

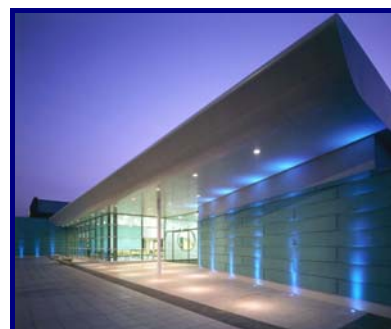
A Case Study

**Clients: Royal Liverpool & Broadgreen University Hospitals NHS Trust.
Cardiothoracic Centre, Liverpool, NHS Trust.**

Introduction.

With an area of over 25,000m² and a construction cost of £63m, this major redevelopment is the largest and highest value project delivered through the Department of Health's ProCure21 Framework.

The scheme has been constructed in seven phases, within budget and on time, and provides extensive new-build accommodation and significant alterations and extensions to the Cardiothoracic Centre's Operating Department together with the alteration and re-use of redundant accommodation.



The completed development provides the Royal Liverpool & Broadgreen University Hospitals NHS Trust with a dedicated Treatment Centre, including Orthopaedic, Urological and General Surgical facilities, Wards and a Day Surgery Unit and the Cardiothoracic Centre with an enlarged Operating Department, Catheter Laboratories, a new Critical Care facility, Out-Patient Department, Acute Wards and Health Records Department.

However, crucial to the successful functioning of the development and its affordability has been the careful disposition and design of highly serviced accommodation shared by the two Trusts, including a new Imaging Department, Pharmacy, Pathology Department and a new main entrance.

The scheme exploits its sloping site and makes extensive use of natural light, courtyard landscaping and colour to enhance the patient environment, aid way-finding and create a high quality, working environment for staff. It also includes a number of innovative features including an orthopaedic 'Barn' operating theatre which accommodates four operating tables within an open-plan area – an arrangement aimed at improving surgical teamwork and the sharing of clinical expertise.

Effective Design Development Leading Trough to GMP.

Following the initial meeting with the Trusts, a detailed programme was prepared, clearly showing the processes to be followed to achieve a GMP together with team members responsible and timescales to be realised.

This programme was backed up with details of the personnel that would be involved including a considered assessment of the number of days for their involvement and their hourly rate, as well as costs for surveys, site investigations and the like. From this information, we issued the Trust a robust estimate of the costs required in the period up to GMP.



Design effectively commenced from first principles with our Healthcare Planner, Directions Consultancy, working with the Trusts to establish a definitive brief and schedule of

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accommodation. Directions Consultancy took the approach that service delivery was paramount and thus was prepared to challenge pre-conceived ideas by the User Groups and, in some case, proposed operational policies.

This approach had the effect of adding area in some departments but succeeded in reducing the overall area by 10% from the initial accommodation schedule. Directions Consultancy worked closely with Architects, Nightingale Associates, during the iterative design process, particularly in the establishment of the adjacencies of shared facilities, most notably the positioning of the Imaging Department.

As the design developed, other Supply Chain Members were introduced at the point when they could add most value.

Thus introducing M&E Installer, EMCOR, and their extended specialist supply chain, ensured that the M&E services were fully integrated into the design with space adequately provided from the outset.



In parallel with design, the cost model was prepared and the initial risk workshop and subsequent risk management regime, was implemented.

The cost modelling allowed Value Management techniques to be put in place with budgets being given for the design elements. This allowed the designers to progress in full knowledge of the cost constraints, within which they were to work, from the outset.

Throughout this whole period up to GMP, a major challenge was to reconcile the agenda of the two Trusts, which naturally did not always concur. We were undoubtedly successful in developing with the Trusts' Project Manager, an Integrated Team comprising decision makers from the Trusts and PSCP team. Indeed, Norwest Holst Ltd's Regional Director sat on the overall Project Board and key personnel of Norwest Holst and the Supply Chain were members of the project steering group.

A key element in keeping a large number of interested parties fully informed of the design development was the use of 4Projects collaboration tool, which after some initial teething problems, proved to be an excellent medium to share all information.

Although the period up to GMP was complicated and complex, we were successful in remaining within the estimate of costs given at the outset for the period up to GMP.

Effective Management Of Construction and Commissioning.

As part of the FBC submission, the whole project was planned in detail and an in-depth phasing strategy was prepared and agreed with the Trusts. Trusts in-put identified the areas were to be prioritised and enabled them to devise a decant strategy for the refurbishment areas in good time.

The 158 week construction contract, awarded in September 2003, was completed, on programme and within the GMP.



Detailed planning was the key to the success of the project and the involvement of the Integrated Team in the process ensured that the Trusts were able to carry out their own planning for equipping and commissioning the completed areas with

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confidence. It also allowed early warning of problems allowing time to re-programme and avoid delay to the overall completion.

The contract programme was produced utilising information from all relevant parties and in particular incorporated the periods identified by the major and specialist work package contractors and was maintained as a "living" document, being regularly reviewed to ascertain that the logic remained relevant and to take into account the effect of any changes to the work content of the Project e.g. additional works or other compensation events, and to give advise to the Trusts on the programme implications of changes under consideration.

