Case Study
Queen Elizabeth University Hospital Campus

Background
The new Queen Elizabeth University Hospital (QEUH) Campus is the UK’s largest Super Hospital build. The £842m campus was developed for NHS Greater Glasgow & Clyde (NHSGGC) by Brookfield Multiplex, and encompasses multiple facilities including the Queen Elizabeth University Hospital, the Royal Hospital for Children, a state-of-the-art Laboratory, Energy Management Centre, and Administration complex.

Located on the former Southern General Hospital site in Glasgow, the new world class facilities deliver the most advanced adult acute, paediatric and maternity services in the UK, and form the biggest critical care complex in Scotland, where an expected 110,000 patients will be treated every year.

The new adult hospital alone features 1109 individual patient rooms equipped to the highest standards with private facilities, television, radio and Wi-Fi access. The adjoining Royal Hospital for Children features 252 paediatric beds, accommodation for parents, a cinema, science centre, roof garden, and interactive sensory indoor and outdoor play areas.

Each part of the hospital campus has its own identity, with areas specially designed to provide quick and easy access for patient transfers, emergency care, and even a dedicated rapid access lift to take patients direct to critical care. As one of Scotland’s leading trauma centres, the new campus also features a helipad on a platform above the 14th floor roof, which is expected to receive around 500-600 patients each year.

Working closely and collaboratively with Brookfield Multiplex and Mercury Engineering, Boston Networks secured the project to design and deliver a multi-million pound state-of-the-art intelligent network infrastructure and security system to the new Queen Elizabeth University Hospital Campus, encompassing Structured Cabling, Wireless LAN, IP Video Surveillance, Access Control & Intruder Detection systems.
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Business Challenge
During the early planning stages, it was quickly identified that the new hospital campus required a future-proof, secure and highly resilient communications and security infrastructure, capable of delivering seamless connectivity and security across the entire campus.

Boston Networks design and delivery teams worked in close partnership with Brookfield Multiplex and Mercury Engineering to meticulously design and schedule the installation. Due to the sheer scale of the build, with the main hospital alone covering 165,000m² of floor space and spanning 14 floors, each floor was separated into zones, each with set entry and exit dates to facilitate the smooth installation of the 24,500 structured cabling outlets, the cabling infrastructure, optical fibre, and voice backbone cabling.

The early completion of the first communications rooms ensured the project progressed ahead of schedule and further supported the initial communications requirements by allowing the phased commissioning of Boston Networks site wide services.

Intelligence Everywhere
The intelligent network was supported by a standards based high performance Augmented Category 6 cabling solution which provides the campus with reliable and resilient mission critical operations at all times. A shielded cabling solution was specified to offer maximum protection against factors such as electromagnetic interference (EMI), and radio frequency interference (RFI), from sources such as medical equipment, which can considerably impact network performance.

Air Blown Fibre technology was selected for the building backbones to offer a flexible and future-proof solution. Cabling ducts were installed, the fibres can then be blown through the ducting as and when required. Air Blown Fibre technology was the perfect solution for the new campus as it is particularly suited to healthcare environments due to the easy upgrade path and scope for expansion, both of which can be undertaken with minimal interruption to critical hospital services.

In total, in excess of 2.5 million metres of shielded copper cable, 2 million metres of Air Blown Fibre and 25,000 RJ45 outlets were installed to connect the 60 communications rooms across the campus – all supported by a fully tested 25 year Manufacturer’s System Warranty.

The highly secure, robust, scalable, and intelligent network acts as the backbone for the entire campus to support both network and security services, to provide unrivalled levels of network performance, service and safety throughout the New campus.
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Safe & Secure
Highly secure IP Access Control, and Video Door Entry systems provide the campus with enhanced operational flexibility and centralised security management. A Power over Ethernet (PoE) solution was deployed across the 450 Access Controlled doors and 75 Video Entry doors to provide the highest level of security and safety for patients and staff 24/7.

The state-of-the-art video surveillance solution encompasses over 420 IP Video Surveillance cameras to monitor and safeguard patients, employees, and visitors throughout the facility. The scalable solution can accommodate thousands of IP surveillance cameras and delivers unsurpassed integration capabilities to ensure the campus benefits from reliable mission-critical high definition (HD) surveillance with guaranteed flexibility.

Alarm Event Display technology was deployed to link the IP Video Surveillance and Intruder Detection Systems, to deliver a flexible, centralised security solution. Alarms triggered on the intruder detection system are monitored centrally, with live footage linked to the site alarms to streamline security management by offering one comprehensive, dynamic, and real-time view of all alarms and events.

Scalable & Always Available
The high performance Wi-Fi infrastructure was designed to be scalable in order to deliver the highest levels of network availability and resiliency to support vital hospital services, and to give patients, visitors and employees fast and secure access to onsite Wi-Fi.

In total, 2,500 Cisco Wireless Access Points were configured and installed to create a robust wireless network to support a number of applications, including the secure and rapid transfer of vital Information, such as heart rate, blood pressure, and respiratory rate, to critical care when a trauma patient arrives by helicopter.

The network also supports a fleet of Automated Guided Vehicles (AGV) which work behind the scenes, using the latest RFID technology, to support the hospital supply chain by delivering medications, meals and linen via a matrix of routes.

In addition to the Intelligent Building, IP Video Surveillance, and Wireless LAN, an audio communications system, fixed and portable induction loop assistive hearing solutions were installed to provide secure and constant communication throughout the facilities.

Boundless Benefits
The specialist experience of the design, delivery, and engineering teams ensured that the project was delivered on time and to the tightest of schedules. Additionally, working collaboratively with technology partners helped to simplify planning, allocate resources, and streamline project management.

To support the NHSGGC commitment to employability, project contractors were encouraged to offer employment, training, and work experience to local residents. Boston Networks embraced the opportunity to show the local community the value and contribution they could bring to the future success of the project, by employing 8 full time apprentices, who are today now permanent, full time employees.
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In addition to sourcing local labour, Boston Networks focused on reducing waste and minimising the Carbon Footprint. All copper and optical fibre communication cables were manufactured by Carbon Neutral cable manufacturer Brand-Rex at their site in Glenrothes. Boston Networks then worked closely with Brand-Rex to store all project materials within a 4 mile radius of the site and to return waste packaging to their manufacturing facility, for it to be re-used or recycled in order to reduce the overall impact on the environment.

Perhaps the greatest benefit for the new campus was the adoption of a single intelligent network. Embracing an intelligent building strategy not only reduced commissioning times, containment, and power supply needs, but, by delivering a fully integrated and state-of-the-art IP network, the campus now has a scalable and bespoke solution offering simplified and centralised management. The entire hospital campus benefits from seamless communications and staff can now instantly access critical information, such as patient records, through the intelligent network, facilitating world class research and patient services.

Construction of the campus was completed in March 2015 and handed over to NHSGCC ahead of schedule and under budget. The campus was officially opened by the Queen in July 2015 and now serves multiple local communities, giving Glasgow one of the most advanced healthcare facilities in the UK.

Project Numbers
- 5 years from Design to Handover
- 8 Project Managers/Supervisors
- 60 Installation Engineers
- 2,500km metres of Augmented Category 6 Copper Cable
- 2,000km metres of Air Blown Fibre
- 25,000 Data Outlets
- 60 Communication Rooms
- 2,500 Cisco Wireless Access Points
- 420 High Definition IP Surveillance Cameras
- 450 Access Controlled Doors
- 75 Video Entry Doors