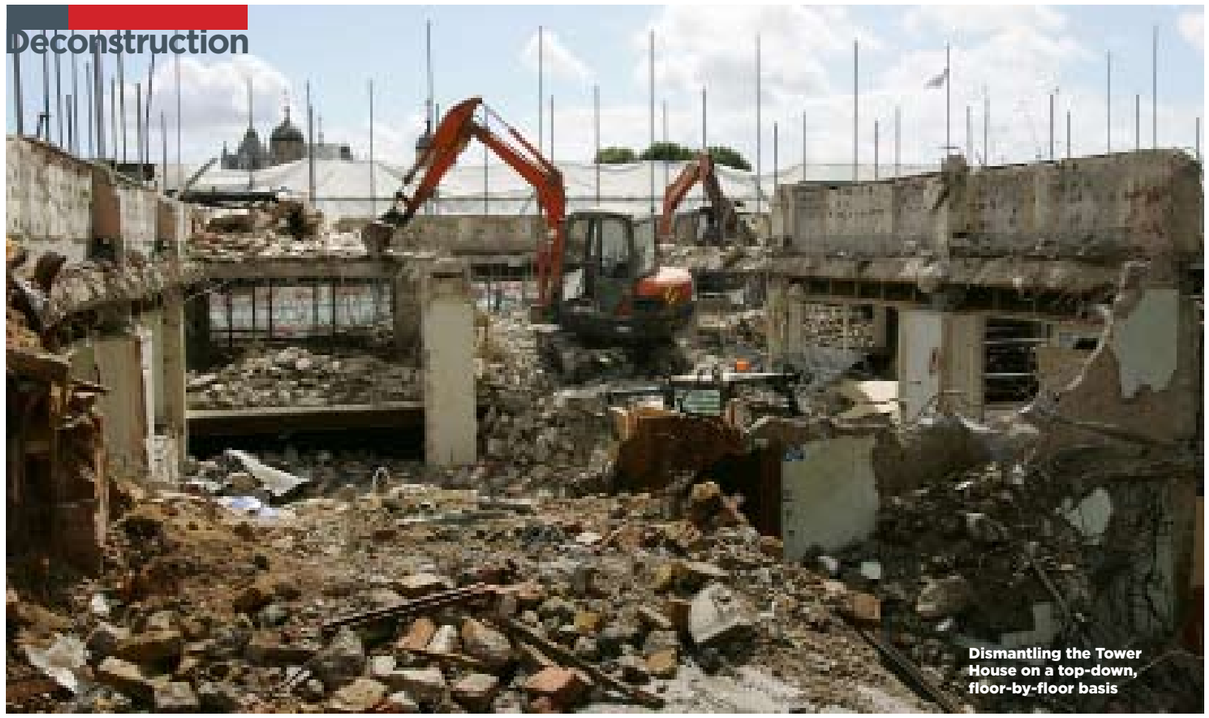


Dismantling the Tower House on a top-down, floor-by-floor basis

# DEMOLITION JOB

Tourists, tube trains and ancient monuments are just some of the challenges faced by demolition contractors operating in London. **BRENDON HOOPER** explains all

**FOR MANY, THE** practice of demolition still conjures up visions of vast swinging balls, violent explosions and huge clouds of dust. The reality, of course, especially in urban locations, is very different.

The proximity to the demolition site of homes, offices, vehicles and people – and the need to maintain normal everyday life – has meant that inner-city demolition has developed into something of an art form.

The trick is to remove the building without anyone noticing what is going on behind the hoardings until a gap appears in the skyline. Pulling this off requires a series of sophisticated techniques, applied to minimise disruption.

All of the usual challenges, plus a few novel ones, were present at the recent demolition of Tower House, an office block located in the heart of the City of London. Unoccupied for several years, the location had been earmarked for redevelopment into high quality office space by London based developers City Offices Real Estate (CORE).

The existing structure consisted of two five- and seven-storey adjoining buildings, one of which was located adjacent to and directly above the ticket hall and main exit to Tower Hill Underground Station. Transport for London (TfL) had insisted the station remain fully open and operational throughout the 26-week demolition project.

"One of the key factors in our selection of demolition contractor was experience of working in and around London Underground locations and premises," said CORE development executive Phil Botes, who chose inner-city demolition specialists Clifford Devlin.

## Similar project

They were able to reference a very similar project – the demolition of a two-storey structure directly above the entrance to Brixton Underground Station in 2005 – which also involved the removal of the existing staircase between escalators, from concourse down to platform level.

To protect the ticket hall at Tower Hill from damage and to safeguard passengers, Clifford Devlin needed to construct a protection deck to withstand possible falling debris and the weight of a five tonne excavator. In conjunction with structural engineers, Lucking and Clark, a lightweight steel platform was designed to protect the first floor slab and cantilever over the rear of Tower Hill's ticket hall. This was erected and bolted to the existing column layout as part of the establishment of the Tower House site.

To reduce vibration from machine movements, its steel plate was fixed with a plywood and Filcor sandwich. The structure was weather-proofed with a 20mm felt membrane coated with a mastic asphalt. The site was fully scaffolded and services such as gas, electricity and telecommunications disconnected.

Like most central London locations, the site was closely bordered by live offices and retail outlets, but Tower Hill was also notable for particularly high volumes of pedestrian traffic. Trinity Square is one of London's busiest thoroughfares used by commuters travelling to and from Tower Hill Underground Station and nearby Fenchurch Street rail terminus.

