

# White City Development – 1900 to 2010

An account of a talk given to the London Underground Railway Society at Toynbee Hall by Paul Godwin of TfL on Tuesday 13 April 2006.

## Introduction

Paul Godwin introduced himself as having trained as a Chartered Civil and Environmental engineer, working for Thames Water, and latterly for Transport for London in TfL Property but now as Stations Upgrades Engineer, London Underground. His involvement with the White City project dates back to 2001/2002, and being involved during his life with both water and drainage tunnels and now underground railway tunnels, he felt he could be called a true underground engineer.

## Overview of the development works

The developer of the site is paying London Underground Limited (LUL) a substantial cash and lease sum to be allowed to develop the site and eventually LUL will receive the freehold of the site and a rental income from the tenants on site as well. The development is of 1.3 million square feet and the £1.2bn cost of development includes £150-£200 million to cover the cost of alterations to the London Underground railways and infrastructure, plus changes to road infrastructure, buses and provision for trams. Planning permission has been granted but the developer has submitted applications for higher density retail provision than previously planned, perhaps reflecting the increasing costs of the project. Once the site is completed, freehold will pass to LUL. The Central Line control centre at Wood Lane is part of the development area, and whilst remaining in situ, in use, and unaltered, will disappear from view. White City Central Line station lies outside the development area and will remain untouched by this project.

A new station for the Hammersmith & City Line will be built next to the bridge over Wood Lane, and there will be car parking under the new shopping centre, a new bus station formed around the old power station, and beneath the development, a new set of 16 stabling sidings for Central Line trains, falling away from the running line at 1 in 256 gradient. These will be fully signalled for ATP and ATO train working, and thus part of the running railway whereas the old depot was manually worked and had to have its own safety case. There will be new bus interchange facilities, provision for a new West London Tram terminus and a new West London Line station. The sidings will be insulated from the rest of the development by being enveloped in a concrete box with a four hour fire separation tolerance. At the buffer stop end of the sidings will be staff accommodation for train cleaners etc., with a lift to give access and to remove rubbish when trains are cleaned at close of traffic. In order to allow the sidings and new access track to be built, an extra span was added to the Hammersmith & City Line bridge as the access track would run directly beneath a bridge pier and thus the pier had to be removed and replaced with an extra span over the old Wood Lane station platform that forms the path of the new access track.

The new Hammersmith & City Line station will sit alongside the new viaduct but detailed designs for the station are still at the planning and approval stage. The new station will be built with step free access, although the platforms are to be built on a curve in the viaduct. Regarding the

redevelopment of Shepherd's Bush Central Line station, the developer will pay for the ground level reconstruction of the buildings and London Underground will pay from its own Capital budget to excavate additional passageways below ground to ease congestion.

There will be a new bus station to the north of the site with bus stands within one half of the old Central London Railway Power Station (named the Dimco building after the company which used it after it ceased to be a power station). There will also be a southern transport interchange near the Holland Park roundabout, catering for bus, Underground, mainline rail, and the Uxbridge trams.

### **The railways in the area**

The speaker gave an overview of the historical development of railways around the development site, beginning with the West London Line of 1840, called 'Punch's Railway'. At its inception, both termini were in remote agricultural areas, thus giving it the nickname of the railway that went nowhere. Later came the London and South Western Railway from 1869-1916, with a line to Addison Road and Hammersmith. Then a slide was shown of the Metropolitan Line of 1864-72, shown on the screen as a wiggly line, representing, said the speaker, his inability to draw straight lines on the computer, and not a comment on the ride quality of the track. Then came the Central London Railway which opened in 1903 with a spur to Wood Lane depot, which in 1908 became a loop to serve the exhibition site. The extension westbound appeared in 1920, as did the Great Western's freight line between its own lines and the West London Line. Later in 1947, the westbound Central Line was further extended. The speaker felt that, considering all the railway developments already mentioned, what was now being built was just a continuing chapter in a history of changing railways in the area.

### **The White City Depot**

The early design of the Central London Railway, with a loop at its western end at Wood Lane, and sidings and crossover at the east at Liverpool Street, meant that railway cars could end up wrong way round on occasion. The Caxton Curve, the tightest radius curve on the Underground, was originally a single track connection beyond the crossovers of Shepherd's Bush to the depot. The curve subsequently became the eastbound line, crossed over by the westbound, and this accounts for the right hand running of trains in the area.



The depot at Wood Lane had a turntable to solve the problems of wrong facing cars, and there was also the facility for trains to completely circumnavigate the depot at its fullest extent, and a connection to the West London Line, possibly to allow coal wagons access to the power station boiler house, and for rolling stock movements. In 1947-48 there was an extensive rebuild at the depot to cope with the new extension. With the aid of pictures projected onto the screen, the speaker demonstrated chronologically the expansion of the depot and the more recent extensive demolition works. Other pictures showed original copper knife style switchgear at the depot (*photo left on 27 June 2006 by Brian Hardy*) and the survival of some original tiling and fixtures.

