

TRANSPORT FOR LONDON

RAIL AND UNDERGROUND PANEL

SUBJECT: STATUS OF THE JUBILEE LINE UPGRADE

DATE: 12 MAY 2010

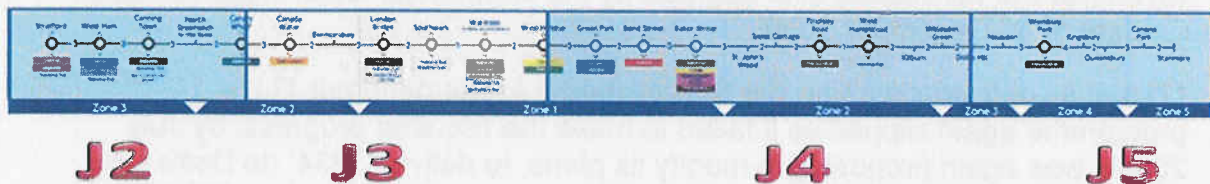
1 PURPOSE

- 1.1 The purpose of this report is to describe the current status of the Jubilee Line upgrade, the proposed commissioning strategy, the risks to completion and the potential impact on customers. The key component of the upgrade is a new Transmission Based Train Control (TBTC) system being provided by Thales Signalling (formally Alcatel). In addition, there are train traction upgrade packages and some infrastructure modifications such as the introduction of a third platform at Stanmore. At the time of contract award this was the largest application of a TBTC system.
- 1.2 The Rail and Underground Panel is requested to note this report.

2 BACKGROUND

- 2.1 The Jubilee Line upgrade is the first upgrade required to be delivered by Tube Lines Limited (TLL) as part of TLL's obligations in the PPP contract. TLL is contractually obliged to achieve the upgrade by delivering such new or enhanced assets as are necessary to meet a Journey Time Capability (JTC) score of 13.91 minutes by a latest implementation date of 31 December 2009.
- 2.2 The original TLL strategy was to deliver the new TBTC system on the line incrementally in an east to west direction, breaking the line into small sections (J2 through to J5, as shown in the figure below) to minimise delivery risk to the overall line. The final phase (J6) would see Automatic Train Operation delivered over the whole line.

