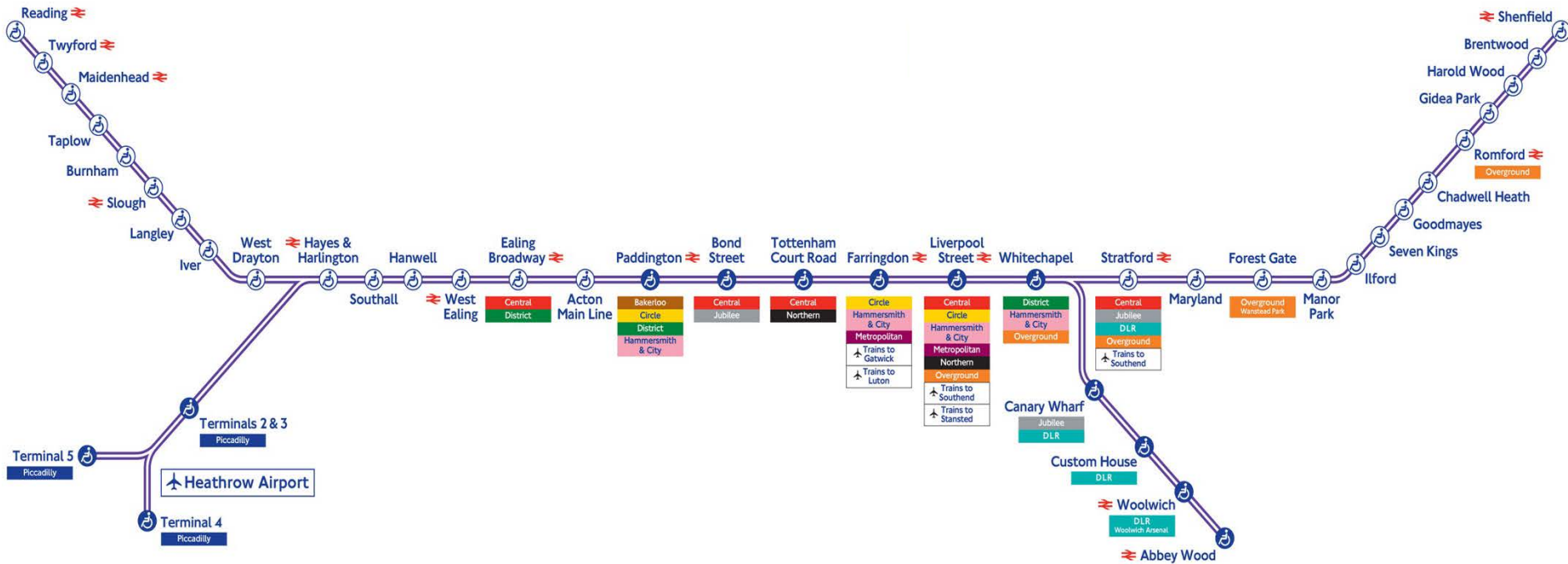




Elizabeth Line Readiness Board

15 JANUARY 2018



2 Agenda



Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Wright

Andrew Wolstenholme

David Hughes

Vernon Everitt

Simon Kilonback

Shashi Verma

Graeme Craig

Lucy Findlay

Kevin Lynch

Andy Brown

Martin Stuckey
(secretariat)

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	Stage 2 Readiness	10 minutes
4.	Stage 3 Readiness	25 minutes
5.	Stages 4 & 5 Readiness	5 minutes
6.	Sponsor & Integration Issues	5 minutes
7.	Financial Summary	5 minutes

Actions from 15 December 2017



No.	Meeting date	Issue	Owner	Target date	Status
17.012	17/11/17	Agreed that launch of Elizabeth line should include public wifi on trains in the tunnel section. Briefing paper on way forward to be provided to Exco	Shashi Verma	15/1/18	Paper prepared for Exco meeting in January
17.015	15/12/17	Financial summary to be included in future reports	Simon Adams/ Martin Stuckey	15/1/18	Complete
17.020	15/12/17	Summary of operational safety performance SPI to be included in future reports	Martin Stuckey	15/1/18	Complete
17.021	15/12/17	Identify any potential negative customer impacts if Plan B for Stage 2 has to be implemented (for an interim period)	Howard Smith	15/1/18	Complete – verbal update
17.022	15/12/17	Communications in relation to Stage 2 to be managed via EL Comms Board	Vernon Everitt	Note	Complete
17.023	15/12/17	Mitigation plans (including contractor end dates) for securing key documentation from contractors to be reviewed	Simon Wright	15/1/18	Ongoing – slide 6



