

## TRANSPORT FOR LONDON

### BRIEFING NOTE

**Subject:** Weekly Mayoral update on Crossrail / Elizabeth line

**Date:** 26 March 2018

#### Manifesto commitment(s)

Not applicable

#### Draft 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 Headlines

- 2.1 Testing of the new trains and infrastructure in the eastbound tunnel between Abbey Wood and Stepney Green was carried out last week. Day time testing in both tunnels will take place this week.
- 2.2 Improvements in the Alstom TSO Costain (ATC) joint venture systemwide schedule have been made. However, further improvement is still required to meet the milestones within Crossrail's Master Operational Handover Schedule that delivers the Elizabeth line on 9 December 2018.
- 2.3 Good progress continues to be made with the fit-out of central stations. Platform screen door installation was carried out at Liverpool Street last week - one of the three remaining platforms.
- 2.4 A meeting with the Office of Rail and Road (ORR) will take place this week to update the ORR on Crossrail's approach to, and pipeline of, regulatory approvals needed to bring the railway into service.

## 3 Costs

- 3.1 CRL's costs are reported on a periodic basis and have increased by £3m in the last period to £12,467m.
- 3.2 Discussions took place between CRL and Sponsors (DfT and TfL) at the Crossrail Sponsor Board on 22 March, regarding the likelihood of additional funding being



required to complete the project. CRL's current forecast shows £45m headroom to the limit of the £600m contingency, funded by TfL.

- 3.3 Scenario analysis presented by CRL indicates that the likelihood of their cost forecast breaching that limit by the time of the next formal report (May) is high as they incorporate the implications of the revised Master Operating Handover Schedule (MOHS), delays to energisation, revised Bombardier programme, and current levels of productivity on the systemwide contracts.
- 3.4 A deep dive into Crossrail / Elizabeth line readiness with TfL Board members was held on 20 March where funding and the delivery schedule was discussed with the CRL and TfL leadership teams.

#### **4 Programme and Schedule**

- 4.1 The key commitments and dates in Crossrail's Master Operational Handover Schedule (MOHS) 2018 are provided in the appendix A.

#### **5 Appendix**

- **Appendix A:** Key milestones from MOHS 2018 schedule
- **Appendix B:** Table of key risks and issues
- **Appendix C:** List of Acronyms
- **Appendix D:** Joint TfL and Bombardier Weekly Report



## Appendix A: Key milestones from MOHS 2018 schedule

MOHS Milestones	MOHS2018 date	Status
Traction power Zones 1&2	Feb 18	Achieved
Dynamic testing Zones 1&2	Feb 18	Achieved
Traction power on Zones 3&4	May 18	
High Voltage Non Traction Power Zones 1&2	May 18	
Stage 2 commencement (contingency plan)	May 18	
Dynamic testing Zones 3&4	Jun 18	
Network Rail award west station contract	Jun 18	
Handover of stations and elements to RfL and LU	Jun-Nov	
High Voltage Non Traction Power All locations	Jul 18	
Dynamic testing all zones	Jul 18	
Trial running commences	Aug 18	
Safety case for central section submitted to RAB C	Aug 18	
Trial operations commence	Sep 18	
Submit Approval to Place Into Service to ORR	Sep 18	
Full Stage 2 services	Tbc	
Stage 3 commencement	9 December 18	



## Appendix B: Table of key risks and issues

Risk / Issue	Key date	Mitigation / Action
<b>Stage 2 - Paddington to Heathrow, Shenfield to Liverpool Street mainline</b>		
Timely completion of ETCS testing and BT on board signalling approval	On-train testing start <b>4 May 2018</b>	Heathrow testing restarted 23 Feb 2018 Further release of software 7.3 is likely to be required for passenger service
<b>Stage 3 - 9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline</b>		
Timely provision of design assurance information, asset data, key operations/ maintenance information.	Systemwide Handover 5 Aug 2018	Maintain improved design assurance close out rate and drive Tier I contractors to provide relevant information in good time.
Risk of delays to the Bombardier schedule for installation of the Class 345 on-board TCMS / CBTC (v 6.1.1 & v7) impacts activities for Dynamic Testing.	CBTC Authorised for Trial Running <b>22Jun18</b>	Prioritisation of software development & testing for Stage 3 in latest BT programme. The revised plans includes contingency to start of testing in central section
Risk of delays to commissioning of NR interfaces impacting trial running.	Commence Transition Testing Z1&2 <b>30Jun18</b> Z3&4 <b>14Jul18</b>	Confirm and maintain blockades. Confirm the programme for installation of wayside equipment, on board software and testing at PML.
Risk of insufficient time to undertake trial operations activity.	Trial Ops 09 Sept 2018	CRL continues to work with contractors on resourcing and prioritisation of key information.
Risk of LU readiness being impacted by ongoing construction at stations, spares availability and completion of staff training.	Trial Ops 09 Sept 2018	Station by station Handover execution plans being agreed between CRL and LU.
Preferred delivery option and programme for wifi and 4G for passengers from stage opening and maintenance teams from handover.	Wi-Fi for passengers 9 Dec 2018	Interim on-train wifi solution proposed. Positive initial engagement with MNOs with procurement planned for Mar 18



