

A necessary evil on the GOBLIN route

One of London's major commuter routes is to partially close between June and September, as work gets under way to electrify and relieve overcrowding on London Overground's busy Gospel Oak to Barking Line.

Weekday services will continue to run, along the section from Gospel Oak to South Tottenham, until a full five-month blockade of the entire route begins in October.

The need for the upgrade has left Network Rail between a rock and a hard place. As one of the capital's few direct radial routes from North to East, it's a strategically important line, and popular with commuters. It's also a glaring omission from London's extensively energised network. But the effects of closing the line will be acutely felt among regular passengers.

In return for new and longer four-car Class 710 trains being introduced in early 2018, up to 10,000 commuters a day will have to bear the

PAUL STEPHEN reports on the £133 million Gospel Oak-Barking electrification project that will lead to the phased closure of the line for eight months from June

temporary burden of an extra 30 to 60 minutes on their journey times, when they will be forced to use replacement bus services, or take the less direct route in and then back out of Zone 1 on the Tube.

Unofficially dubbed the 'GOBLIN', the route's 14 miles of un-electrified railway are linked to electrified lines at each end - the North London Line at its western terminus Gospel Oak, and the London, Tilbury & Southend Railway at its eastern end at Barking. It also links to four more electrified lines along its route - the Midland Main Line, East Coast Main Line, the Lea Valley Line and the Enfield Town & Southbury Loop.

Introducing overhead wires will therefore not only benefit passengers, with extra seats on the new electric rolling stock, but also open up a much-needed alternative route for electric-hauled freight. Electrification will enable freight traffic to exit the North London Line at Gospel Oak and head east for Tilbury and the Channel Tunnel, avoiding busy junctions at Camden Road and Stratford.

Significant disruption is unavoidable says Rob Fairhead, the project's sponsor at Network Rail. This is due to the large amount of civil engineering required to accommodate overhead wires as, in addition to the platform extensions that are needed for longer trains,

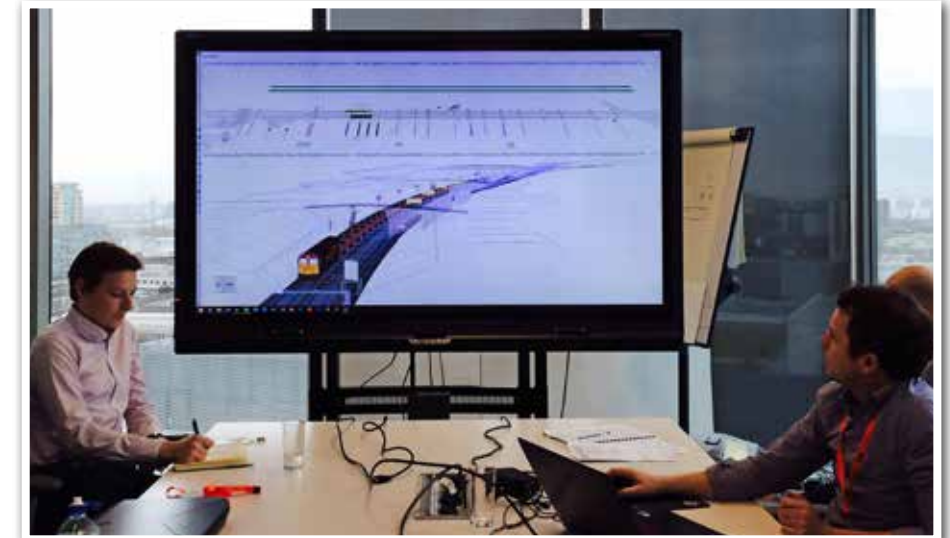
four sections of track have to be lowered, four bridges rebuilt and a further six modified.

"Walthamstow to Queen's Bridge Road is the biggest job, where we're digging down up to 50cm," says Fairhead. "That's why we need a full blockade from South Tottenham to Barking, and the other section will only be closed after September. This isn't a matter of preference - it's the only way.

"Once we've started, stopping won't be an option. You can't have one line open and one line shut, because we need to take all the track away and work in quite a tight space.

"It's a big job and it will be very disruptive. We've done as much as we can at weekends - we've started piling and there are quite a few masts up already - but we still need to close the line for eight months to lower the track."

Having avoided its proposed closure under Beeching's consolidation of the railways in the 1960s, the line endured a chronic lack



of investment, de-staffing and an unreliable service (using some of the oldest diesels on the network) throughout the 1980s and 1990s. But 'GOBLIN' has enjoyed something of a renaissance in the 21st century. Its importance has grown as capacity has been eaten up on other routes over the years, driven by the continued growth of London's population.

