

TRANSPORT FOR LONDON

BRIEFING NOTE

Subject: Weekly Mayoral update on Crossrail / Elizabeth line

Date: 03 October 2018

Manifesto commitment(s)

Not applicable

Mayor's Transport Strategy (MTS)

A good public transport experience

Proposal 57: The Mayor, through TfL, will work with the DfT to open the Elizabeth line in 2019, with services initially providing 24 trains per hour through central London and increasing in frequency during the 2020s as demand requires.

1 Purpose

- 1.1 Weekly update to the Mayor outlining progress and challenges ahead of the launch of the Elizabeth line.
- 1.2 The Mayor is asked to **NOTE** this briefing.

2 Overall programme

- 2.1 The Crossrail Sponsor Board on 20 September requested that Crossrail Ltd review the time, cost and risk allowances contained within its Remedial Action Plan (submitted to Sponsors following the delay announcement) to provide greater confidence in the delivery programme and to ensure that sufficient additional funds are requested to complete the project.
- 2.2 CRL has reviewed its schedules to take into account the latest progress on site and recent contractor performance and has updated its high level delivery plan. This now includes a start of interim dynamic testing (1 shiftx5 days a week) from December and main dynamic testing (Phase 4 – 2 shiftx5 days a week) commencing in January (previous target 22 October).
- 2.3 Dates for Tier 1 contractors being substantially demobilised at the central stations have also pushed back but still demonstrate achievability of an autumn delivery.
- 2.4 CRL is in the process of recasting its overall MOHS (the master schedule). It will be available in late October. ■■■ dates for critical activities and key milestones will continue to be used to drive contractor performance.

3 Routeway construction:

- 3.1 Critical programme metrics for routeway construction are tracked weekly and actively monitored by Crossrail Ltd (CRL). The production rate of Phase 2.1 Installation Release Notes (IRNs) remains critical and is being hampered by completion of the infrastructure



and a lack of resources. Overall systemwide IRNs for Period 6 show a variance of 571 against a plan of 1,533. The table below outlines the latest available progress and look ahead for the routeway commodities which are the critical path for infrastructure readiness for Phase 4 Dynamic Testing.

	Fire main install	Fire main pressure test	Fire main flow test	Low voltage dist.	Pumped drainage install	Walkway install
Total IRNs ^	34	-	-	62	31	36
Total tests	-	34	17	-	-	-
Completed this week	0	0	0	0	0	2
Total complete (actual)	10	1**	0	1	4	7
Total complete (forecast)	12	0	0	1	3	10
Difference	-2	+1	-	-	+1	-3
Current 2 week look ahead	6	4	0*	12	3	8
Notes:						
metrics as of week ending 23 September 2018						
* Fire main flow tests are expected to commence the week of 8 October						
**Fire main pressure tests: tests carried out in the previous week need to be repeated to capture components currently being installed.						
^ the Total IRNs can change as the assurance programme progresses						

Testing and Commissioning

- 3.2 Dynamic Testing window number 12 took place during the weekend of 29 to 30 September. The transition testing between TPWS and CBTC signalling systems from the central section to the Great Eastern was undertaken successfully in both directions 11 times. This represents very positive progress. In addition, Siemens identified the cause of a communications failure between the Route Control Centre and the train and have successfully applied a manual fix to the train settings. Testing was also undertaken at full line speed between Pudding Mill Lane and Stratford, outside of the tunnel area where speeds have previously been restricted to 23mph.
- 3.3 As reported last week, an independently-chaired review of readiness to enter into a schedule of 5 day testing / 2 day construction has concluded this will not commence on 22 October (as previously planned). The CRL leadership team has been reviewing the outcome of the review and it will be reflected in the revised MOHS. Note that the recent independent schedule review concluded Autumn 2019 opening was compatible with starting 5/2 dynamic testing in January 2019, although the later that 5/2 dynamic testing starts the greater the risk to opening.



Systems integration

- 3.4 CRL has appointed a systems integration specialist who has started to review the current status of systems integration activity. The review is due within a month and will include recommendations relating to revised structure, process, governance and accountabilities. It is likely that a substantial systems integration authority will be embedded within the existing Crossrail management structure. The results of this review will be used to form the structure and personnel requirements for this new team.

4 Train production and testing

- 4.1 A detailed update on progress with Bombardier is provided in Appendix A.

5 Stations

- 5.1 Overall station completion is measured periodically/every four weeks and will be next updated following the CRL Board next week.
- 5.2 The new MOHS will be finalised later in October and will include revised staged completion and handover dates for the stations.

6 Network Rail works for each stage

Stage 5:

- 6.1 The review of available options in regards to the expected [REDACTED] [REDACTED] for the western station enhancement works has continued. The need and options for [REDACTED] were discussed at the DfT portfolio board on 13 September and will now be raised at NR's Executive committee on 2 October.
- 6.2 NR will commence enabling work at Ealing Broadway, West Ealing, Southall and Acton Main Line this month, and continue to plan to maximise use of the important Christmas works period.
- 6.3 Local authorities are likely to challenge vigorously any reductions in scope. This will add to schedule pressure which will have already been extended by the potential need to reprice the works. NR is publically committed to delivering these station upgrades by December 2019.

