

# Softly softly

**This article explains some of the techniques that were needed to minimise the environmental impact of a recent inner-city project.**

ROB UNWIN, CLIFFORD DEVLIN

The demolition of Tower House, a six-storey office block located in the heart of London's financial district, presented a series of unique challenges to the contractor, Clifford Devlin.

Not only was it situated next to and above one of the capital's busiest Underground Stations, but also located just 2m from the east elevation was a Roman Wall, a designated Ancient Monument that needed to be preserved in-situ.

Given the proximity of live offices on all sides, thousands of pedestrians travelling to/from work and one of London's most popular tourist attractions, the Tower of London, as well as the attendance of archaeologists tasked with safeguarding the heritage feature, a considerable amount of thought and no little creativity needed to be introduced to the demolition methodology.

The £1.1 million project involved the removal of a six-storey, 1100m<sup>2</sup> building in Trinity Square, EC3 to make way for a new development consisting of high-quality office space. The existing structure, which had been vacant for over two years, consisted of a reinforced concrete frame including heavy basement, ground- and first-floor slabs over the adjacent London Underground property and metal-framed glazing and brickwork façade.

The south elevation was situated directly above the ticket hall and main entrance to Tower Hill Underground Station, which is used by thousands of commuters and tourists daily. The District & Circle Line station therefore needed to remain open and operational throughout the demolition project.

To ensure the safety of its users and to prevent damage to its roof, a weatherproofed lightweight steel protection deck was designed, in conjunction with structural engineer Lucking & Clark. Designed to withstand falling debris from above and the weight of a 5-tonne excavator, it was installed above the first-floor slab of Tower House and bolted to the existing columns. To avoid damage to the retained section of the columns during the attachment of the bolted connections, exploratory works were undertaken and a cover meter used to locate the reinforcement.

An Armco crash barrier was also installed along the perimeter of the ticket hall to prevent the risk of haulage vehicles accidentally causing damage to the structure.

The structural demolition of the building was carried out internally on a top-down, floor-by-floor basis using 6-tonne mini-excavators fitted with hydraulic attachments such as 'crackers', 'munchers' and 'pulverisers' to reduce noise and vibration. To ensure structural integrity during



**Figure 1 top: Tower House was situated above Tower Hill tube station.**

**Figure 2 centre: A lightweight steel deck was installed to protect the entrance to Tower Hill tube station below.**

**Figure 3 bottom: Back-propping was used extensively to ensure the stability of the structure.**



Figures 3 (right) and 4 (below): The walls of the building are carefully pulled down under close supervision and brick, stone and concrete is amassed on-site before being taken away for recycling.



Figure 5 right: The main structure is gradually removed under the watchful eye of the Cantillon team.

Figure 6 below right: Goliath the long reach excavator goes to work on the main building with water being sprayed to provide dust suppression.



mobile tracked crushing unit and then further processed to provide a useful material for backfilling and other purposes in the construction industry. Again, this is crushed to a 6F2 product specification. Also recovered are many fine materials, which will be processed, washed and then put back out into the construction marketplace.

At the forefront of this challenging project is Nick Taylor, Cantillon's operations manager. "The close proximity of the River Thames provided us with the opportunity to eliminate the use of lorries removing recyclable waste from site. The vast majority of recycled materials are being taken by barge and on to recycling facilities for processing. This has helped to reduce the carbon footprint of the demolition process significantly. Logistically, it has been a challenge but the whole team involved in the scheme, led by St Martins, has worked together to make sure that it happens. I've not seen recycling of demolition waste using barges on a scale like this before. Hopefully we are setting new standards for the future."

As an ongoing part of its environmental scheme, Cantillon advises every client on the optimum method of disposing of material from the demolition of their site. It has embraced new legislation on SWMPs (Site Waste Management Plans) as the company had already been auditing clients' sites to maximise the quantity of recycling. Recent legislation has formalised this process and allowed Cantillon to assist its clients to achieve increasingly better ratings under the various sustainability schemes that exist.

With the Thames at such close proximity to the site, it made sense to both St Martins and Cantillon to take full advantage. Both companies are endeavoring to ensure that every step of the project is as green as the finished development will be – with St Martins' designs having already received an 'Excellent' EcoHomes rating.

However, it's not just the environment that's reaping the benefits from this initiative. The site is surrounded by a high-density residential area, including three schools in close proximity, so this bold initiative will significantly reduce traffic in the immediate vicinity, which will benefit the local community.

## Concluding remarks

While Chambers Wharf represents the last of London's large wharfs, its removal demonstrates the robustness, durability and sustainability of concrete. Once the demolition process has been completed, the site will be ready for the next phase of development.

## Chambers Wharf – key facts

Site size: 1.5 hectares (3.6 acres)

Total residential space: Gross approx. 63,000m<sup>2</sup>; Net approx. 39,000m<sup>2</sup>

Total retail space: 480m<sup>2</sup>

Parking spaces: 183 for cars, 24 for motorcycles and 656 for bicycles

Energy: Combined heat and power units; ground source heat pumps; solar thermal panels; rainwater harvesting; green and brown roofs, wind turbines and sustainable underground drainage.

Carbon emission reduction: In excess of 30% lower than Building Regulations Part L 2006.

Project team: In addition to St Martins as the developer, the expert team includes Ian Simpson Architects, DP9 (town planning), Hoare Lea (building services), Clarke Bond (structure), Gardiner & Theobald (cost consultant), Place Design (landscape), Denis Wilson (transport) and ENTEC (environmental).