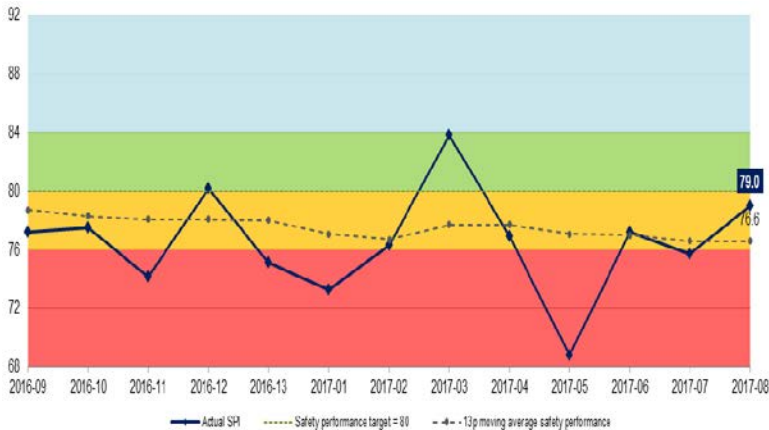
Construction

In Period 9, the HSPI increased to 2.58 (P8 = 2.56) with all 11 key contracts achieving an HSPI score of 2.20 or above (100%). The RIDDOR rate fell to 0.07 (P8= 0.08) and the lost time case AFR remained static at 0.17 (P8=0.17).

There were five significant incidents:

- 1 x RIDDOR Major Injury**
08 December 2017 – [Redacted]
- 1 x Lost Time Injury**
16 November 2017 – [Redacted]
- 3 x High Potential Near Misses**
 - 18 November 2017 – [Redacted]
 - 05 December 2017 – [Redacted]
 - 06 December 2017 – [Redacted]

Operations



- P9 SPI improved to 79.0 (P8 = 75.7) but is still below target of 80.0
- Crossrail Operations team: No injuries or incidents
- TfL Rail: Four slip trips and falls reported; three resulting in minor injuries and one in no injury. Investigations attributed all the incidents to passenger behaviours such as running for trains or losing balance while walking
- Final draft RoGS mainline application (for RfL as authorised IM for the central section) submitted to ORR and stakeholders on 21 Dec 17

Stage 2

20 May 2018 – Paddington to Heathrow, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Red	[REDACTED]	[REDACTED] 12 Jan 18	[REDACTED]	Howard Smith	
	Yellow	Timely Completion & Handover of OOC including NR Stage M signalling	Sect A BIU 22 Jan 18	Interfaces being managed and contingency plans for delayed commissioning of signalling	Howard Smith	
MTR, NR & RfL Readiness	Yellow	Timely completion, acceptance and Handover of DOO, Hayes & Harlington turn back and other KO4 deliverables from NR. Delay to 4 platform extensions.	DOO SATs complete 20 Jan 18 Hayes & Harlington complete May 18	Ensure lessons from Stage 1 are implemented. All DOO SAT commissioning completed and benchmark images captured during Xmas blockade.	Simon Wright	
	Yellow	Delayed availability of simulator (ETCS) impacts driver training. Last software upgrade currently scheduled after planned start of training.	Dvr Training Commences 01 Mar 18	2 Simulators now at OOC. Driver training programme under review to mitigate delays in software drops.	Howard Smith	
Customer	Yellow	Risk to timely installation of TVM and Gate lines at Heathrow and elsewhere.	20 May 18	Gate line at Heathrow planned by 01 May 18. Paddington forecast Sep 18 - HEx Oyster fare risk	Shashi Verma	

