



The Educational Foundation of Abigail Bailey and Ann Levett



Grant Application – Upgrading the Chelveston Village Hall Network

Summary of the application

The Trustees of the Educational Foundation are seeking a grant of **£900** as a 75% contribution towards upgrading the Village Hall network to ultra-fast full fibre broadband.

The Gigaclear full fibre network in the Village was switched on at the end of January 2020. As part of its “community hub” initiative, the company has provided the Parish Council with two complementary subscriptions to its service, each for a period of 18 months. The Parish Council has asked that these connections be made available to the Parish Church and the Village Hall. The aim is to allow residents free use of the service, so that they can experience the benefits, and can have a location to get internet access in the event that their home broadband goes down. The aim is for Wi-Fi access to be available both within the buildings and outside in their grounds.

Whilst Gigaclear is providing the service, the cost of getting the connection to the buildings and the internal networking falls to the two organisations. This grant would enable the Village hall to complete the installation and take full advantage of the new connection.

Why network a Village Hall?

The Village Hall has had an internet connection since 2010. Initially this was tapped off the tenant’s connection in the adjacent School House. In 2015 the Village Hall installed a dedicated connection because it was becoming more heavily used. The internet now has a wide range of uses in the Hall:

- **Meetings:** The Parish Council and the Trustees of various charities use the internet during their meetings to access agendas, minutes, accounts, supporting documents etc.
- **Clubs and Societies:** The Nene Valley Astronomers, Women’s’ Institute and The Nene Valley Home Education Network have access to the internet during their meetings so that presenters can use web based materials during their talks.
- **Dance Classes:** They stream music during classes and demonstration videos from YouTube.
- **Gaming Clubs:** Two gaming clubs use the Hall as their base and hold weekend internet based gaming meetings.
- **Parents:** Some parents spend several hours waiting whilst their children attend classes. They use the internet connection for business, social and entertainment purposes.
- **Building Management:** Our security cameras are already connected to the internet, providing alerts when hirers open up the building and close down the building. The sound system is controlled by smart phone through Wi-Fi. We would like to connect our heating and lighting system to the internet for remote monitoring.
- **Emergencies:** The Village Hall is the emergency reception and command centre for the Village. Internet connectivity is a key requisite for this role.

Our existing 60Mbps connection is now heavily loaded and can sometimes have 30 simultaneous users, in addition to the three building management connections. The Gigaclear connection will offer a fivefold increase in capacity. It will allow more of the building management to be monitored remotely and will allow greater capacity for all users.

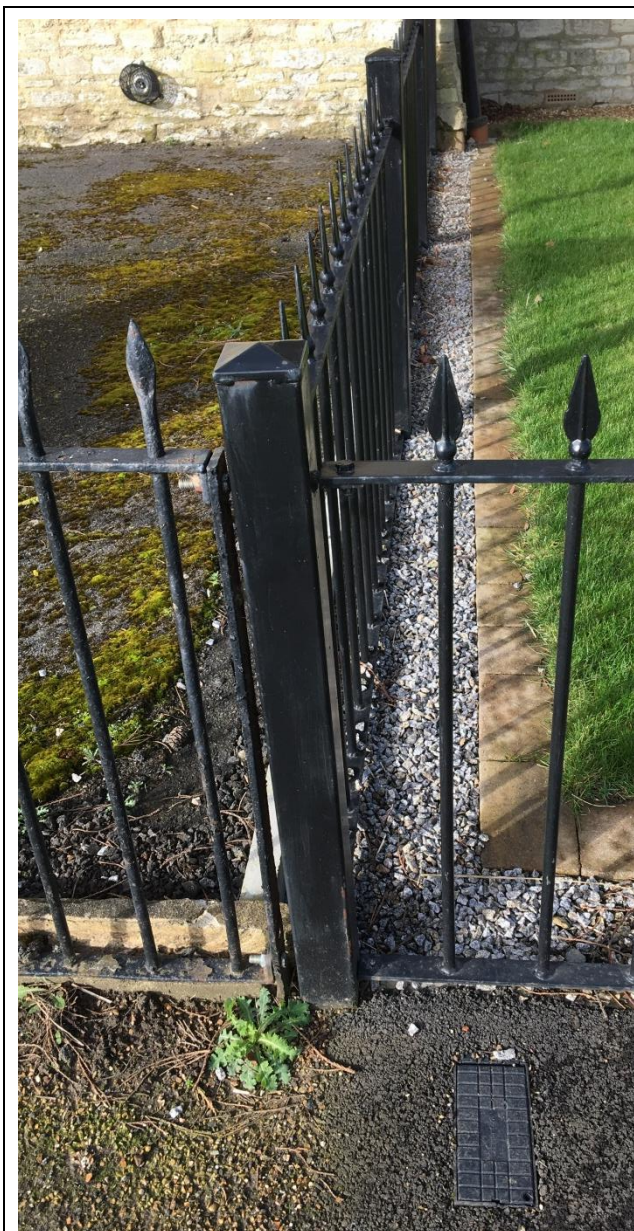
The challenges overcome and those that remain

The Gigaclear engineers provided a duct to their Point of Termination (POT) in the street. We then had to extend this duct to the Village Hall ourselves. Gigaclear engineers can’t work on heritage buildings as part of their normal installation work.

