Dundonnell, Garve, Scotland, IV23 2QX](#)
[Badcaul, Dundonnell, Garve, Scotland, IV23 2QY](#)
[Durnamuck, Dundonnell, Garve, Scotland, IV23 2QZ](#)

[Badluarach, Dundonnell, Garve, Scotland, IV23 2RA](#)
[Lochbroom, Garve, Scotland, IV23 2RB](#)
[Dundonnell, Garve, Scotland, IV23 2RE](#)
[Lochbroom, Garve, Scotland, IV23 2RG](#)
[Leckmelm, Lochbroom, Garve, Scotland, IV23 2RH](#)
[Leckmelm, Lochbroom, Garve, Scotland, IV23 2RL](#)
[Campbellton, Lochbroom, Garve, Scotland, IV23 2RN](#)
[Ardcharnich, Lochbroom, Garve, Scotland, IV23 2RQ](#)
[Leckmelm, Lochbroom, Garve, Scotland, IV23 2RR](#)
[Lochbroom, Garve, Scotland, IV23 2RS](#)

[Braemore, Lochbroom, Garve, Scotland, IV23 2RT](#)
[Fasnagrianach, Lochbroom, Garve, Scotland, IV23 2RU](#)
[Lochbroom, Garve, Scotland, IV23 2RW](#)
[Lochbroom, Garve, Scotland, IV23 2RX](#)
[Auchindrean, Lochbroom, Garve, Scotland, IV23 2RY](#)
[Lochbroom, Garve, Scotland, IV23 2RZ](#)
[Achlunachan, Lochbroom, Garve, Scotland, IV23 2SA](#)
[Crofton, Lochbroom, Garve, Scotland, IV23 2SB](#)
[Letters, Lochbroom, Garve, Scotland, IV23 2SD](#)
[Ardindrean, Lochbroom, Garve, Scotland, IV23 2SE](#)
[Rhiroy, Lochbroom, Garve, Scotland, IV23 2SF](#)
[Loggie, Lochbroom, Garve, Scotland, IV23 2SG](#)
[Lochbroom, Garve, Scotland, IV23 2YD](#)

IV26

[Morefield Lane, Ullapool, Scotland, IV26 2PH](#)
[Morefield Industrial Estate, Morefield, Ullapool, Scotland, IV26 2SR](#)
[Ullapool, Scotland, IV26 2SS](#)
[Parc Mhor, Ullapool, Scotland, IV26 2SW](#)
[Garve Road, Ullapool, Scotland, IV26 2SX](#)
[Garve Road, Ullapool, Scotland, IV26 2SY](#)
[Ullapool, Scotland, IV26 2SZ](#)
[Ullapool, Scotland, IV26 2TB](#)
[St Valery Place, Ullapool, Scotland, IV26 2TD](#)
[Riverside Terrace, Ullapool, Scotland, IV26 2TE](#)
[Moss Road, Ullapool, Scotland, IV26 2TF](#)
[Moss, Ullapool, Scotland, IV26 2TG](#)
[North Road, Morefield, Ullapool, Scotland, IV26 2TH](#)
[Rhue, Ullapool, Scotland, IV26 2TJ](#)
[Ullapool, Scotland, IV26 2TL](#)
[Ardmair, Ullapool, Scotland, IV26 2TN](#)
[Strathkanaird, Ullapool, Scotland, IV26 2TP](#)
[Ullapool, Scotland, IV26 2TQ](#)
[Morefield, Ullapool, Scotland, IV26 2TR](#)
[Morefield Place, Ullapool, Scotland, IV26 2TS](#)
[Kanachrine Court, Morefield, Ullapool, Scotland, IV26 2TU](#)
[Ullapool, Scotland, IV26 2TW](#)