6 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Programme 89.5% complete against plan 91.5% Key contract for Energisation and Dynamic testing C610 77% complete against plan 87%	D Testing Z1&2: 29Jan18 Z3&4: 23Apr18	Systemwide's "Plan Delta" (revised linear works programme) is in place and embedded within updated schedules to deliver DT in Zones 1, 2, 3 & 4 and completion of all works for Trial Running / Handover. Preparation of revised MOHS – programme for completion – end Jan18	Simon Wright	
	Red	Timely provision of design assurance information, asset data, key operations/ maintenance information	Handover 5Jul18	- Design assurance slowed in the period so will receive further focus at close out meetings - delivery of asset information including O&M requirements remains cause for concern. Escalation with Tier I contractors	Simon Wright	
	Yellow	Timely completion of infrastructure works (tunnel ventilation, stations MEP, cable management systems)	Handover 5Jul18	Implementation of mitigation plans. Daily engagement with Project teams and Contractors	Simon Wright	
	Red	[REDACTED]	Train tested & delivered to central section 29Jan19	[REDACTED]	Howard Smith	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness	Yellow	Risk that there is insufficient time to procure spares and maintenance services	Info req. 1 Mar 18	CRL continues to work with contractors on resourcing and prioritisation of key information	Howard Smith & Simon Wright	
	Yellow	RFLI readiness – risk maintenance staff not being fully trained	TUCA available 01 Feb 18	Monitoring forecast TUCA availability (End Jan 18); Train the trainer replaced by end user training and provision of contractor support post handover	Simon Wright & Howard Smith	
	Red	Risk of delays to commissioning of NR interfaces impacting trial running	Blockades Z1&2 3-24 Mar 18 Z3&4 6-20 May 18	Recovery plans under development for installation of C620 equipment on NR lines to Stratford	Simon Wright	
	Red	Risk of insufficient time to undertake trial operations activity	Trial Ops 06 Aug 18	Complete infrastructure and testing as early as possible to allow unimpeded trial operations. Prepare station Handover plans	Simon Wright & Howard Smith	
	Red	Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training	Trial Ops 06 Aug 18	LU Readiness Board overseeing this activity	Howard Smith	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Customer	Red	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	Handover 5Jul18 9Dec18	Confirm programme and way forward. Scope and confirm funding.	Shashi Verma	
	Yellow	Marketing launch and customer information activities	9Dec18	Launch plan to be prepared and managed by EL Comms Board.	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains		ONW Funding uncertainty and delays to stations	KD22 (S4) 31Aug18 KD24 (S5) 10Sep18	Funding secured - NR to confirm £20m contribution. West Inner stations: advance works on piling & canopies commenced	David Hughes	Yes
		Ilford Depot exit line speed works and wire heights to be completed to support Stage 4&5 timetable	19May19 Programme TBC	Alternate plan for stabling being finalised with Anglia - DfT and NR support being sought. Wire height preferred option in development (note that Ilford will be used for stabling during Stage 3 testing)	Andrew Wolstenholme/ David Hughes	Yes
		Stage 4 power upgrade works (KD22)	KD22 (S4) 31Aug18	Scope /options review for installing temporary infrastructure to support Stage 4 services	Simon Wright	Yes
		Stage 5 ETCS availability – Stockley to Paddington	15Dec19	Mitigations being developed for ETCS programme slippage and lack of integration testing	Andrew Wolstenholme	Yes
		Stage 5 power upgrade works (KD30) ATS sites at Slough & West Ealing still to be brought online	KD30 (S5) 31Aug18	Final output from modelling to confirm requirement awaited. Conversion to AT power forecast May 18 (subject to modelling).	Simon Wright	
		Confirmation of timetable (train paths). Sale Of Access Rights panel have only approved rights specified in the TAO	20Dec17	The additional paths required to fulfil the timetable have been confirmed by SOAR panel. Close.	Howard Smith	Yes

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR & RfL Readiness	Green					
Customer	Yellow	Uncertainty over NR construction programme for station upgrades	KD22 (S4) 31 Aug 18 KD24 (S5) 10 Sep 18	Secure a robust programme from NR which meets 15 Dec 19 date for all On Network Works.	Simon Wright	Yes