Since taking over the line in 2008, London Overground has increased staff levels at stations and doubled the frequency of services to four trains per hour, reversing the decline and encouraging passenger numbers to rise.

The line was put on the Tube map and included in the Oyster pay-as-you-go scheme, further boosting its profile. An average of 10,000 people now pass through its stations during the morning peak.

A victim of its own success, its biggest problem has become overcrowding on its fleet of eight two-car diesel Turbostars, strengthening the case for electrification on this isolated diesel-only section of track.

However, the scale of the engineering task at hand and the hefty cost of electrifying the route caused the project to be shelved on cost grounds by the Department for Transport in 2008, and once again in 2012. The cash was finally obtained in June 2013 in the Government's spending round, and contracts awarded in September 2015.

Fairhead adds: "In the 1980s there was only a half-hourly service run by ancient diesels. If one was cancelled, you could wait at a station for an hour-and-a-half for the next one. Ridership has gone through the roof now that we have staffed stations again, as some people wouldn't have previously used this line in the evenings and wouldn't feel safe at some of the stations.

"The [electrification] concept has been around for 20 or 30 years, ever since we electrified the North London Line in the 1980s, and the 1990s when we prepared the

Network Rail has been able to reduce the duration of the blockade by using a 4D-modelling tool to plan construction in fine detail, and simulate the entire sequence of scheduled work well before it commences. NETWORK RAIL.

surrounding lines for Channel Tunnel traffic. It meant we had wires at Gospel Oak, South Tottenham and Barking, and at some point you naturally want to join these together - not just for passenger services but also to divert freight. Any electric train that runs up the North London Line has nowhere else to go - it has to go via Stratford or Hackney up to Camden Road and onwards.

"On face value it's such an obvious electrification scheme to carry out, but the challenge has always been making a convincing business case. Mile for mile it's an expensive scheme - not because of the electrification but in creating the necessary clearances.

"It's a £133m scheme but most of that cost is the civil engineering. We advertise it as an electrification scheme, but that's the easy bit. It's the peripheral work that's the main cause of the blockade."

An unforeseen benefit of postponing the scheme has been the pace of technological change and new engineering techniques, which have brought down both the overall cost and the duration of blockade needed.

Network Rail's 'GOBLIN' team has chosen to pioneer the use of a new 4D software package that enables planners to use virtual simulation technology to choreograph the construction sequence to the nearest second. An interactive construction sequence exposes design faults before they happen, allowing for greater optimisation of manpower and equipment. The software has been used for track renewals on the West Coast Main Line and London Underground's Victoria Line, but never on such a big project. ➔

Freightliner 66603 hauls a West Thurrock-Tunstead cement train past Harringay on April 20. The 'GOBLIN' route will soon welcome electric-hauled freight bound for Tilbury and the Channel Tunnel, and allow it to bypass congested junctions at Stratford and Camden Road. ANTONY GUPPY.

London Overground 172005 passes tree surgeons at work at Queen's Road, Walthamstow on April 20, clearing the way for the installation of OLE masts. J Murphy & Sons won the £59.6m electrification contract in September 2015. ANTONY GUPPY.

➔ “Twenty years ago we would have had to knock down more bridges and it would have been over-engineered by today's standards, but now we have slab track.

“A lot of bridges can't be raised, plus there's a gravity-fed sewer which carries all the effluent from Waltham Forest, but to lower track we're going to use slab track, which allows tighter clearance than if it was ballasted.

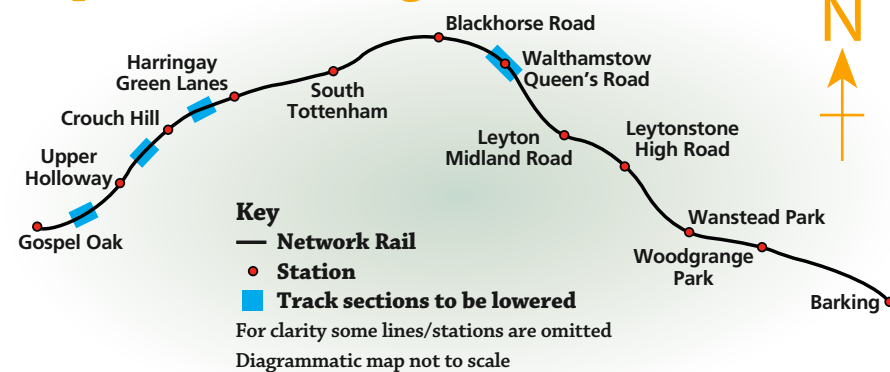
“The main challenge we face is a logistical one, so we've commissioned a 3D modelling company called Freeform to create a 4D model that also factors time into the simulation. It creates an animation so you can see what happens at every minute of the construction. It allows us to ensure that one group of people won't clash with another, and that there isn't going to be an engineering train parked in front of an access point. We can avoid all those things that would waste time, so we can plan everything to a tighter timeframe.