7 Approvals for each stage

- 7.1 The overall approvals for each stage will be updated when the detailed delivery schedule is finalised by the end of October.

8 Appendix

- 8.1 **Appendix A:** Joint TfL and Bombardier Weekly Report



Appendix A: Joint TfL and Bombardier Weekly Report

Elizabeth line - Bombardier Weekly Report 1 Oct 2018

Note No: 27

Key Activities and Issues

- 54 trains have been completed in Derby by Bombardier. TfL has [REDACTED] pending delivery of further validated software to allow greater use of the units on Network Rail infrastructure, and further reliability improvement of the existing fleet. The actions being taken are summarised below including the introduction of 9 Car units into passenger service on Networks Rail's infrastructure, planned for November. The intention is to re-start train delivery so that the remaining fleet can be accepted by summer 2019 with deliveries at a steady and sustainable rate.
- Old Oak Common Depot is in full operation.
- Four 7-Car trains continue to be used on TfL Rail services between Paddington and Hayes & Harlington based at Old Oak Common. Ten 7-Car trains are available for passenger service on the Liverpool Street to Shenfield line.
- Bombardier's reliability growth plan based on the mean distance between service affecting failures (MDSAF, a standard industry measure based on any delay over 3 minutes caused by a train fault). The target has been reduced to 7800 miles by 10 November (previously 13000 miles). This is supported by an updated programme of modifications, progress with which is tracked weekly. MDSAF in the last full four weeks (Period 6) was 6516 miles, up from 3060 miles in the previous Period. Although reliability is not growing as fast as previously planned, which is not good, the impact of any incidents is being reduced by better response and in Period 6 TfL Rail service performance was the best of any operator nationwide.
- The latest Siemens signalling software for the Central Section has been tested at Melton Test Track with the latest R7.2.2.5 train-software. Tests were completed on 26 September and of the 29 formal tests to be undertaken, 12 passed, 10 failed and 7 are under analysis (the test may have been 'passed' but with a subsequent or related fault occurring which requires investigation). A productive review session with Siemens, CRL and RfL was held at Melton 27 September and the necessary fixes are being analysed and programmed into further releases by Bombardier (next release planned to be available for testing from 16 November) and Siemens (date to be confirmed this week).
- BT continues to undertake work to validate the software which can be used for running in traffic hours on Network Rail. This will allow the 9-Car units to substantially increase the mileage operated and will help build reliability prior to use in the Central Section tunnels. The target for making submissions to the necessary safety bodies remains 5 November.
- The last Test Window took place 28/29 September and included further testing of the transition between the CBTC signalling and national rail (TPWS) signalling at Stratford, at the eastern end of the central tunnels as well as running in the tunnels themselves. The



transition testing was much more successful than previously with 11 'clean' passes out of 19 transitions attempted, 2 fails and the others being analysed. This represents good progress. In addition, for the first time, on train software was upgraded to allow condition monitoring data from the train to be sent to Route Control Centre via the signalling radio system.

- In addition to the daily and weekly meetings between Bombardier, Siemens, Crossrail and TfL a plan is now being implemented to further strengthen the Crossrail project's capability and resource to manage system integration.
- Development of Release 7.3 on-train software continues. This will be used for Heathrow services utilising the European 'ETCS' signalling system. Bombardier has submitted a programme which delivers the R7.3 train software configuration tested and validated for passenger service for by 6 February 2019. BT are actively exploring the potential to start driver training in advance of this date and how any additional, specific, safety case requirements can be met to allow this to happen.
- With a large amount of testing and a number of software releases, updates and derogations all requiring approval, software quality and assurance is the continuing focus.



Key Programme Milestones

Stage 2	P80 Programme (V3_5_1) 11thJan	Current Forecast
Approval for driver training on Great Western routes excluding European Train Control System	27 Feb	Completed
Commence build of TCMS release 7.3 (the Stage 2 passenger service software)	26 June	Commenced 30 July
Independent Safety Assessment body ('ISA') approval for European Train Control System MR3 software necessary for Stage 2	6 Aug	Under review
Independent Safety Assessment body ('ISA') approval for TCMS release 7.3	18 Sept	Under review
Approval for European Train Control System driver training on Great Western	24 Aug	Under review
Approvals for European Train Control System Passenger Service	28 Sept	6 Feb 19 Under review
Stage 3		
Completion of Transition testing at Melton ready for Central Operating Section Dynamic Testing	29 Jan	Completed
Commence build of TCMS release 7.2 (the Stage 3 passenger service software)	24 April	Completed
Independent Safety Assessment body ('ISA') approval for European Train Control System MR2 software necessary for Stage 3	22 May	Completed
Approval of CBTC signalling for Central Operating Section Trial Operations	22 Jun	Completed
Availability of 22 trains for Trial Running in the Central Operating Section	13 Aug	Unit Acceptance Paused
Approval of Class 345 for Stage 3 Passenger Service	10 Oct	Under Review
Start of Stage 3 Passenger Service	9 Dec	Autumn 2019
Old Oak Common Depot		
Section A Brought into Use	1 Mar	Completed
Section B1 Brought into Use	11 Apr	Completed
Section C Brought into Use	30 May	Completed