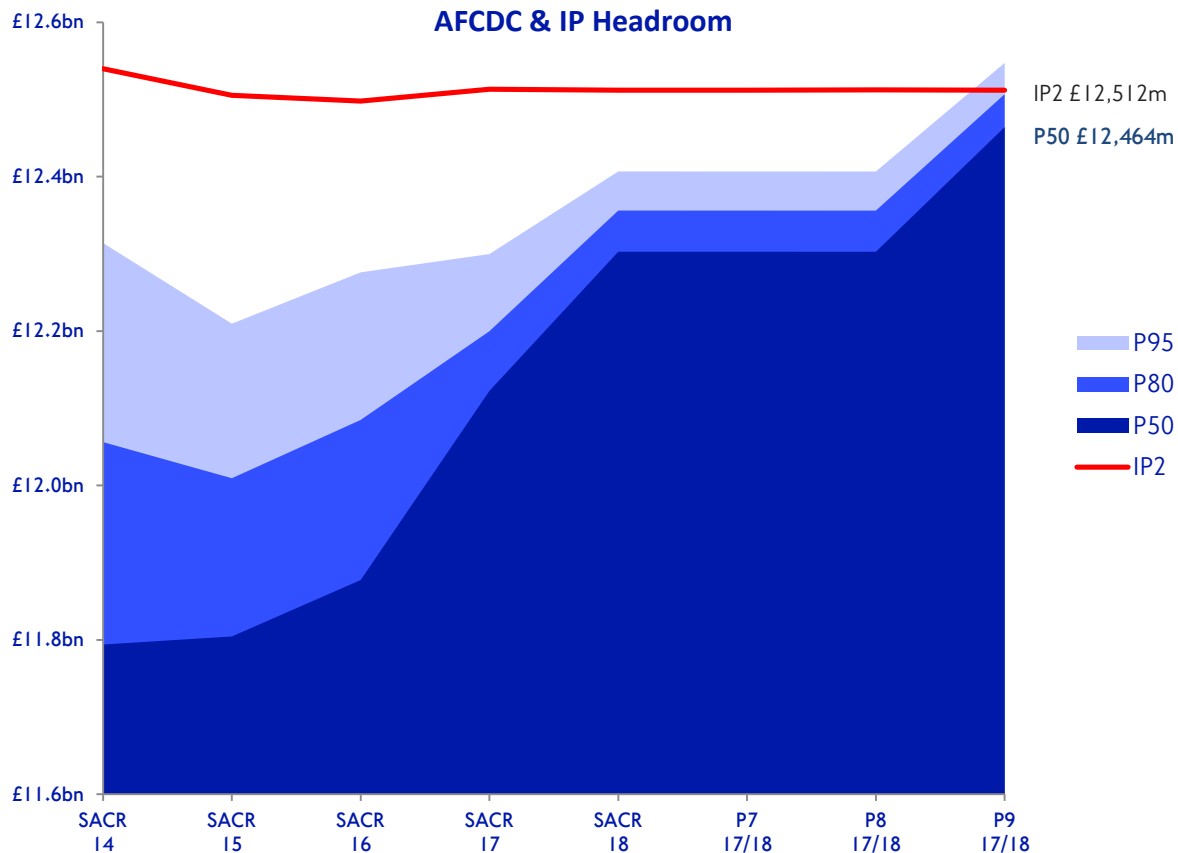
11 Integration and Sponsor Issues



No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Chairman's reappointment confirmed. Transition of governance to be discussed	Andrew Wolstenholme & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Close Out Director confirmed. Close out organisation included in approved business plan - key roles to be filled via internal appointments to retain knowledge	Andrew Wolstenholme

P9 Financial Summary

Crossrail



- In Period 9 the AFDCD increased by £161m to £12,464m (P50).
- Headroom to IP2 is now just £48m.
- The quarterly cost QRA accounted for £149m with additional risk provisions being crystallised for known cost pressures communicated in prior periods. The extra £12m reflects the cost increase for the 2018/2019 Business Plan.
- Whilst extremely unwelcome, these pressures come with just seven months of critical project activity remaining. As such, the Executive remains confident that Crossrail will continue to meet its commitments in 2018.

On Network Works

- The Forecast Final Outturn Cost (FFOC) has reduced to £2,508m to reflect the £22m funded via the Additional Funding Agreement between CRL and NR.
- CRL received confirmation from the DfT that the required £84m is now approved, meaning the £154m required funding package has been secured subject to NR formally confirming their £20m contribution.
- NR cumulative (gross) spend (which excludes adjustments for Traction Power / Accelerated Renewals) is £2,528.3m and represents 90% complete.



Agenda



Invitees

Mike Brown (chair)	Mark Wild	Howard Smith	Simon Wright
Andrew Wolstenholme	David Hughes	Vernon Everitt	Simon Kilonback
Shashi Verma	Graeme Craig	Lucy Findlay	Kevin Lynch
Andy Brown	Martin Stuckey (secretariat)		

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	MOHS 2018 Baseline update	10 minutes
4.	Stage 2 Readiness	5 minutes
5.	Stage 3 Readiness	20 minutes
6.	Stages 4 & 5 Readiness	5 minutes
7.	Sponsor & Integration Issues	5 minutes
8.	Financial Summary	5 minutes

Actions from meeting of 15 January 2018



No.	Meeting date	Issue	Owner	Target date	Status
17.024	15/1/18	Contingency plan for Carillion works for NR (on western section) to be understood	Andrew Wolstenhome	9/2/18	Verbal update
17.025	15/1/18	Continue to update MB on Bombardier progress	Howard Smith	9/2/18	Ongoing – slides 5 & 6
17.026	15/1/18	Plan illustrating the updated programme (MOHS) to be prepared and presented to next meeting	Simon Wright	9/2/18	Short presentation attached
17.027	15/1/18	Funding decision timescales for any key items (e.g. Ilford) which are particularly relevant to DfT to be advised	Simon Adams	9/2/18	Discussed at Sponsor Board. Close



