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demonstration project



Deconstructive acoustic screen

Contractor Recycles 99.6% of Demolition Waste at Large Scale Hospital Refurbishment

Contractor:	Skanska
Client:	Barts and The London NHS Trust
Case Study Ref:	284
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St Barts in Smithfield and The Royal London in Whitechapel are two of the oldest and best known hospitals in the UK. The work being undertaken at both sites is Britain's largest hospital programme, with a total value of over £1 billion. Once complete, Barts will become a Cancer and Cardiac Centre of Excellence with the majority of care provided in a new state-of-the-art facility. Most of the services currently provided at The London Chest Hospital in Bethnal Green will also move to Barts. Clinical services at The Royal London, including London's leading trauma centre, the capital's second biggest children's hospital and one of Europe's largest renal units, will be brought together in a new landmark multi-storey building.

Hospital refurbishment presents a number of unique challenges. Both Barts and The London Hospitals will have to stay 100% operational throughout the lifetime of the project. Noise, dust and vibration must be kept to an absolute minimum due to potential adverse effects on patient recovery time. Skanska identified this as a flagship project for many issues, including sustainability, at an early stage. Innovations such as a large acoustic screen to absorb sound and vibration and the appointment of Sustainability Champions throughout the project team have put this project on the cutting edge of sustainability issues.

Measurable Benefits:

- 50,000 tonnes of waste diverted from landfill
- 99.6% of demolition waste recycled
- Over 250,000 bricks have been sent for reuse
- No fuel spillages
- To date, work has not been stopped due to noise, dust or vibration
- Good relationship with relevant Local Authorities enables swift Section 61 Agreements whenever these are required.
- The initial figures will be used as a benchmark against which future phases of the project will be measured.

Demolition contractor engagement

The project's lead-in time enabled Skanska to focus on planning and preparation and engage key partners at the outset. Engagement of the demolition contractor, Keltbray, at an early stage meant that waste separation could be planned from the beginning of the project and targets could be agreed between all partners. These targets were then incorporated into the contract and waste management plan.

Client buy-in

Early planning, strict monitoring and regular communication has led to a mutual understanding of requirements and agreement on how these can be achieved allowing any changes to be made before problems occur. To ensure complete buy-in throughout the team, Sustainability Champions have been appointed. Due to the sensitive nature of the users of the building, noise and dust prevention were considered a priority. In addition to Section 61 Agreements, a Noise, Dust and Vibration Protocol has been agreed. The protocol establishes a continual monitoring regime and sets strict compliance thresholds.

Techniques for segregation

To ensure that maximum value is obtained for all waste products, a waste hierarchy has been established. Salvage was viewed as the most desirable option followed by reuse on-site or off-site, then recycling either on-site or off-site followed by recovery and the last, least desirable option, was landfill. This hierarchy was written into the contract and the project's site waste management plan.

Salvage and retain

Architectural heritage Architectural Schedule of interest

Salvage

Bricks	Radiators	Chimney pots
Roofing slates	Timber beams	Floorboards
Radiators	Basins	Baths
Light fittings		

Segregated waste streams

Aggregate	Metal	Timber
Plasterboard	Asbestos	General Waste

The waste is then monitored via monthly returns, waste transfer notes, audits and inspections.

The management of waste on the project has many logistical issues. At The Royal London site, it is possible to segregate the waste on-site. However the small size of The Barts site has meant that innovative techniques for waste segregation will have to be employed with some having to be done off-site at a separate facility.

Pollution Prevention

Construction must take place without disrupting patients' recovery and new and innovative solutions have had to be sought. Dust, noise and vibration levels were identified as key issues so the client and contractors agreed acceptable levels at an early stage. It was decided that an acoustic screen was needed to shield the children's intensive care unit at the Royal London which is directly adjacent to the building site. The screen would also avoid the need to move the patients to alternative hospitals for the duration of the works which saved project time. Existing acoustic screens were found to be inadequate and generally designed for short-term use, ending up in landfill.

A high quality, durable and deconstructive acoustic screen was erected one metre from the hospital. It is six floors high and covered one entire portion of the remaining hospital building.

The acoustic screen has the following advantages:

- Excellent noise attenuation properties – 26dB(A)
- Design life of 25 years
- Supported on foundations using a scaffold system, reducing the need to excavate and create waste spoil
- Screen covers the full height of the building (6 floors)
- High durability and fully deconstructable
- Requires very little maintenance and any damaged panels can be easily removed, without replacing the entire screen.

The noise levels were so low that Skanska has considered installing a webcam on-site so that patients in the children's intensive care unit can see how the refurbishment is progressing.

Strict monitoring of dust levels was imperative so that the hospital could be informed if levels threatened a risk of infection. An electronic monitor was installed which sends text messages to the environment manager when the level of small dust particles (PM10s) exceed background levels. Monitoring equipment is so sensitive that Skanska has recorded PM10 dust from forest fires in Eastern Europe and high pollen counts in Holland. This system enabled Skanska to provide the hospital with general air quality data which could be of use in the future. As a result of this, at the demolition stage, no complaints were received from the children's intensive care department regarding dust or noise. These results established noise, dust and vibration benchmarks against which future projects could be measured.

"The noise and dust were our two biggest concerns, but to date we have remained in full operation of all services without these issues being of any due concern."

Jane McLean, Head of Nursing, for the Women and Children's Hospital, Barts and the London NHS Trust

"I was impressed to see the acoustic screen when invited to visit the Royal London Hospital construction site. The comprehensive protection it provides goes well above good practice and is a solution not seen before in Tower Hamlets. The approach and commitment shown by Skanska to date has been exemplary and I look forward to continuing our good relationship over the duration of the project."

David Farrell, Principle Environmental Health Officer, London Borough of Tower Hamlets

"The professionalism of the Skanska teams is allowing clinical work to carry on in the hospitals with minimal disruption to the staff and patients. Congratulations to all of you for maintaining the high standards that have become integral to all Skanska projects."

John Costello, Chairman, Capital Hospitals Limited

Community engagement

Skanska has a philosophy: "Skanska are members of this community – not visitors to it". Regular workshops reinforced the way that they operate and team members support and assist the delivery of initiatives creating a socially responsible culture throughout their operations. To ensure good community relations Skanska employed a Community Relations Manager.

Lessons Learned

- Early planning leads to better communication between all stakeholders as all understand the requirements and limitations of the project
- Early considerations of issues such as waste allows detailed assessment of the possibilities and room for innovation
- Regular monitoring is essential so changes can be made before problems occur
- Appointing Sustainability Champions throughout the team ensures buy-in at every level.



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