## Appendix C: List of Acronyms

Acronym	Description
ATC	Alstom, TSO, Costain joint venture
BT	Bombardier Transportation
CBTC	Communications Based Train Control
CRL	Crossrail Limited
DfT	Department for Transport
ETCS	European Train Control System
LU	London Underground
MNO	Mobile Network Operators
MOHS	Master Operating Handover Schedule
MTS	Mayor's Transport Strategy
ORR	Office of Rail & Road
PML	Pudding Mill Lane
RAB (C)	RfL Assurance Board for Crossrail
RfL	Rail for London
TBC	to be confirmed
TCMS	Train Control Management System
TfL	Transport for London
TPH	Trains per hour



## Appendix D: Joint TfL and Bombardier Weekly Report

## Elizabeth line - Bombardier Weekly Report 26 March 2018

## Note No: 5

Key Activities and Issues

- 41 trains have been completed in Derby by Bombardier, which is in line with plan.
- 13 (out of 15) 7-Car trains are based in Ilford and in service on the Liverpool St to Shenfield line. The day to day availability of trains has improved.
- Dynamic Testing in the Crossrail tunnels has continued with first use of the eastbound tunnel between Abbey Wood and Stepney Green. This week dynamic testing will move to daytime as the checks to demonstrate electrical safety alongside other railways (LU, DLR) have been successful.
- Approvals to support the start of testing of the automatic operation of the train in the Crossrail tunnel were submitted on schedule by Bombardier on 16 March. They were reviewed, revised and approval was given for the next intermediate stage (Protected Manual operation). Further information is required to support automatic operation at full speed in the tunnel. Assurance submissions need to remain a key area of focus both short and medium term.
- Bombardier continues to test the latest release (7.1) of the train management software on the test rig and on train at Derby. The release was on time but a number of bugs still exist. The speed of defect rectification remains key to the success of Stage 3 operations and extra resources are being identified.
- A number of meetings are currently taking place to ensure close collaboration between Bombardier, Siemens, Crossrail and TfL. This relationship, covering train and signalling, is vital for Stage 3 testing and passenger service.
- The next Stage of Old Oak Common Depot (Stage B1 – comprising 6 additional sidings) is due to be brought into use on 11 April. This remains on plan.
- TfL Rail is still on schedule to take over the Heathrow Connect services in May 2018, using the existing rolling stock to the airport and Class 345's between Paddington and Hayes and Harlington.
- Driver training on the Great Western route has continued in line with plan. One of the key activities for the success of this plan is an update for some route-specific software functions and this is being addressed urgently by Bombardier. Current dates for resolution are 10 April for release and 7 May for safety approval.
- Scheduled pre-testing of the European Train Control System ('ETCS') in the Heathrow tunnels did not take place on 23 March because of difficulties booking track access, it is rescheduled for 6 April. Laboratory testing is about to start in Charleroi, Belgium allowing some ETCS tests to take place without requiring access to the actual railway at Heathrow.



The next weekly update will be on 9<sup>th</sup> April and will include additional short term milestones, as agreed by the Commissioner/BT Chairman conference call which took place 22 March.

### Key Programme Milestones

<b>Stage 2</b>	P80 Programme (V3_5_1) 11 <sup>th</sup> Jan	Current Forecast
Approval for driver training on Great Western routes excluding European Train Control System	27 Feb	Submitted 5 March
Approval for European Train Control System driver training on Great Western	24 Aug	12 Oct
Approvals for European Train Control System Passenger Service	28 Sept	19 Nov
<b>Stage 3</b>		
Completion of Transition testing at Melton ready for Central Operating Section Dynamic Testing	29 Jan	Complete
Approval of CBTC signalling for Central Operating Section Trial Operations	22 Jun	22 Jun
Availability of 22 trains for Trial Running in the Central Operating Section	13 Aug	13 Aug
Approval of Class 345 for Stage 3 Passenger Service	10 Oct	10 Oct
Start of Stage 3 Passenger Service	9 Dec	9 Dec
<b>Old Oak Common Depot</b>		
Section A Brought into Use	1 Mar	Complete
Section B1 Brought into Use	11 Apr	11 Apr
Section C Brought into Use	30 May	30 May

