

TRANSPORT FOR LONDON

BRIEFING NOTE

Subject: Weekly Mayoral update on Crossrail / Elizabeth line

Date: 08 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 (CRL) 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). Overall systemwide IRNs for Period 6 show a variance of 571 against a plan of 1,533.



The production rate of Phase 2.1 Installation Release Notes (IRNs) remains critical and is being hampered by completion of the infrastructure and late orders/ missing deliveries by and to the contractor. Action is being taken through weekly meetings to discuss and align weekly inspection and IRN plans, daily calls on each IRN forecast date, and Friday meetings for disciplines leads to reports on actual delivery. All suppliers have been spoken to and materials are now either delivered or have been expedited.

Testing and Commissioning

- 3.2 The independently-chaired readiness group review of entry into 5 day testing / 2 day construction will meet again in early November. This will assess progress against the detailed entry criteria covering train readiness, infrastructure readiness and signalling readiness. Internal readiness meetings are also being held regularly and the detailed testing plans are being populated. 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

- 3.3 CRL has appointed a systems integration specialist who is reviewing the current status of systems integration activity. The review is due within three weeks 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 this 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 the Network Rail (NR) Executive Committee on 3 October. NR is pursuing [REDACTED] and will update Sponsors on 15 October. It also is continuing to explore value engineering options for potential efficiencies.



- 6.2 Tender returns for Package 3 (Southall, Hayes, and West Drayton) have been assessed and tender recommendation made, although clarity now is being sought with respect to staging options. The final recommendation is expected [REDACTED] Package 2 (Acton, Ealing Broadway and West Ealing) tender returns have been received and are under review. Both packages are subject to [REDACTED] [REDACTED] [REDACTED]. NR has not yet been able to provide sufficient information to CRL to validate this [REDACTED].
- 6.3 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.
- 6.4 Contract award for Ilford and Romford station upgrades [REDACTED].
- 6.5 Local authorities are likely to challenge vigorously any reductions in scope. This could add to schedule pressure which will have already been extended by the potential need to reprice the works. NR remains 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 8 Oct 2018

Note No: 28

Key Activities and Issues

- 54 trains have been completed in Derby by Bombardier. TfL has [REDACTED] [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 is 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). Bombardier's target is 7800 miles by 10 November. This is supported by a programme of modifications and activities, progress with which is tracked weekly. Bombardier continue to defer making changes to the 7-Car train software to allow focus on adding functionality required for signalling on the 9-Car trains. MDSAF in the last full four weeks (Period 6) was 6516 miles (up from 3060 miles in Period 5). In the first 3 weeks of Period 7 the MDSAF is 5023 miles.
- The latest tests of CBTC signalling and associated software for the Central Section tunnels were completed on 26 September. Of the 29 formal tests undertaken, 12 passed, 15 failed (including where the CBTC signalling test may have been 'passed' but with a subsequent or related fault occurring) and 2 are under analysis. Productive review sessions were held with Siemens, CRL and RfL at Melton 27 September and 3 October and the necessary fixes are being analysed and programmed into releases by Bombardier and Siemens, for further testing from mid November. The detailed programme will be confirmed this week. The start of Main Dynamic Testing in the Central Section tunnels has been moved back from 22nd October as the agreed entry criteria relating to completion and testing of infrastructure and train and signalling systems will not be met by that date. A further review will take place at the beginning on November.
- Bombardier 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 build of Release 7.3 on-train software is now complete. This will eventually 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 by 6 February 2019, and is exploring the potential to start driver training in advance of this date. This supports a full introduction of passenger services to Heathrow at the [REDACTED]. This programme needs to be reconfirmed and made robust against the need for further iterations of Release 7.2 for the central tunnels. Bombardier is undertaking this further programming exercise (managing 7.2 and 7.3 together) during the coming week.

- Further Heathrow pre-testing took place 5/6 October. This was to test the existing software against elements of the wayside system such as the imposition of temporary speed restrictions [complete results Monday].
- In addition to the daily and weekly meetings between Bombardier, Siemens, Crossrail and TfL a project is now underway to further strengthen the Crossrail project's capability and resource to manage system integration.
- With a large amount of testing and a number of software releases, updates and derogations all requiring approval, software quality and assurance remains the continuing focus.



Key Programme Milestones

Stage 2	P80 Programme (V3_5_1) 11th Jan	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	Completed
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
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