Safety

Construction

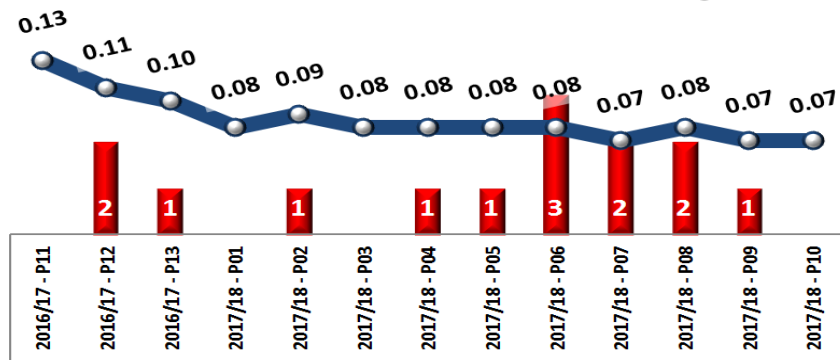
In Period 10, the HSPI fell to 2.48 (P9 = 2.58) with 10 of 11 key contracts achieving an HSPI score of 2.20 or above (91%). The RIDDOR rate remained at 0.07 (P9 = 0.07) and the lost time case AFR fell to 0.16 (P9 = 0.17).

There were no significant incidents.



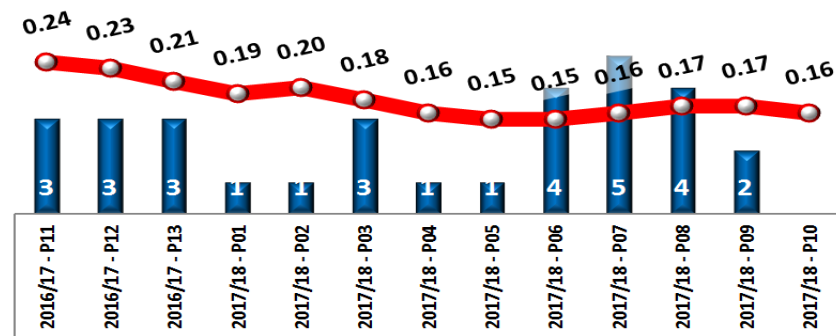
RIDDOR AFR

Annual Target is 0.15



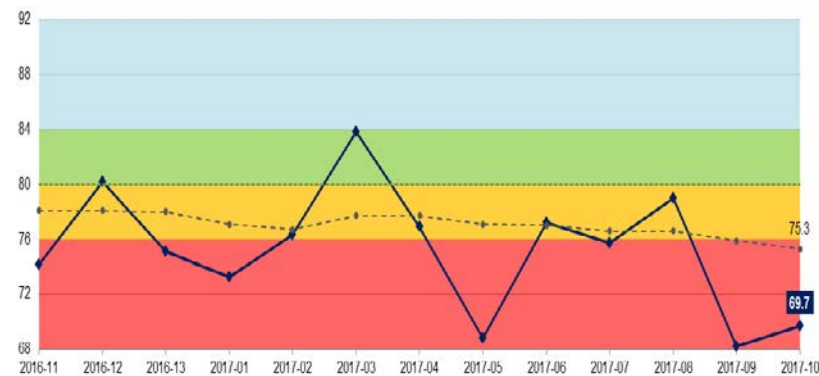
Lost Time AFR

Annual Target is 0.23



Operations

- In Period 10, the SPI improved slightly to 69.7 (P9 = 68.2) but is still well below the target of 80.0. The 13 period moving average score continued to drop and has for the first time entered the red 'poor performance' zone.
- TfL Rail: During the period seventeen passenger accidents were reported, comprising twelve minor injury accidents and five no-injury accidents. There were thirteen slip trips and falls reported, eleven of which resulted in minor injuries. In eleven cases the investigations established that the incidents were caused by passenger behaviours such as running for trains or losing balance whilst walking. Two accidents were attributed to sub-standard conditions. There were four platform train interface accidents reported during the period. One resulted in a minor injury and three resulted in no injury.
- Crossrail Operations team: No injuries or incidents.



