The future-proof nature of Trend building controls is nowhere more evident than at Plymouth’s Derriford Hospital. The latter’s site-wide BMS incorporates every generation of Trend IQ controller so far developed, all working together as an integrated, centrally managed system. The much-expanded system, whose original elements were installed in 1982, has been a key part of Derriford’s on-going and highly successful energy saving programme, and has also proved an invaluable maintenance aid. The latest phase of the BMS’s development has seen it expanded into a major new extension to the main hospital block.

Administered by Plymouth Hospital NHS Trust, Derriford provides both general hospital and specialist services, and has recently acquired a medical school. Over the last quarter of a century it has grown out of all recognition, as has its Trend BMS. Originally comprising just two controllers it now has more than 300 – a mixture of IQ1, IQ2, IQ3 and IQL series models. Among them is an IQ150 – which was the first intelligent building services controller ever to be developed.

Much of the system – particularly its more recent parts – has been supplied and engineered by Bristol-based 2As’ Limited, a Trend Technology Centre. The company’s latest project has involved installing a combination of IQ3s and IQL11s to control and monitor the HVAC services in the hospital’s new 9-storey, 12,000 m² extension, which provides additional cardiac facilities, a new general intensive care unit, a medical library and research facilities.

The 45 IQLs control office fan coil units on the building’s administration floor. The LonWorks bus to which these connect is linked via a Trend 3xtend router to an Ethernet network of 22 IQ3xcites and IQ3xacts on the ‘wet’ heating, air handlers, DHW and other plant. The same router also links the Ethernet and LonWorks networks to the site-wide internetwork that forms the BMS’s communications ‘backbone’, also connected to which are 15 LANs. Distributed across these are the numerous IQ1 and IQ2 controllers. There are also several more IQ3s, in a theatre suite extension opened last year. The entire system can be managed and monitored from a single point, through Trend supervisors in the main hospital building.

As well as controlling and monitoring the HVAC throughout the 12-storey main hospital block and its new extensions, the BMS takes in nearby staff residences, the medical school and a radiology academy, which is located about a mile away. These last two buildings were opened in 2005 and in both there are IQL-controlled fan coil units. In the medical school there are also IQLs that operate high-level windows to provide ventilation.

The progressive and easy expansion of the BMS has been facilitated by its flexible architecture, and by Trend’s...
long-standing policy of backward compatibility.

This has allowed new generations of controls – such as the IQ3 series – to be fully integrated into the existing system, avoiding the need for complex gateways or the total replacement of older controls.

Derriford has an annual energy bill of some £2,500,000 and its energy consumption in 2005/06 stood at 55.76GJ/100m³ net heated volume, which compared very favourably with other NHS hospitals of its type. (The median value for large acute units outside London was 73.91GJ/100m³.) The Trend BMS is making a significant contribution to the site’s impressive levels of energy efficiency, as it has for many years.

One way in which the system has prevented energy wastage is by enabling much stricter time control of the HVAC services, and thus preventing the unnecessary heating or cooling of unoccupied areas. Savings have even been made in the operating theatres – of which there are over 30 – by the air-handling units being automatically switched to low-speed after midnight. (The plant can be manually switched back to full-speed if a theatre is needed.)

The system is also making increasing savings through variable speed control of fans and pumps. For instance, the output of the hospital’s main hot water pumps is closely matched to demand by regulating their speed in accordance with differential pressure readings. A similar strategy will be applied to control of the secondary chilled water pumps in the new extension. Moreover, the system will be able to control the chilled water temperature on the basis of outside air temperature. There will be speed control too of the building’s three main AHUs, via Trend NX inverter drives on their supply and extract motors. A number of the air handlers in the main block are similarly equipped.

With the Department of Health requiring the NHS to cut 15% off its carbon emissions by 2010, the BMS’s energy saving role will assume even greater importance in the years ahead. Lighting control may well be part of this future role.

The savings made by the BMS have not just been in energy, as Derriford’s Maintenance Supervisor, Norman Spiller explains: “The Trend system has been an indispensable maintenance tool, one that has saved us an enormous amount of legwork. Without it we would probably have needed another dozen M&E staff.”

Using a ‘client’ Trend supervisor on his desk, Mr Spiller can view conditions and plant status throughout the hospital. He is also able to diagnose faults and adjust control settings. Further supervisors in one of the main plant rooms provide the same facility to other members of his team. It is here that system-generated plant alarms are reported.

Monitoring temperatures on the domestic hot water systems – a vital measure in preventing legionellosis – is among the BMS’s duties. Should any of a number of temperatures breach their pre-set limits an alarm is instantly generated. For example, the DHW return must be above 50°C and the cold water supply below 20°C. Every week, sensor readings stored within the controllers are automatically uploaded and archived by the main supervisor. This provides a continuous temperature record, which is an HSE requirement.

Derriford is well aware that to get the most from the BMS it must be regularly serviced and maintained. Part of this maintenance work – including the periodic recalibration of sensors – is done by the hospital’s own personnel. It also has a service agreement under which a Trend field service engineer spends a day on site every other month. In addition, Trend is working with the hospital to gradually upgrade the older IQ controls, some of which have been operating continuously for over 20 years.

2A’s Limited can be contacted on 01275 374524.