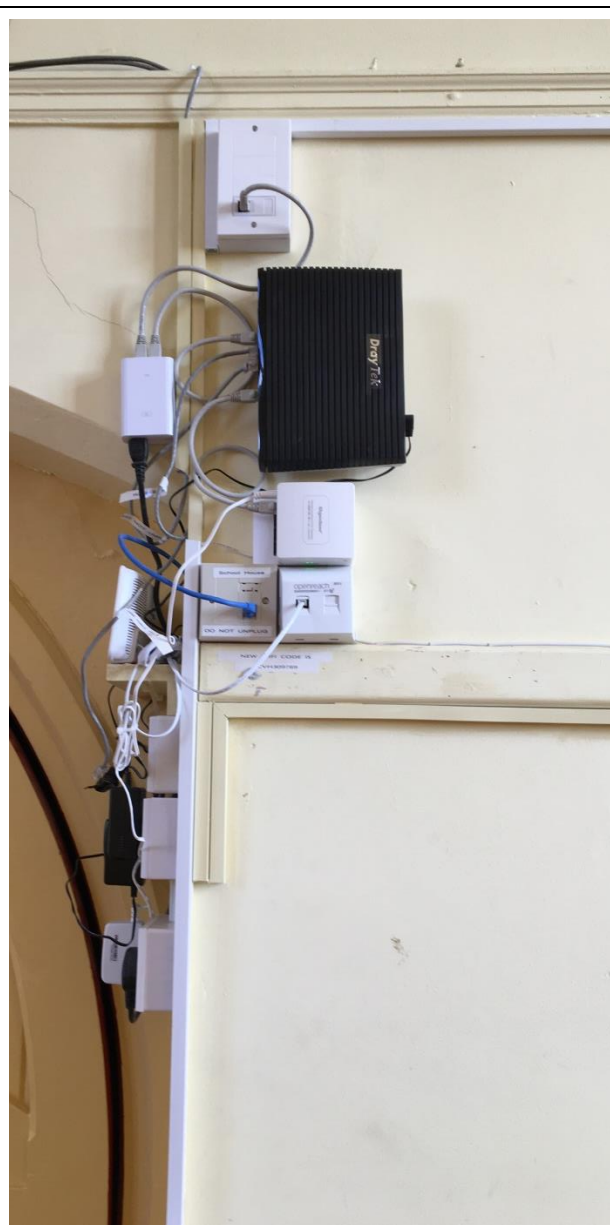
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Fortunately, we had already installed a gravel service channel from the road to the Village Hall wall when School House was refurbished in 2017. Therefore, unlike at the Church, getting the fibre optic cable into the Village Hall building was relatively simple.

We laid additional duct along this channel in the gravel from the POT right up to the point of entry to the building. Gigaclear then blew optical fibre from the Hall back to the cabinet. This all went well. The left hand photograph shows the “invisible” connection. However our problems unfolded inside the building.



Gravel service channel from POT to the Village Hall wall. The optical fibre enters the building behind the black drain pipe out of sight.



Temporary “lash up” arrangement with new router (wall mounted black box) to allow fibre to be connected into existing internal network.

When the project was planned with Gigaclear in September 2019, they said they would provide a standard 4 port internet hub. This would have been a straight swap for the hub from our existing provider PlusNet. This was ideal as it required no changes to the internal wiring and projected costs were minimal.

However, in the intervening four months the standard equipment supplied by Gigaclear has changed significantly. They now supply two units which work together – a wall mounted fibre optic modem and a separate table top router. Both need a power supply but their large power adapters don't fit together

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into a standard double socket (a clear oversight by Gigaclear!) The table top router is a bulky item and can't be wall mounted in the niche occupied by our existing hub. It also only has one Ethernet port instead of the minimum of 4 that we require.

This might work in a domestic setting but is little use in the Village Hall. On the day of installation, we were able to test the connection with their table top router but then had to disconnect it and revert back to our existing arrangements. We then purchased a wall mounted router and connected this temporarily into our system to allow us to work with the new fibre connection and understand its capabilities.

Although we can take our existing cables into the new router, the right hand photograph above shows the “rats nest” of equipment and cables that has been necessary to achieve this. This is not ideal and is not at all secure. Cables could become dislodged by Hall users, particularly during parties. The units can be also unplugged or rebooted by unauthorised users.