N.B. SPI calculation has not been adjusted to account for MTRC taking over 11 more stations in Period 10.

⁵ MOHS 2018 Baseline Update



See separate attachment

6 Stage 2

20 May 2018 – Paddington to Heathrow, Shenfield to Liverpool Street mainline




	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Red	[REDACTED]	[REDACTED] TBC	Contingency plan of 2 tph C345 RLU running Paddington to Hayes & Harlington and 2 tph C360 Paddington to Heathrow. Selective Door Opening requirement tbc	Howard Smith	
	Yellow	Timely Completion & Handover of OOC including signalling commissioned	Sect A BIU 9Feb18 Sect B1&2 BIU 22Feb & 25May18	Interfaces being managed and contingency plans for delayed commissioning of signalling	Howard Smith	
MTR, NR & RfL Readiness	Green	Timely completion, acceptance and Handover of DOO, Hayes & Harlington turn back and other KO4 deliverables from NR	DOO SATs complete Hayes & Harlington complete May18	All DOO SAT commissioning complete. Operational proving forecast Feb-Mar18. H&H bay extension not required for RLU operation	Simon Wright	
	Yellow	Delayed availability of simulator (ETCS) impacts driver training. Last software upgrade currently scheduled after planned start of training	Dvr Training commences TBC	2 Simulators now at OOC. Driver training programme under review, including driver training for contingency plan	Howard Smith	
Customer	Yellow	Risk to timely installation of TVM and Gate lines at Heathrow and elsewhere	20May18	Gate line at Heathrow planned by 01May18. Paddington forecast Sep18 - HEx Oyster fare risk	Shashi Verma	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing		Programme 90.1% complete against plan 92.0% Key contract for Energisation and Dynamic testing C610 77% complete against plan 89%	D Testing Z1&2: 25Feb18 Z3&4: 11Jun18	Revised C610 linear works programme agreed but cable installation 4-6weeks behind; mitigation actions in place to support fibre, signalling and DT programme. MOHS finalisation.	Simon Wright	
		Timely completion of infrastructure works (tunnel ventilation, stations MEP, cable management systems)	Commence Trial Running 5Aug18	Prioritise systemwide activities and continue to seek programme mitigations. MOHS 2018 finalisation.	Simon Wright	
		Timely provision of design assurance information, asset data, key operations/ maintenance information	Handover systemwide 5 Aug18	Maintain improved design assurance close out rate Drive Tier 1 contractors to provide relevant information in good time.	Simon Wright	
			Train tested & delivered to central section 25Feb18	Prioritisation of software development & testing for Stage 3 in latest BT programme. Revised plans build contingency to start of testing in central section.	Howard Smith	
		Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Commence Trial Running 5Aug18	Confirm / maintain blockades in March & May. Confirm the programme for installation of wayside equipment, on board software and testing at PML.	Simon Wright & Howard Smith	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness	Yellow	Risk that there is insufficient time to procure spares and maintenance services	Info req. 1 Mar 18	CRL continues to work with contractors on resourcing and prioritisation of key information	Howard Smith & Simon Wright	
	Yellow	RFLI readiness – risk maintenance staff not being fully trained	TUCA works complete 28 Feb 18	Train the trainer replaced by end user training and provision of contractor support post handover	Simon Wright & Howard Smith	
	Red	Risk of insufficient time to undertake trial operations activity	Trial Ops 09 Sept 18	Complete infrastructure and testing as early as possible to allow unimpeded trial operations. Prepare station Handover plans	Simon Wright & Howard Smith	
	Red	Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training	Trial Ops 09 Sept 18	LU Readiness Board overseeing this activity	Howard Smith	

9 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Customer	Red	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	9Dec18	Interim on-train wifi solution proposed. Positive initial engagement with MNOs with procurement planned for Mar18	Shashi Verma	
	Yellow	Marketing launch and customer information activities	9Dec18	Launch plan to be prepared and managed by EL Comms Board	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Ilford Depot exit London end works and wire heights to be completed to support Stage 4&5 timetable (& stabling to support Stage 3)	19May19 Programme TBC Stabling required Dec-18	Exit speed works not required pending agreement with AGA. Wire height works review, prioritisation and proposal to be completed end Feb 18	Andrew Wolstenholme / David Hughes	Yes
	Yellow	Stage 4 power upgrade works (KD22)	KD22 (S4) 31Aug18	Scope /options review for installing temporary infrastructure to support Stage 4 services	Simon Wright	Yes
	Yellow	Stage 5 ETCS availability – Stockley to Paddington	15Dec19	Mitigations being developed for ETCS programme slippage and lack of integration testing	Andrew Wolstenholme	Yes
	Green	Stage 5 power upgrade works (KD30) ATS sites at Slough & West Ealing still to be brought online	KD30 (S5) 31Aug18	Conversion to AT power forecast May 18	Simon Wright	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR & RfL Readiness		Timely completion of staff accommodation at Maidenhead sidings	KD24 (S5) 10Sep18	NR programme and forecast completion date to be confirmed	Simon Wright	
Customer		Uncertainty over NR construction programme for station upgrades	KD22 (S4) 31Aug18 KD24 (S5) 10Sep18	NR schedule for six west enhanced stations shows a phased completion from Sep19 to Dec19. Main ITT's issued with award recommendation expected end-April18	Simon Wright	