“The 4D element has never really been done by Network Rail before. Previously you would have had a hard copy trackplan or schematic to work from each day, which is very limiting. Hard copies only give you a snapshot of the plan, whereas this shows the project in real time. And if we change the plan and feed in the data it changes the animation accordingly.

“I think we'll see a lot more of this as it's more efficient and saves money on projects. The first time we ran it we discovered clashes which we could then take action to avoid. The other difficulty we used to have was that there are only three ways to get engineering trains in or out of the line at Gospel Oak, South Tottenham or Barking. Is the train in front blocking the line because it's waiting for a driver? We used to try to keep track of these factors on separate bits of paper, but now they are all combined into one coherent picture.”



Gospel Oak to Barking line



He adds: “We have to pay millions of pounds in compensation to operators, so if we can shorten the blockade time then costs will be lower and passengers will be back on the trains quicker, so it'll be a big win.”

Fairhead knows that part of the project's success lies in limiting disruption and keeping 30,000 lineside residents and every inconvenienced passenger on side. Network Rail and TfL have therefore embarked on an extensive communications campaign using social media, a dedicated website and a series of drop-in sessions at all stations on the route to help keep people informed. Regular meetings are held with officers from all six borough councils affected by the line, and fortnightly meetings are held with internal stakeholders to discuss and try to mitigate likely disruption to local residents. NR is keen to highlight the air quality improvements the project will bring to this densely populated part of London once the diesel units have been replaced, and that the environmental impacts of construction work have been carefully considered, including any loss of biodiversity.

“We've divided up communications with TfL, so we communicate with lineside neighbours and they communicate with passengers,” adds Fairhead. “Obviously we support each other as well, which is why we have been at all the drop-in sessions.

“We've sent letters to everyone living within 150 metres of the line, which is about 30,000 residents, and we're engaging with local schools because the line will be electrified

London Overground 172005 passes newly erected masts at Harringay Green Lanes on its way to Gospel Oak on April 20. These two-car diesels will be replaced with new four-car Class 710s in early 2018, once electrification is complete. ANTONY GUPPY.



(with its accompanying dangers). We are trying to communicate through all available channels in the most cost-effective way

“We want to be carbon neutral and, as we are chopping down a number of trees along the route, we are replacing them by replanting

in local parks. That's gone down well, because we're doing things that some small community groups can't afford. The footprint of the wires is probably four or five metres wider than the railway, so we need to cut down anything that might foul the OLE. But, equally, we

understand that people are used to having trees there, so we need to explain to people exactly what we're doing and why.”

The switch from two-car diesels to four-car electric trains will double capacity, but passenger demand across the railways is also expected to double within the next 25 years, while London's population is predicted to top 10 million by 2030.

Compounding this will be the 4km eastern extension of ‘GOBLIN’ to a new 10,800-home residential development at Barking Riverside. Subject to an agreement over funding, this should be in operation by 2021.

But Fairhead would like to reassure passengers that they are unlikely to face anything like this level of disruption to their journeys again. He says that the short-term pain is certainly worth it for the long-term gain. Future improvement work to boost capacity will be relatively simple to implement, as a result of the forthcoming blockade.

“This isn't the end of the story. In future we'll look at resignalling, which will allow us to run more trains. The Barking Riverside extension is coming in a few years, but most of the work will be done offline. Extending the platforms further might be the next step to facilitate an eight-car railway, but this is the first and most painful step. Once the line's been electrified then anything else can be done on weekends, bank holidays or very short blockades. We won't need to close the line for this length again for any foreseeable reason.

“The wires are coming, the new trains are coming and the railway people have needed is now coming after so many years of waiting. I don't want to undersell what we are doing - it will be very positive.”



Passenger numbers on the Gospel Oak-Barking line have more than doubled since London Overground took over the running of the route in 2008. Class 177 L721 departs Walthamstow Queen's Road for Barking on April 17 1999, when investment was still lacking. ANTONY GUPPY.



Network Rail and TfL staff held drop-in sessions at all stations on the route between April 18 and May 5 during evening peak hours to explain the work and answer questions posed by passengers and local residents. This was the first session at Barking on April 18. NETWORK RAIL.