This approach to planning and programming ensured that all the departmental opening dates were met and allowed the additional works instructed by the Trusts, a new Main Entrance and enhancements to the Barn Theatres, (totalling £8m), to be incorporated within the project period.

On all our sites, Health and Safety matters are of paramount importance and the Joint Venture Partners of IHP have an excellent track record in this respect.



At the Broadgreen Project, Norwest Holst Ltd. were very pleased to be awarded a plaque commemorating 750,000 accident free hours on the project.

Dispute resolution

The use of Early Warning Procedures in a non-confrontational manner was proved to be a very effective vehicle for avoiding escalation of issues potentially threatening cost and programme. Any party could give notice of a potential problem and convene a meeting to work in collaboration to resolve the problem in the best interest of the project. Working in this manner ensured resolution before the problem became critical and thus potential disputes became sensible negotiations.

Problems overcome

The design solution not only meets the differing needs of the Two Clients but also successfully links the two Trusts' existing Accommodation, which is located at opposing corners of the hospital grounds and across a sloping site over four levels.

The precise disposition and internal planning of shared facilities were critical to the scheme's success and were only established after gaining a comprehensive appreciation of user needs by developing and testing a series of alternative solutions.



Norwest Holst recognised from the outset that hospitals and construction seldom mix, and planned to provide an "invisible " presence on site. This was achieved by establishing a separate site entrance, segregating the hospital completely from construction activities.

Specific problems e.g. working in close proximity to "live" operating theatres, were overcome by providing additional methods for sound-proofing and Early Warning Procedures to halt works if necessary.

How Quality And Value For Money Was Measured And Achieved.

Broad quality standards were initially agreed between a team comprising designers and contractors. These were reflected in design proposals and samples (including sample rooms) for discussion and acceptance by the trust's team led by the Project Director working closely with the 'Design Champion' (the Chairman of one of the Trusts).



The ProCure21 partnering arrangement facilitated the ongoing involvement of the Integrated Team members in the design and construction process and thereby allowed consideration and testing of alternative approaches in a true 'value engineering' approach.

Consequently, many changes were instigated in order to improve constructional quality and functionality, for reasons of 'buildability' and to aid affordability. However, importantly, it also allowed funds to be diverted towards design enhancements in areas where maximum benefit was gained.

As a company, we like the AEDET toolkit for assessing design and found this useful in gauging the opinion of the design with the interested parties. There is no doubt that there was a very positive reaction to the design proposals and this has persisted now that the project is complete and in operation, with a high degree of satisfaction expressed by staff and users.

Innovation

Barn Operating Theatre

Because it is a relatively new concept, and thus there is little Experience available in the UK, the Barn Operating theatre was a particular challenge to the services team.

No HTM's or NHS guidelines were available at the time, Although subsequently one of the Country's leading experts on the subject, Malcolm Thomas, has used Broadgreen as the basis for guidelines to be published in the future.



Specialist subcontractors, Howarth Airtech, were appointed to underwrite the performance of the airflow systems that were designed to prevent any air mixing across the four operating tables, and thereby isolating one area from the next.

M&E Installation

Having a very open consultation process between all parties, it was possible to introduce some innovation into the project that would benefit everyone from the Client to the Subcontractor. Two particularly beneficial new methods for the electrical services was the use of Pre-wired Distribution Boards that improved quality and saved installation time, and the use of Flexi Shield Cable in all areas, thus considerably reducing the requirement for electrical containment.

Measurement of value for money is a difficult concept and should be viewed widely, not in just monetary terms. The Broadgreen Project is a high quality development with world-class facilities at an affordable cost.

Perhaps the acid test is the amount of additional work and repeat business awarded to Norwest Holst, both during the construction period and subsequently.

Lessons Learnt

The team have held two Project Reviews, one for the Construction Process and one for the Design Process. Both forums proved positive and were a frank and honest exchange of views, which will benefit future Projects.

4Projects, the collaboration toolkit used on the project, was a learning curve for many and will in future become more extensive and will be introduced to a project from the outset. We will aim persuade the more reluctant parties to come on board by persuading them of the benefits and ensuring that the right level of training and support is given.

In order to minimise the possibility of misinterpretation of drawings by non-technical users, on future projects we would present layouts to particular complex rooms by means of 3 dimensions views.

Conclusion

The Broadgreen Hospital Redevelopment project will be remembered, by all those involved, as an enjoyable experience and one where the aspirations of the ProCure 21 Initiative were fully met in practice.

Good design, high quality, innovation, certainty of delivery, both in terms of cost and time, full integration of Trusts' and PSCP's Teams and an excellent safety record have been achieved in full. This has resulted in the provision of genuinely world-class facilities for the people of Liverpool.

The enthusiasm, dedication and spirit shown by the many individuals involved in the process from start to finish have been second to none. The values and success criteria we agreed at the outset have been surpassed and the experience gained will serve all the individuals in the process well in future projects.