[Kanachrine Place, Ullapool, Scotland, IV26 2TX](#)
[West Argyle Street, Ullapool, Scotland, IV26 2TY](#)
[Argyle Street, Ullapool, Scotland, IV26 2UB](#)
[Argyle Street, Ullapool, Scotland, IV26 2UD](#)
[Quay Street, Ullapool, Scotland, IV26 2UE](#)
[Quay Street, Ullapool, Scotland, IV26 2UG](#)
[The Pier, Ullapool, Scotland, IV26 2UH](#)
[Shore Street, Ullapool, Scotland, IV26 2UJ](#)
[Mill Street, Ullapool, Scotland, IV26 2UN](#)
[Pulteney Street, Ullapool, Scotland, IV26 2UP](#)
[Quay Street, Ullapool, Scotland, IV26 2UQ](#)
[West Shore Street, Ullapool, Scotland, IV26 2UR](#)
[Seaforth Lane, Seaforth Road, Ullapool, Scotland, IV26 2US](#)
[West Lane, Ullapool, Scotland, IV26 2UT](#)
[West Terrace, Ullapool, Scotland, IV26 2UU](#)
[Ladysmith Street, Ullapool, Scotland, IV26 2UW](#)
[Fraser Place, Ullapool, Scotland, IV26 2UX](#) [Seaforth Road, Ullapool, Scotland, IV26 2UY](#)
[Fraser Court, Ullapool, Scotland, IV26 2UZ](#)
[Ullapool, Scotland, IV26 2WE](#)
[Mill Street Industrial Estate, Ullapool, Scotland, IV26 2WN](#)
[Ullapool, Scotland, IV26 2WW](#)
[Morefield, Ullapool, Scotland, IV26 2WX](#)
[Quay Street, Ullapool, Scotland, IV26 2XA](#)
[Latheron Lane, Ullapool, Scotland, IV26 2XB](#)
[Castle Terrace, Ullapool, Scotland, IV26 2XD](#)
[Market Street, Ullapool, Scotland, IV26 2XE](#)
[Custom House Street, Ullapool, Scotland, IV26 2XF](#)
[Riverside Terrace, Ullapool, Scotland, IV26 2XG](#)
[Broom Park, Ullapool, Scotland, IV26 2XH](#)
[Broom Park, Ullapool, Scotland, IV26 2XJ](#)
[North Road, Ullapool, Scotland, IV26 2XL](#)
[Morefield Crescent, Ullapool, Scotland, IV26 2XN](#)
[Broom Court, North Road, Ullapool, Scotland, IV26 2XP](#)
[Ullapool, Scotland, IV26 2XQ](#)
[Vyner Place, Ullapool, Scotland, IV26 2XR](#)
[Royal Park, Mill Street, Ullapool, Scotland, IV26 2XT](#)
[Broom Park, Ullapool, Scotland, IV26 2XU](#)
[Moss Bridge Court, Moss, Ullapool, Scotland, IV26 2XW](#)

[Ullapool, Scotland, IV26 2XY](#)

[Ullapool, Scotland, IV26 2YA](#)

[Ullapool, Scotland, IV26 2YB](#)

[Island View, Achiltibuie, Ullapool, Scotland, IV26 2YF](#)

[Achiltibuie, Ullapool, Scotland, IV26 2YG](#)

[Polglass, Achiltibuie, Ullapool, Scotland, IV26 2YH](#)

[Badenscallie, Achiltibuie, Ullapool, Scotland, IV26 2YJ](#)

[Achiltibuie, Ullapool, Scotland, IV26 2YL](#)

[Achiltibuie, Ullapool, Scotland, IV26 2YN](#)

[Achiltibuie, Ullapool, Scotland, IV26 2YP](#)

[Achiltibuie, Ullapool, Scotland, IV26 2YQ](#)

[Altandhu, Achiltibuie, Ullapool, Scotland, IV26 2YR](#)

[Achiltibuie, Ullapool, Scotland, IV26 2YS](#)

[Achnahaird, Achiltibuie, Ullapool, Scotland, IV26 2YT](#)

[Polbain, Achiltibuie, Ullapool, Scotland, IV26 2YW](#)

