

A fast track for sports fans

Redesigning Wembley Park Underground station in half the planned timeframe and half the budget called for Arup's serious creative thinking skills.

Words: Tim Edwards

Arup and architects Pascall & Watson (P&W) had developed a design for the total reconstruction of Wembley Park Station, to create a London Underground (LU) station on a par with the best of the existing Jubilee Line extension stations. Wembley Park Station is the primary gateway to Wembley Stadium and one of the busiest cross-platform interchanges on the network, with six LU platforms and adjacent network rail tracks. The complex project was planned to take four years at a total cost of £90M, including major signalling and track works, but was stopped by early uncertainties about whether the stadium redevelopment would proceed along with the mooted plans for a Public Private Partnership for maintaining the underground system.

Three years on, with the stadium construction on site and set to finish in September 2005, LU returned to Arup and the architects to continue with the station redevelopment. The budget had fallen to £42M and just two years remained before the stadium was due to reopen.

The team knew this would be a stiff challenge and immediately set about generating options for what could be done. "Our intimate knowledge of all the site's complexities allowed us to plan out the most expensive and time-consuming elements of the previous construction programme," recalls Tim Snelson, Arup's project manager. "So we were able to achieve the required increase in predicted passenger levels despite the time pressure."

Renewing building services without disruption

Position a new plant room in the car park, away from the existing plant rooms, under the new concourse allowed new cabling to be routed from the opposite end of the station. Old cabling was peeled back as work progressed. This meant cabling work could begin before the new concourse was finished and avoided a need for costly temporary station systems, saving approximately £2M.

Arup proposed a neat solution to retain and extend the area of the existing station concourse by moving the stairs down the platform away from the ticket hall, building a new overbridge in their place. Lifts for mobility-impaired passengers would go into the old stairwells in a deliberately efficient and functional response to strict railway engineering constraints.

Work on railways is often frustrated by restrictive engineering times dictated by the need to keep trains running. The new overbridge was designed to be built piecemeal using bolted steel and precast concrete components that could be hoisted into place by tower cranes at night and during weekend possessions (closures). It's a logic that would apply to any work over operational train tracks. Indeed, Arup is currently using the philosophy for a bridge design over the tracks at Harrow-on-the-Hill.

Work was also accelerated by introducing three work fronts. These were separate building areas within the station where work could continue simultaneously and independently. This meant that when Tube Line Ltd (TLL) asked Arup to modernise the sagging platforms halfway through construction, the contractors were able to continue work on the concourse and event-day ticket hall while a solution was designed.

The result of all that intricate planning? A station designed to meet the most exacting standards and the strictest limitations, delivered on time and within budget.

Maximising passenger throughput

Double size of station concourse; widen entrance stairs. Remove obstructive columns in new event-day ticket hall by erecting a mast that could support the lightweight ethylene tetrafluoroethylene (ETFE) roof from above.

Correcting sagging platforms

Close three of the six platforms at a time, allowing the station to remain open. Avoid time-consuming cable diversions and track closures by retaining platform edge walls and constructing a new platform behind.



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Timesavers

Avoiding unnecessarily complicated works, such as signal and drainage diversions. Keeping demolition to a minimum. Retaining as much of the existing buildings as possible, especially the area of the existing ticket hall above a Network Rail track (permission for work here may have taken months to obtain). Creating three work fronts, minimise station closures by using precast overbridge components over tracks. Replacing existing canopies by producing a 3-D computer model in the same package used by the manufacturer, using the same specifications, to reduce lead times.

Client

Tube Lines Ltd
Project Sponsor
London Underground

Architect

Pascall & Watson Architects Ltd

Management contractor

Taylor Woodrow Construction

Cost consultant

Franklin & Andrews



Bill Prentice