



GOBLIN gets wired...

The Gospel Oak-Barking line has long stood out as a glaring omission from the electrification map, owing to its status as the last remaining un-energised part of the London Overground network.

The need to bring the wires to this 14-mile route across northeast London - unofficially dubbed the 'GOBLIN' - had become chronic, with severe overcrowding demanding the introduction of new and longer rolling stock.

Before electrification work began in June, the 10,000 passengers that passed through its stations during the morning peak had simply overwhelmed the capacity provided by the four, two-car diesel Turbostars that served the line each hour.

And as GOBLIN is linked to electrified lines at each end (and several more via junctions along its route), there were obvious advantages to freight in opening up an alternative route for electric-hauled traction away from the busy junctions at Camden Road and Stratford.

Despite it being one of the most costly electrification schemes ever undertaken by Network Rail on a cost-per-mile basis, government finally met the £133m price tag in June 2013, and contracts were duly signed in September 2015.

Due to the national significance of the scheme's potential to remove freight from the road, the Department for Transport is supplying 80% of the money, while just a fifth will come from Transport for London.



▲ Track lowering at the south end of Walthamstow Queens Road station. The Up line trackbed has been excavated to a depth of 50cm below the height of the adjacent Down line. Queens Road bridge - one of the lowest on the line - is in the background. NETWORK RAIL.

PAUL STEPHEN reports from Walthamstow Queens Road station on the technical challenges facing Network Rail during its ongoing £133 million Gospel Oak-Barking electrification project

Long-suffering commuters will be able to reap the benefits provided by new four-car Class 710 Electric Multiple Units (EMUs) from early 2018, but not before they have endured a full blockade of the line for five months, beginning in October. In the meantime, the eastern half of GOBLIN has been closed since June between South Tottenham and Barking, while a curtailed service has continued on weekdays-only between Gospel Oak and South Tottenham. However, that too will cease in October.

So what has made the scheme so expensive, and what is driving the long eight-month phased closure of a route just 14 miles long?

"There are 17 overhead structures in this mile-long stretch to Blackhorse Road alone, so we had a choice of either raising them to fit in the wires or lowering the track," says Neil Hamilton, senior programme engineer at Network Rail, during RAIL's visit to Walthamstow Queens Road on July 20.

"People think that as an electrification project we just put the wires up, and they don't necessarily think about the unseen stuff. But this is more of a civil engineering job - the wiring is the easy bit.

"There's also lots of bonding to do and immunisation of the signalling ahead of the 25kV electrical supply being switched on, plus drainage work and platform extensions at stations. You need to have a barrier between the frequency emanating from the 25kV supply and the communications systems the signals are operating on.

"We had to weigh up what was best, easiest and cheapest to do in the timeframe we've got."

Walthamstow Queens Road lies near the halfway point of GOBLIN and within the portion of the line that closed in June. It will not re-open until the end of the full line blockade in February 2017.

It also lies at the centre of the most complex of the six sites along GOBLIN where track lowering is required. The labour intensity of the project is significant, with NR estimating that 1.2 million man-hours will be needed to complete the engineering.

A 500 metre-long stretch of track is being lowered by between 25 and 50cm at Walthamstow Queens Road to provide clearance for overhead wires beneath the abundance of road bridges that cross the line

as it cuts through some of the most densely populated residential areas of Walthamstow.

Most of the track will remain ballasted at its new depth, but two shorter stretches of lower profile concrete slab track will be needed in order to squeeze under the two lowest bridges that cross the line at Queens Road and Pretoria Avenue.

The high track 'fixity' system being installed is the same as that being used in Glasgow Queen Street tunnel, where clearances are at their tightest on the Glasgow-Edinburgh electrification project.

The bridge at Pretoria Avenue created an added headache for Network Rail, because in addition to being lower than most of the other

bridges, a gravity-fed Victorian sewer which cannot be lowered any further lies just 20cm beneath the railhead.

The close proximity of these two bridges to the northern and southern ends of Walthamstow Queens Road also prevented NR from raising the track level back to its original height through the station, forcing a large-scale rebuilding of its platforms.

Hamilton says it was this perfect storm of problems that forced NR to ask for a blockade of the eastern end of GOBLIN for eight months, and the rest for only five.

He adds: "Of all the track lowering sites, this is the 'biggy', which is why we need all that time.

"These two bridges are really awkward and are so low they've prevented us from raising the track through the station in the middle, meaning the platforms have had to be underpinned and will need re-building.

"The other areas are much less complicated so only need a five-month closure."

During the re-building and lengthening of



▲ Looking north-east in the direction of Blackhorse Road station and the Gospel Oak end of the line, work continues to lengthen the platforms at Walthamstow Queens Road to accommodate four-car EMUs once electrification is complete. PAUL STEPHEN.

both platforms, the station will also benefit from modernised CCTV, new lighting, platform furniture and tactile platform edges.

Although perhaps ruing the Victorians' decision not to dig down deeper when the line was constructed in the 1860s, Hamilton says the railway's original designers unwittingly aided the electrification process in other ways.

Unfortunately for Hamilton and his team of contractors, it was impossible to foresee the need for an overhead electrical supply at that time; the first DC third-rail electric railways would not open in Brighton and on the London Underground until two decades later, with overhead systems not coming to these shores until after the Second World War.

"One area where the Victorians helped us was with the retaining walls, which are huge and very well-built. This has saved us both time and cost when coring through the brickwork to stabilise the overhead wires - even if they put in the bridges too low."

The other good news for GOBLIN users beyond receiving longer rolling stock in 2018 is that electrification will make it easier to implement further improvements to capacity in the future. The installation of masts and the re-siting of signals has been made to the gauge required for the future lengthening of Class 710s from four cars to five, while there is also a proposal for the complete resignalling of the line during Control Period 6 (2019-2024), which currently restricts movements to four trains per hour.

Hamilton adds: "The electrification project has been designed for four-car running, but future-proofed for five-car in that all new structures are being put outside of the five-car range in the areas being worked upon.

"We've been asked to do this for four cars, but from a signalling and electrification perspective there's no reason why we can't look at running five cars in the future." ■

Further reading

See feature in RAIL 800

Looking down from Pretoria Avenue bridge concrete slab track is being laid towards Blackhorse Road station in the distance. On July 20 the Up line had been removed with the Down retained to enable the movement of material in and out by rail. ANTONY GUPPY.