IV27

[Elphin, Lairg, Scotland, IV27 4HH](#)

[Elphin, Lairg, Scotland, IV27 4HL](#)

[Elphin, Lairg, Scotland, IV27 4HN](#)

Appendix 3 – Housing and Population Figures⁹

| Township | Properties | Population |
|-------------------------------------------------------|-------------|------------|
| Braes of Ullapool | 63 | 111 |
| Ullapool (East of North Street) | 64 | 157 |
| Ullapool (Garve Road) | 60 | 118 |
| Ullapool (Shore Street & Quay Street) | 82 | 140 |
| Ullapool (Ladysmith Street) | 103 | 223 |
| Ullapool (Seaforth Road & West Terrace) | 72 | 133 |
| Ullapool (St Valery Place) | 65 | 120 |
| Ullapool (Riverside Terrace & Moss Road) | 51 | 122 |
| Morefield Place | 51 | 123 |
| Vyner Place | 61 | 161 |
| SUB TOTAL | 672 | |
| Letters & Lochside | 91 | 173 |
| Braemore & Leckmelm | 99 | 131 |
| Rhue, Ardmail, Strathkanaird | 97 | 157 |
| SUB TOTAL | 287 | |
| Badlurach, Durnamuck, Badcaul, Ardessie & Camusnagaul | 72 | 149 |
| Gruinard, The Coasts & Sand Passage | 55 | 73 |
| Dundonnell, Badrallach, Scouraig & Altnaharrie | 67 | 108 |
| SUB TOTAL | 194 | |
| Reiff, Altandhu, Polbain & The Summer Isles | 64 | 113 |
| Achiltibuie, Achnaherd & Culnacraig | 83 | 115 |
| SUB TOTAL | 147 | |
| Laide and Mellon Udrigle | 75 | 104 |
| SUB TOTAL | 75 | |
| Elphin | 59 | 103 |
| SUBTOTAL | 59 | |
| GRAND TOTAL | 1434 | 2634 |

⁹ All figures taken from <http://www.streetcheck.co.uk/>

Appendix 4 – Equipment Specifications

| Location | Location Component | QTY | Part No: | Description |
|---------------|-------------------------|------|-----------------|-----------------------------------------|
| Radio Station | Lease line | 1 | | Fibre router |
| | Backhaul to Main Mast | 1 | AIRFIBER5 | 5GHz PtP Link |
| | | 1 | TPS-UPS-ST24-NB | UPS |
| | | 2 | | 12V 180ah deep cycle battery |
| | | | | |
| Main Mast | Scaffolding & Fixings | 1 | | Listed seperately |
| | | | | |
| | Backhaul to Station | 1 | AIRFIBER5 | 5GHz PtP Link |
| | | 1 | TPS-UPS-ST24-NB | UPS |
| | | 2 | | 12V 180ah deep cycle battery |
| | | 1 | RB2011UiAS-IN | MikroTik RouterBOARD |
| | | 3 | | Enclosure, backplate and mountings |
| | | 1 | | 100M Toughcable & 100 x RJ45 connectors |
| | | 3 | | Enclosure heater and stat |
| | | 1 | RD CRED100 | Electricity meter |
| | | 2000 | | 2.5mm2 3 core SWA cable |
| | | 1 | TL BSM16/6 | Consumer Unit |
| | | 1 | | Meter, CU enclosure |
| | | 1 | | Sundries, fittings, cable, glands etc |
| | | 1 | TSPOEPRO | Ubiquiti TOUGHSwitch PoE Pro (8 Port) |
| | | | | |
| | PtMP Ullapool | 3 | R5AC-PRISM | Rocket 5AC Prism radio |
| | | 1 | AP-5AC-90-HD | airPrism 5GHz HD 90° sector antenna |
| | | | | |
| | Backhaul to Achiltibuie | 1 | RM5-AC-PTP | Rocket M5 AC 450 Mbps PtP radio |
| | | 1 | 5G30 | Rocket Dish 30dBi antenna |
| | | 1 | RFAUDK25 | RF Armor dish kit |
| | | | | |
| | Backhaul to Dundonnell | 1 | RM5-AC-PTP | Rocket M5 AC 450 Mbps PtP radio |
| | | 1 | 5G30 | Rocket Dish 30dBi antenna |
| | | 1 | RFAUDK25 | RF Armor dish kit |
| | | 1 | | Mast foremote dish over horizon |
| | | 1 | | 305M Toughcable & RJ45 connectors |
| | | | | |
| | Monitoring | 1 | | Beaglebone or Raspberry Pi or small PLC |
| | | 1 | | 3G comms |
| | | | | |
| | Renewables | 1 | 175L | 118W Wind turbine |
| | | 1 | TPS-K24-120W | Sloar panels |