¹² Integration and Sponsor Issues

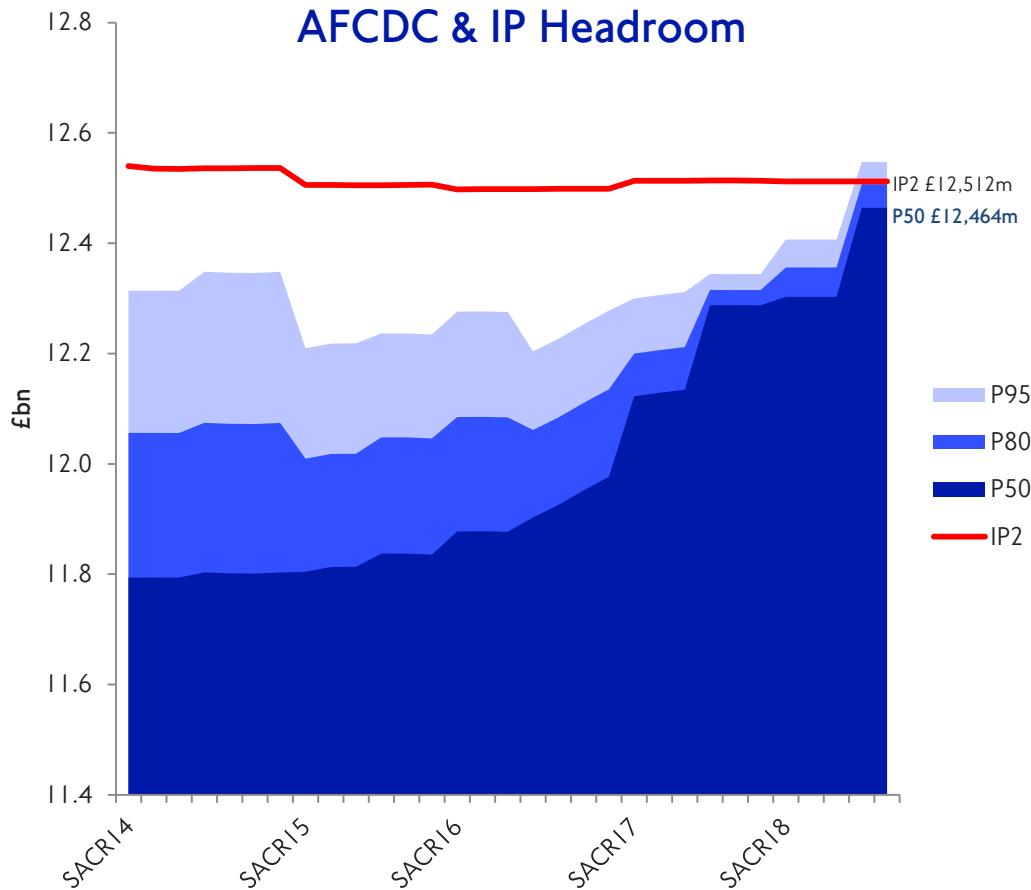


No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Chairman's reappointment confirmed. Transition of governance being discussed	Andrew Wolstenholme & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Close out organisation included in approved business plan - key roles to be filled via internal appointments to retain knowledge	Andrew Wolstenholme

P10 Financial Summary



Crossrail



- The P50 AFDC remained at £12,464m in the Period, £43m below the P80 AFDC and £48m below IP2.
- Cost increases were funded by a £71.1m drawdown from risk.
- In the Period, Crossrail spent £18.3m above the 2017/18 Business Plan. This is predominantly due to lower than planned productivity, delays and prolongation.
- Current actions to remain within funding :
 - Review of cost efficiencies internally within CRL, and available savings within the supply chain.
 - Review of remaining scope to be delivered by CRL.
 - Continuing the focus of cost reviews to challenge the Tier 1 contractor teams directly.