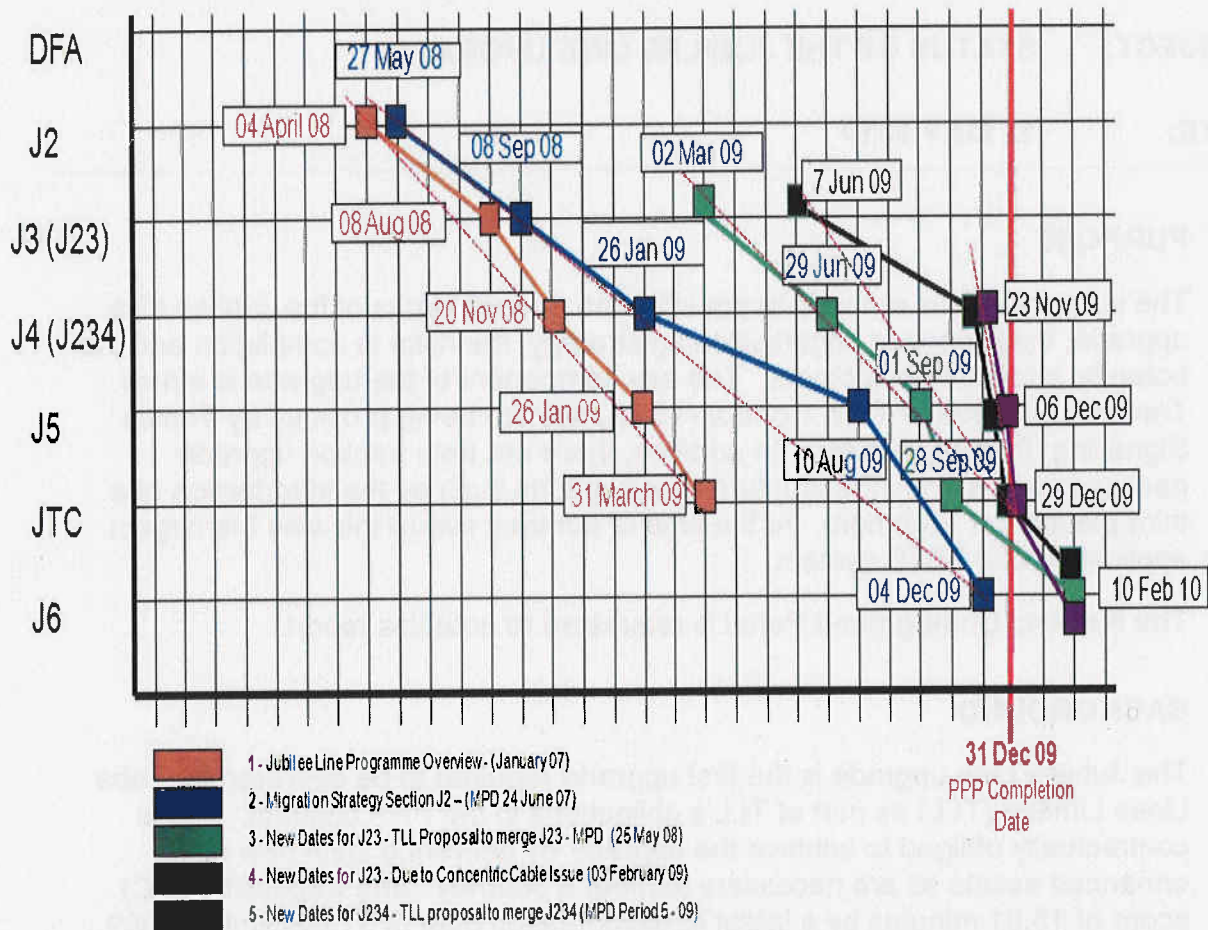
Original Migration Strategy



- 2.3 TLL would have had to create system boundaries for each stage to allow the trains to move from TBTC signalling to conventional 'Tripcock' signalling mode as they progress. However, over time, as the project has fallen behind schedule, TLL has skipped stages of its original plan and combined these sections in an attempt to meet the required Jubilee Line upgrade delivery date

(of 31 December 2009 under the PPP contract). This is illustrated in the graph below. The only system boundary that now exists is between J4 and J5 (at Dollis Hill).

Programme Review (Changes over 30 Months)



- 2.4 A little over a year ago, TLL's assertion that it would complete the Jubilee Line upgrade by the contractual date, despite the programme delays that had occurred, was embedded in a Supplemental Agreement (known as the 'Additional Closures Agreement') dated 29 April 2009, in which, in return for certain considerations, LU granted a number of further short notice closures to TLL (often across other closures and events) on the basis that TLL would:
- (a) deliver TBTC in the J23 area (i.e. east of Waterloo) by 9 September 2009 at the latest; and
 - (b) deliver the full Jubilee Line upgrade by the contractual latest implementation date of 31 December 2009.
- 2.5 LU met its obligations under the Supplemental Agreement, but TLL's programme again slipped as it failed to make the required progress; by July 2009 it was again proposing to modify its plans, to deliver 'J234' (to Dollis Hill) as a single initial section and then the full upgrade by 31 December 2009. In doing so TLL requested six additional short notice weekend closures, in addition to the twelve already granted in April, insisting that this was all that was required to complete the upgrade despite LU's very grave doubts. (The TLL resulting timeline is indicated in the purple line in the chart above).
- 2.6 Despite some further additional closures being provided, it soon became clear

that there was no prospect of the Upgrade completing by 31 December 2009. Finally, as the deadline approached, TLL offered a more realistic programme; in addition to the 113 weekend closures already granted, TLL asked for 19 further weekend closures and a further 14 "contingency" weekend closures up to the start of October 2010.

- 2.7 Based on this new, more credible, programme, LU issued a Corrective Action Notice to TLL on 5 January 2010 requiring it to deliver the upgrade by 11 October 2010, more than nine months late, in line with its revised programme.