| Location Component | QTY | Part No: | Description |
|-----------------------|-----|--------------|-----------------------------------------|
| PtMP Achiltibuie | 1 | RM5-AC-PTMP | Rocket M5 AC 450 Mbps PtMP radio |
| | 1 | RM5-AC-PTP | Rocket M5 AC 450 Mbps PtP radio |
| | 1 | 5G30 | Rocket Dish 30dBi antenna |
| | 1 | RFAUDK25 | RF Armor dish kit |
| | 1 | 5AC22-45 | airMAX AC 5 Sector antenna 45° 22dBi |
| | 1 | | Enclosure, backplate and mountings |
| | 1 | | Enclosure heater and stat |
| | 1 | | Sundries, fittings, cable, etc |
| | 1 | TPS-MS4X4 | 8 Port Gigabit PoE injector |
| | 1 | | Scaffolding & Fixings |
| PtMP Lochside | 1 | RM5-AC-PTMP | Rocket M5 AC 450 Mbps PtMP radio |
| | 1 | 5AC22-45 | airMAX AC 5 Sector antenna 45° 22dBi |
| | 1 | RM5-AC-PTP | Rocket M5 AC 450 Mbps PtP radio |
| | 1 | 5G30 | Rocket Dish 30dBi antenna |
| | 1 | RFAUDK25 | RF Armor dish kit |
| | 1 | | Enclosure, backplate and mountings |
| | 1 | | Enclosure heater and stat |
| | 1 | | Sundries, fittings, cable, etc |
| | 1 | TPS-MS4X4 | 8 Port Gigabit PoE injector |
| | 1 | | Scaffolding & Fixings |
| PtMP Little Lochbroom | 1 | RM5-AC-PTMP | Rocket M5 AC 450 Mbps PtMP radio |
| | 1 | 5AC22-45 | airMAX AC 5 Sector antenna 45° 22dBi |
| | 1 | RM5-AC-PTP | Rocket M5 AC 450 Mbps PtP radio |
| | 1 | 5G30 | Rocket Dish 30dBi antenna |
| | 1 | RFAUDK25 | RF Armor dish kit |
| | 1 | | Enclosure, backplate and mountings |
| | 1 | | Enclosure heater and stat |
| | 1 | | Sundries, fittings, cable, etc |
| | 1 | TPS-MS4X4 | 8 Port Gigabit PoE injector |
| | 1 | | Scaffolding & Fixings |
| Monitoring | 1 | | Beaglebone or Raspberry Pi or small PLC |
| | 1 | | 3G comms |
| Renewables | 3 | 175L | 118W Wind turbine |
| | 3 | TPS-K24-120W | Solar panels |

| | |
|----------------------------------------|------------------------------------------|
| Consumer Premise Equipment | |
| Household Wireless Bridge/ Transceiver | Ubiquiti Nanobeam AC 19bBi (NBE-5AC-19) |
| Wireless Bridge (longer distances) | Ubiquiti PowerBeam AC 22dBi (PBE-M5-300) |
| Wireless Bridge (longest distances) | Ubiquiti PowerBeam AC 25dBi (PBE-M5-400) |
| Household WiFi Router | Ubiquiti Networks airRouter HP |