Our connection is certainly faster but now has a number of problems and disadvantages which emerged as we experimented with the connection:

- Our existing Wi-Fi hub was relatively powerful and projected its signal well in the building, even with 1m thick stone walls. The Gigaclear supplied hub wasn't as strong. It is a domestic unit designed to be used with repeaters throughout a large house. Each of these is a table top unit needing separate power, clearly impractical for a Village Hall.
- The existing network cabling in the Village Hall is nearly 10 years old and has been installed piece meal over the years as each new device was added. This cable cannot handle the full speed of the new fibre optic connection and is of the wrong length for access to the router in the ideal new position (hence the temporary “lash up”).
- Replacing the integrated PlusNet Wi-Fi hub with three items (Gigaclear fibre modem, a new router and a new wireless access point) needs additional power sockets, all wired back to our battery backup.
- The incoming connection is very fast but has been subject to some disruption. Some of these have been planned outages whilst the Gigaclear network is being expanded. Others have been unscheduled outages. Our security systems rely on the internet being available. We have never lost our PlusNet connection since it has been installed. These experiments have now shown how important it now is to us on a day to day basis.
- We need to be able to monitor the network remotely as it gets more complex and need alerting if it goes down.

The proposed solutions

- **Resilience:** We will obviously be pressing Gigaclear to improve reliability but clearly need a fall back option in case the Gigaclear network goes out of service. The new router already purchased has a “dual WAN” capability. It can simultaneously be connected to two different internet service providers. This will provide an “always on” option – the Gigaclear and PlusNet connections will be added together and will be resilient if one of them drops out. This could be achieved by connecting the existing PlusNet hub to the router but it would be better to replace the existing hub with a second “simple” modem, leaving the new router to be the heart of the network doing all the work. This is then easier to manage remotely.
- **Wi-Fi access:** A modern Wi-Fi “mesh” will be installed. This would have wall mounted access points throughout the building and outside as required. Initially we will start with one mesh unit and explore the coverage. More can be added seamlessly as required to give the range needed.
- **Cabling:** The router will be moved into a secure cabinet in the storage cupboard to the left of the “rats nest” in the photograph above. All the existing network cabling will be replaced and rewired to terminate in the cabinet in the latest type of cable. The battery backed power supply will be rerouted into the cabinet, where a surge protected block will supply all the units.
- **Remote management:** A “Cloud key” would be added to the network to allow the system to be remotely and securely managed.

The costs

Item	Quantity	Purpose	Cost
DrayTek V2926-K Vigor Router/Firewall (Dual-Ethernet WAN)	1	Heart of the network with two internet connections	£187.49
Draytek Vigor 130 ADSL Modem	1	To replace PlusNet Router	£84.98
Datacel 6u Wall Mounted Data Cabinet/Data Rack 390mm Deep	1	To hold all items securely in store cupboard	£72.00
300mm Deep Front Mounting Modem Shelf (1u)	2	To hold router, modem & switch	£38.64
PDU with UK 13Amp Plug Sockets	1	To power cabinet	£30.00
CE 24 Port Cat6 Patch Panel - 1u RJ45 UTP	1	To terminate cabling	£33.60
Ubiquiti UniFi US-8-150W Switch	1	To add extra ports	£186.84
Ubiquiti UniFi Controller Hybrid Cloud Key		To control network	£73.26
Ubiquiti UniFi AC Pro Indoor / Outdoor Access Point (UAP-AC-PRO)	1	Main Wi-Fi connection	£131.58
Ubiquiti UniFi AC Outdoor Mesh Pro	1	Supplementary connection	£172.62
CE Cat6 Cable U/UTP Dca LS0H 305 Metre Box	1	Cabling	£83.54
Cat 6 Patch Leads (0.5m)	10	Connections	£11.30
Trunking, pattress boxes, RJ45 sockets etc		Wiring	£90.00
Totals (all labour will be undertaken by volunteers)			£1,195.85

Finances

At the [Annual Meeting of the Foundation](#), rebuilding of the network was not considered as a large development project for the year. From the meetings with Gigaclear in September 2019, their router should have been a straight swap with little additional work. Our [2020 budget](#) therefore made an allowance of just £150.00 to cover the costs of running the ducting into the Village Hall and one additional access point to supplement the Gigaclear provided one. It now transpires that the additional work described will be required if we are to make any use of the high speed connection.

Following major refurbishment work to both the Village Hall and School House in 2017, the Foundation's actual reserves fell to **£5,376**. This was far too low to cover potential repair bills for two heritage buildings and so the Trustees reached an agreement with the Foulger Trust to provide a loan underpin the balance sheet allowing us to cover any unexpected repair bills that might arise. The Foundation paid more interest on this loan than the Foulger Trust could have otherwise earned on deposit. Everyone benefited from the arrangement. Over the last two years, the Trustees have repaid this loan and rebuilt the reserves to **£20,638**, using the rental income from School House. This level of reserves is considered the minimum sensible level for two heritage buildings which have a combined re-building cost of over **£1.2million** at the last valuation.

The Trustees feel that rebuilding the network would be of benefit to the community of users but are conscious that operating surpluses will be significantly lower in 2020 as increased fuel prices and the impact of Covid-19 take effect. Although hire charges for private parties have been increased, the Trustees have maintained the subsidised rates for Educational classes to encourage a diverse programme of affordable activities.

A **£900** grant from the Wind Farm Trust will allow us to deliver these network improvements and maintain the strong balance sheet we need to keep these heritage assets in good order.

Adrian Dale, Clerk to the Trustees