3 CURRENT SITUATION

- 3.1 Since Christmas 2009, some progress has been made by TLL, although further issues have emerged as the system testing has progressed. During the four day line closure 25-28 December 2009, TLL was able to undertake some more significant testing and ran a system-proving trial in the J23 area for the first time (although Stratford Market Depot was not at that time completed). Then, during a further four-day closure at Easter 2010, TLL 'cut over' the entire J234 TBTC system including Stratford Market Depot and carried out "final" testing to enable LU to run Trial Operations over two partial days, during which a handful of LU's Train Operators had a chance to use the TBTC system for the first time. The Easter closures were much less promising with further problems exposed at Stratford Market Depot and Neasden Control Centre, as well as with train and system reliability.
- 3.2 Hence, even within the J234 area, while the prognosis looks more encouraging, there are still many challenges to overcome to ensure that the system has reached a level where it can be operated reliably and without numerous 'workarounds' that would significantly impair performance.
- 3.3 For the J5 area, including Neasden Depot, the prognosis is not so good: while basic correspondence testing has commenced, the intense system level tests are only just commencing. The J5 area is the most challenging having:
- (a) the complex interface with Neasden depot;
 - (b) a 'Mixed Mode Area' where both Jubilee and Metropolitan trains operate;
and
 - (c) a new third platform at Stanmore.
- 3.4 There are a large number of outstanding system change requests; and, in LU's view, substantial further work is required by TLL. LU believes that it will be some months before the system could be used in passenger service.

4 TLL'S PROPOSED COMMISSIONING STRATEGY

- 4.1 The manner in which a new signalling system is commissioned and brought into service is of fundamental importance given the operational impact. As described earlier, the original TLL strategy was to bring in the first limited section (J2) east of North Greenwich into TBTC (manually-driven) mode, thus limiting the scale of new system brought in and its potential impact on reliability. Such incremental commissioning is in line with good industry practice.
- 4.2 The next stages of commissioning would have extended to J23, then to J234, then to J2345 and eventually full Automatic Train Operation. As the schedule

has slipped however, the commissioning strategy has changed and more has been put into the "first" commissioning such that, rather than a first small section, it had been proposed, last summer, that all of J234 be commissioned together.

- 4.3 LU had, from the start, expressed its concerns at such a major first step and TLL has now re-thought its approach again. The most recent proposal from TLL, received in the past few weeks, is to revert to a J23 commissioning stage (although this is still a large section containing London Bridge, Canary Wharf and North Greenwich). However, because of earlier TLL decisions and design changes, there is now no system 'boundary' at Westminster; that is, no ability for a train to transfer from TBTC control to conventional signalling as was first proposed three years ago. Instead there has to be a physical boundary, which means in effect a track closure between Green Park and Waterloo to separate J23 from J45.
- 4.4 TLL has proposed to introduce the system in a phased manner, which would help to grow the reliability of the assets, in effect splitting the railway into two halves at weekends, operating in passenger service but with no Jubilee line service to or through Westminster. TLL propose to offer the line in this configuration for multiple weekends. There would be three phases:
- Initially TLL would introduce TBTC mode east of Waterloo, while a 'normal' service operates north from Green Park; this would mean a reduced frequency service on the eastern half, through Canary Wharf and North Greenwich (10 trains per hour compared with the usual 18) at weekends, and no through service from north to south, disrupting longer journeys, but it would reduce the number of full weekend closures.
 - Once the J23 section is at an acceptable level of reliability, and the J45 section is ready, TLL would 'swap over', with the section from Green Park to Stanmore then operating in TBTC signalling mode and the Waterloo to Stratford section under conventional signalling in tripcock mode.
 - Finally, once the J45 section has proven to be at an acceptable reliability level, the whole line can be commissioned in TBTC mode in full passenger service for the full weekday service, and the upgrade completed.
- 4.5 To this end LU has urged TLL to undertake a detailed assessment of when the system would be reliable enough to support passenger service at weekends. While TLL has expressed a wish to operate this service during May, the experience of the system over Easter and over the May day bank holiday weekend (a 3 day closure) suggests that it is far too unreliable, and it will be necessary to wait for the next version of software to be released at the end May and then – if it is an improvement - start the 'split weekend service' during June.
- 4.6 The advantage of this commissioning approach is that it would provide for the introduction of the TBTC based service on a limited geographical area at relatively quiet times, rather than the whole line switching to full TBTC service at one go.
- 4.7 The commercial terms under which this commissioning strategy will be implemented are being negotiated and it is anticipated that Heads of Agreement can be entered into this month.

5 RECOMMENDATION

5.1 The Rail and Underground Panel is asked to NOTE the report.

6 CONTACT

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