Literally tens of thousands of commuters pass by each day and these numbers are swelled by tourists visiting two of London's most popular attractions, Tower Bridge and the Tower of London, situated just a stone's throw away.

With such an unusually high volume of 'sensitive receptors' in close proximity, the project needed to adhere to strict environmental controls. A variety of standard pollution control techniques were applied to minimise the emission of sound, vibration and dust.





Project manager and demolition specialist Rob Unwin explains: "In such circumstances, we omit more rudimentary demolition methods in favour of low-impact, non-percussive techniques. Consequently, our methodology is probably better described as deconstruction as the building is carefully and progressively dismantled internally using hydraulic equipment, which is far more labour intensive."

## Less sound

The building was demolished on a top-down floor-by-floor basis by mini-excavators fitted with hydraulic attachments such as 'munchers', 'crackers' and 'pulverisers', and supplemented, where necessary, by hand-held tools. This equipment may sound violent but it emits far less sound and vibration than more traditional demolition methods.

Even so, these activities were still subject to a Section 61 – that is, prohibited before 8am, between 10am-noon, 2pm-4pm and after 6pm. The larger concrete structures adjacent to the tube station, such as the basement, ground and first floor slabs, were fractured and removed using specialist techniques – diamond drilling and saw cutting – which further reduce vibration.

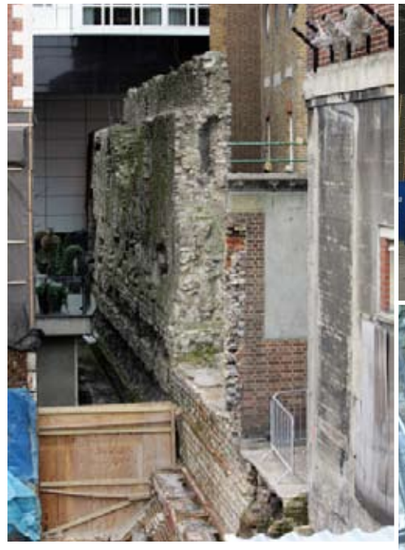
The site was enclosed by fitting a tough monarflex sheeting to the scaffolding which prevented debris and dust from escaping its confines. However, this was not air-tight, and to further minimise airborne particles from entering the immediate environment the workface was sprayed with a fine water mist.

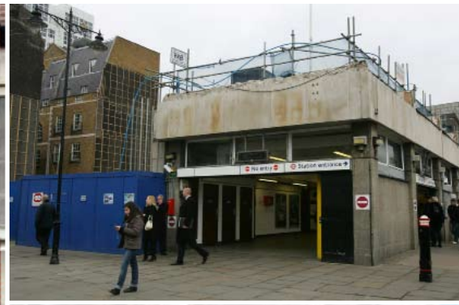
Sound, vibration and air quality monitoring were carried out regularly at the site's perimeter to ensure emissions were kept within acceptable limits.

A further complicating factor at Tower House was the presence of a Roman wall situated just yards from the building's east facing elevation. It had been designated by English Heritage as a Scheduled Ancient Monument and therefore needed to be preserved. Scaffolding was carefully erected around the wall and a protective plywood covering attached.

Again, drilling and saw cutting were used to remove any large concrete structures close to the wall, including the basement slab which extended almost to its edge. Survey points were placed on the wall to detect any micro-movements throughout these operations.

The archaeological investigation, which was specified by the Museum of London Archaeology Service (MOLAS), extended across the whole of the site up to 3.5m below existing slab level. The excavation was carried out by Clifford Devlin as the works progressed and supervised for the client by a team from archaeology consultants Mills Whipp Partnership.





**Clockwise from above: The Roman wall still standing one demolition job and a few millenia later; Temporary Tower Hill Underground Station exit in use; Demolition by hand**

Space, or almost a complete lack of it, provided another major obstacle to the contractors.

## Logistical challenge

"A small central courtyard provided the only space within the site confines for us to conduct operations," said Unwin. "This presented a huge logistical challenge to the team, especially when scheduling the location of a mobile crane to lift plant and equipment to upper floors and the removal of waste. All operations needed to be planned and sequenced in some considerable detail in advance."

Typically on a project like this, waste would be segregated and sorted at ground level by material type (glass, plasterboard, metals, timber, concrete, and so on) and placed into skips which would be removed to local recycling centres when full. Lack of any useable ground floor space meant waste was segregated into piles within the building and skip lorries summoned and loaded only when enough of a particular material had been collected.

To aggravate the situation, vehicular access to the site was also problematic. The only entrance to the site led directly from Trinity Square, which was constantly thronged with pedestrians and traffic. A traffic management plan, which was submitted before the project commenced to TfL and the Highways Department of the London Borough of Tower Hamlets, included the re-location of a taxi bay directly outside the only entrance to the site.

**"The trick is to remove the building without anyone noticing what is going on behind the hoardings"**

Nevertheless, a full-time banksman was still required to coordinate deliveries by stopping traffic and pedestrians on both sides to allow transport to enter/exit the site. "We routinely plan site transport movements in advance to minimise vehicle use from an environmental perspective but this took on added significance from a logistical perspective," said Unwin. Despite these many challenges, the demolition work was completed on schedule, on time and on budget.

Central London is perhaps the most difficult and challenging location in which to practice the 'art' of demolition. Having to contend with narrow streets, confined spaces, underground services, buildings with heritage and architectural significance, while allowing life to continue in one of the world's busiest cities, takes some doing. It requires planning, discipline, attention to detail and the flexibility to adapt to the unexpected.

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