The Housing Forum
CONSTRUCTING EXCELLENCE

demonstration project

Lemon Tree House

Lemon Tree House

Constructor:	Avebury International Plc
Client:	William Sutton Homes
MMC Manufacturer:	WAVE
Case Study Ref:	297
Project No:	2820
Publication Date:	June 2007
Region:	London
Build cost:	£4.29 million (excluding on-costs, prelims and fees)
Start Date:	February 2006
Completion Date:	March 2007
Themes:	The impact of Modern Methods of Construction (MMC) on Resource Efficiency

Lemon Tree House is a new-build housing development on a brownfield site on Bow Road in Tower Hamlets, London. The development (a seven-storey block around a central courtyard) comprises 49 flats and three ground-floor retail units for William Sutton Homes part of the Affinity Sutton Group. Avebury International is acting as constructor and designer on the project with the off-site solution being provided.

Site constraints

The large number of constraints presented by the site meant that it would have been difficult to use traditional methods of construction and these were ruled out from the very beginning.

Issues included:

- Proximity to several underground lines (site within 10m of one line)
- Location on Bow Road, a 'red route' which is one of the main roads into the capital
- Lack of space on site (0.14ha in total) with virtually no storage space
- Difficulties of building in London
- Location in a conservation area and adjacent to a listed building
- Limited access to the site
- Neighbouring special needs school requires restrictions on noise and working hours
- Precise aesthetic requirements to comply with requirements of the pre-existing planning permission for the site.

The client's response was to appoint Avebury International, an organisation that specialises in social housing (and with a great deal of experience in working with MMC solutions) and to use WAVE's timber panel construction system.

Use of MMC

The decision to use an MMC solution was taken at an early stage for a number of reasons:

Logistical: The site's logistical constraints, meant that the footprint of the building covered nearly the whole site with minimal space for storage. A 'just-in-time' MMC delivery, including off-site manufacturing solutions, therefore proved essential. A tower crane was erected in the courtyard area to help with the pouring of in situ concrete and facilitating the handling of JIT timber panels.

Time: The client also needed the construction time to be as rapid as possible and MMC solutions were also felt to involve quicker construction times than traditional methods. At the height of the work, one floor was being erected each week.

Budget: The WAVE solution, in combination with Avebury's innovative procurement and extensive knowledge of MMC construction, has resulted in the development being delivered for an affordable cost. An independent analysis by Davis Langdon stated that the costs were in the lowest quartile of the lowest quarter for projects of a similar scale.

Design: The flexibility of the WAVE system allowed compliance with the strict requirements of the pre-existing planning permission for the site. These included 27 different apartment types, but the WAVE solution was flexible enough to allow 80% of the panels to be standard.

As the decision to use an MMC solution was taken at an early stage it wasn't necessary to make major changes to the project process, although some changes were made to the sequencing of the work, and scheduling was constantly monitored and amended due to the speed of the construction process. An integrated approach to supply was adopted, particularly because of issues surrounding deliveries to site. There was also a far greater need for communication across all parts of the project team, from managers, suppliers and the labour force. The handling of materials on-site also needed attention to ensure that site staff were trained in the use of MMC solutions for construction.

Sustainability and Resource Efficiency

Every aspect of sustainability was considered in making the decision to use MMC: environmental in terms of CO_2 emissions and waste reduction; economic in terms of affordability of build, running and long-term use; and social in terms of the effect on the neighbouring special needs school and the training/development opportunities the site could offer.

Use of a light-weight construction solution allowed the foundations and basement of the previous building to be reused, thus saving considerable time and cost and avoiding breaking them out which would have been a very disruptive process for the school and neighbours.

Early resource efficiency decisions included the use of large panel construction, allowing for fewer joints and less on-site handling, on-site plasterboard recycling and a structural design based around key-component dims. In addition, there was an integration of multiple elements into prefabricated wall, roof and floor cassettes, with erectors fixing numerous components at any one time. Dry construction also allowed for a light-weight structure including external tile cladding and maximum load deliveries.

A site waste management system was set up which reduced waste by 50%, with remaining waste being segregated and recycled. The panel system required 30% fewer journeys, materials are all FSC and PEFC approved and the high level of insulation cut CO_2 emissions by approximately 60%. Success in reducing CO_2 and waste was confirmed by Sandy Allcock, the Thames Gateway Development Director at Affinity Sutton. The project was also a finalist in the Building Awards, WRAP Award for Sustainable Construction 2007 (the only social housing project short-listed) and won a Building Safety Group award for Health and Safety. This is in part due to the fact that MMC allows less construction on-site, which improves Health and Safety.

Key Enablers

The key enablers to the success of the project were the suitability of the product to the project and the experience of the project planning team, combined with a truly partnered approach to ensure successful delivery. Design freeze occurred early and allowances were made to ensure sufficient time for construction and manufacturing drawings. Regular supply partner meetings took place at the design stage to enable input into discussions on design and buildability, thus avoiding problems later in the project.

Lemon Tree House

The integration of the design and construction teams at Avebury was also important and removed the possibility of barriers occurring. A lot of effort was also put into ensuring that the site remained tidy and well organised in order to reduce the impact of the logistical constraints due to lack of space.

Potential issues caused by design freeze, planning, communication and entrenched views were avoided by organised supply chain involvement right from the outset. Milestones were clear and well translated and there was a genuine 'can do' philosophy.

Lessons learned

- Focusing on process and people makes the integration of products easier to achieve
- Good communication is key to fast-build projects
- Early design freeze is essential if early involvement is to be capitalised on
- Engineered timber sections make detailing between dissimilar materials less challenging
- Removal of waste (both process and resource) through good process understanding and management can give a significant competitive edge to a business offer.

Outcomes

As a mixed use project that utilised numerous dissimilar materials, Lemon Tree House provided the team with a deeper understanding of development type and delivery of advance timber structures in tight locations. It also provided the main contractors with a richer range of solutions for its portfolio. Crucially, it provided the supply chain with the confidence to challenge the position of perceived risks and subsequent actions during planning.

If any changes were to be made 'next time' they would include even greater levels of off-site integration with on-site assembly.

"In 30 years in the sector I've never seen contractors, suppliers and partners working together so openly and constructively as this."

Helen Cope, RSL Sector Consultant.

CONSTRUCTING EXCELLENCE
in the built environment

Constructing Excellence
Warwick House,
25 Buckingham Palace Road,
London SW1W 0PP

T 0845 605 5556 E helpdesk@constructingexcellence.org.uk
W www.constructingexcellence.org.uk

william sutton homes
today and everyday

wave

AVEBURY

Gareth Lewis, Director of Business Development and Communications
T 01908 672698 E gbl@avebury.com