It was also noted that four roads in the depot still contain original Central London Railway profile current conductor rail dating from when the line was third rail operation, not fourth as nowadays (photo below on 27 June 2006 by Brian Hardy).



### **Wood Lane stations**

The speaker then spoke of the old Wood Lane station and its development, showing pictures of the sliding platform which allowed trains egress from the depot and represented an ingenious solution to a difficult problem. He stated that the old platform four of the station is slightly outside the development area and will remain untouched but perhaps blocked off. A small bracket remains the only remnant of the great exhibition sheds to survive after the demolition works that recently 'wrought destruction on the history there'. Then the audience were shown pictures of the old Wood Lane Metropolitan & Great Western Railway station, which was of wooden construction and opened for the exhibitions of 1908. It closed in 1959 as the result of a fire.

### **The Exhibitions**

The audience viewed pictures of the various exhibitions which took place on the White City site, and the speaker explained that these began with the 1908 Franco-British exhibition which celebrated three years of 'entente cordiale' between the two countries which marked the end of centuries of intermittent conflict. Eight times as many people visited this exhibition as had visited the old Crystal Palace exhibition, and 100 times as many as visited the Millennium Dome. The 1908 exhibition was the first of a series of exhibitions on the site, and boasted hugely ornate and grandly decorated pavilions, rides and rollercoasters and, among many other things, a miniature railway. The next exhibition to follow this was an Anglo Japanese one.

### **The Olympic Stadium**

By 1966 this stadium was a dog track, but it also saw use by Queens Park Rangers Football Club, and as a venue for one of the 1966 World Cup qualifying matches. Originally it had been

built for the 1908 Olympics. However, Britain did not bid for the 1908 Olympics, which was to be held in Italy. But in 1906 Vesuvius erupted and the Italian Exchequer's thoughts were diverted from Olympic preparations to disaster relief. As Britain was building for an Exhibition, it was decided that Britain should host the Olympics. White City stadium was built in less than two years, long before the days of massive 'Multiplex' type construction giants and had a capacity of 150,000, though the quantity of lavatory provision is not recorded! The modern marathon was instituted at the games, and the additional 385 yards on top of the traditional 26 miles was because King Edward VIII and Queen Alexandra wanted to view the start of the race at Windsor Castle, and it was 26 miles from White City, so the organisers added the 385 yards in order that the runners would run a circuit of the track and cross the finish line in front of the Royal Box.

### **The Trains**

Next the speaker showed pictures of some of the rolling stock which has served the Central London Railway and its successors over the years. Early locomotives were un-sprung direct motor driven and caused huge vibration nuisance to structures built above the alignment of the line, and probable annoyance to the staff tasked with driving them. In 1903 a total of 64 motor cars were ordered and attached to the original carriages because of the lack of success of the locomotives. Two 1899-built Hunslet oil-fired condensing steam locomotives also worked the line and saw service in the depot. An audience member related a story recorded by J.M. Maskelyne which stated that drivers did not like taking these steam locomotives into the tunnel chimney first, and that crews often made random and unscheduled station stops and fled to the surface to gasp fresh air. The locos had two sets of buffers, both for tube stock and for coal wagons. The speaker rounded off this section by showing pictures of the various types of rolling stock used on the line right up to recent 1960, 1962 and 1992 stocks. A short discussion ensued on the possible use of the overhead trolley wires evident in some open air pictures of the depot.

### **The Power Station**

This was called the Dimco building because of its previous owners between ceasing to be a Central London Railway power house and becoming derelict. A new electrical substation will be built within one half of the building, to serve the new development, while the other side will be parking for buses laying over between trips. The speaker stated that these buildings must remain untouched as there is a preservation order on them, and he showed slides of the building in its early years, and the massive old machinery which was contained within, together with a few slides of famous film and television episodes which have filmed at that location.

### **Today**

Then slides were shown of the state of demolition and the construction of the new sidings. The sidings were begun by sinking a contiguous row of piles forming a retaining wall, and columns to support the roof of the sidings which is the floor of the shopping centre. The sidings area has space for 16 roads and the track is fixed directly to the concrete slabs. The sidings are surrounded by a 400mm thick concrete box and the floor is overtopped with a further 150mm of sacrificial concrete which is a continuous sleeper to which the track is bolted. This sacrificial layer can be changed and replaced if ever needed without affecting the basic structure. The sidings are designed to last for 110 years and whilst the concrete surround is in perpetuity the responsibility of the developer to maintain, the 150mm sacrificial layer is the responsibility of London Underground through its maintenance contracts.

The shopping centre will have four anchor stores of which only one, Marks and Spencer, has so

far signed up. Although the shopping centre has an entrance from Shepherd's Bush Green, the main façade faces north, turning its back on the Green, and the speaker wondered what that might say about regeneration in the area

The sidings columns have crash protection deflectors in case of derailment of trains travelling in the area. There are smoke extractor and sprinkler systems, not to protect the trains, but to protect the personnel who will use the area. The train conductor rails are directly fixed to the slabs, and track is flat bottom rail, a type of rail which is replacing the usual bullhead rail across the Underground, but in areas where the increased headroom needed for this type of rail is not a problem, as it is a lot higher in section. Point-work is also fixed directly to the slabs. The space available in the sidings for the track to fan out from one road to sixteen roads is tight and a number of LUL track standards have had to be conceded to allow this to be done. A lot of detailed computer work has gone on to model the wheel to rail interface as the bogies present themselves through the point-work. Each side of the supporting columns is a track and between each pair of tracks is an open meshed walkway barriered off with gates coinciding with the doors of the parked trains, so that staff will not fall onto the track if there is no train present. Open mesh walkways were a subject of debate at the planning stage, as small items such as train keys can be accidentally dropped through them. The slides of the sidings show that they are bright and airy in ambience, but with sixteen trains stabled, and several thousand kilowatts per train on a hot summer evening, temperatures in the sidings could reach 38 degrees Celsius or more. Statistically this may only happen for six hours a year, not long enough to justify a big air conditioning plant for the sidings area, so under such circumstances the workforce will withdraw to their air conditioned quarters until the train motors cool down and the temperature in the sidings lowers. Staff welfare is paramount and a management work-round would be to stable trains at lesser frequency (one every twenty minutes instead of every ten, or on alternate roads rather than starting at road one).

### **The Bridge Slide**

The approach road to the new sidings is under a viaduct and it is not possible to tunnel under so it had to be removed and replaced with a bridge span, by cutting the old span back and grafting on a new span, which was built off site. Demolition of the old structure and sliding in of the new span took place over a weekend possession. Slides were shown of various stages of the operation as it took place. The end of the old red bridge was cut off first then the new lilac coloured structure was slid across and new shear strengtheners were put in. A gantry had to be built to carry the cable run clear so that the new bridge span could be slid in beneath. There was no demolition of the old viaduct except during engineering hours when trains did not run, but the whole of the rest of that four day weekend, worked continued above while Central Line trains ran beneath, so crash decking was put under the bridge demolition area. Parts of the old bridge to be removed were marked out, and then cut out, and the edge that had been cut was then coated for protection and shrouded against demolition dust and debris. Then two hydraulic jacks inched the bridge into position, controlled "by a bloke with a bicycle pump", joked the speaker. All bags of ballast, new track and other necessary equipment were kept ready on the viaduct to reinstate the track work. The old bridge had been highly substandard as regards LUL bridge clearance regulations, whereas the new span was closer to the accepted levels. The whole operation was planned to the minute. Multiplex were involved, but Costain were the ones who used their experience of major projects to see it through, and all the while progress was being monitored by Metronet engineers on site throughout the works, on behalf of London Underground.

## **The future**

Once every thing is built, what do you call it? If you call two stations White City, which one do the emergency services arrive at when called? The new Hammersmith & City Line station will not be called Wood Lane, as LUL policy is to name stations after the area they are in, not the street they are in. Shepherd's Bush Central Line station will retain its name, whilst the H&C station will become Shepherds Bush Market. The sidings will be called White City sidings, not least because all signage and engineering drawings use this name. Then slides were shown of the earthworks in connection with the North London Line station, and slides of the proposed West London tram were also shown. Then the speaker mentioned the next big development in the area, a mixed use development, not with Westfield, the developer of the shopping centre, but with another developer. That development will see White City Central Line station be covered over and become an 'underground' station.

Two questions were forthcoming from the audience, one concerning the sidings. The speaker said that the sidings can be accessed from either the eastbound or westbound lines, and are automatically signalled from the control room, with an additional local control panel, so theoretically, trains could be stabled on two minute headways.

The other question concerned the opening of the Shopping Centre. The speaker said this was officially due in December 2007, and the developer gets his money if the project opens on time, but there are contingency plans in place in case the opening is later. Additionally, Shepherd's Bush Central Line will not be fully finished by then, so LUL has had to convince the Railway Inspectorate that it can cope with increased volumes of traffic even whilst the station is still a building site as extra passageways are excavated.

The talk concluded with the usual vote of thanks from the audience.

**Donald McGarr**