On Network Works

- The Forecast Final Outturn Cost (FFOC) has reduced to £2,480m to reflect the £28m cash funding NR secured via DfT Grant Funded Agreement.
- NR cumulative (gross) spend (which excludes adjustments for Traction Power / Accelerated Renewals) is £2,567.2m and represents 92% complete (inc VN's).



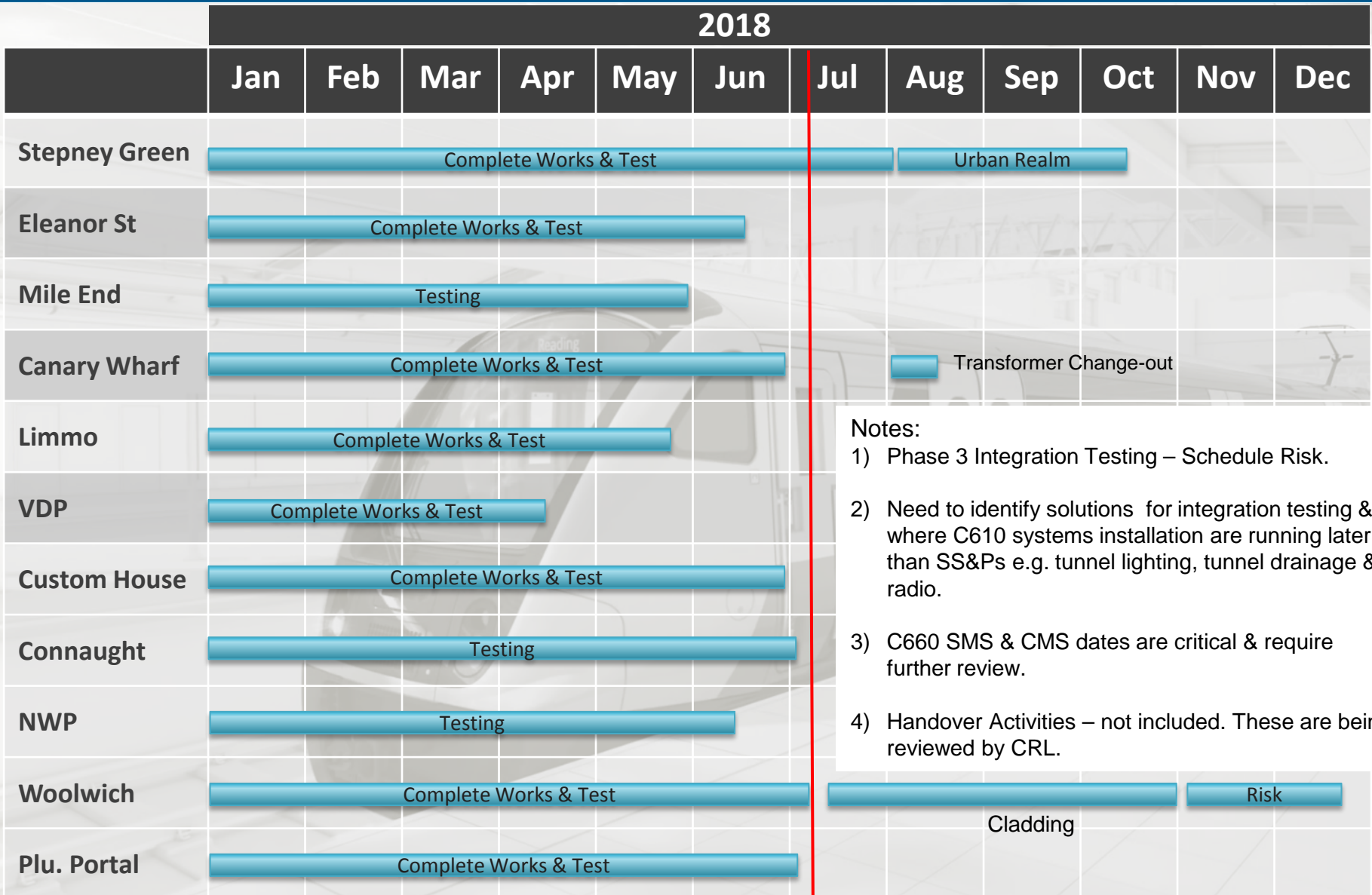
Elizabeth Line Readiness Board

MOHS 2018 Baseline Update

Simon Wright



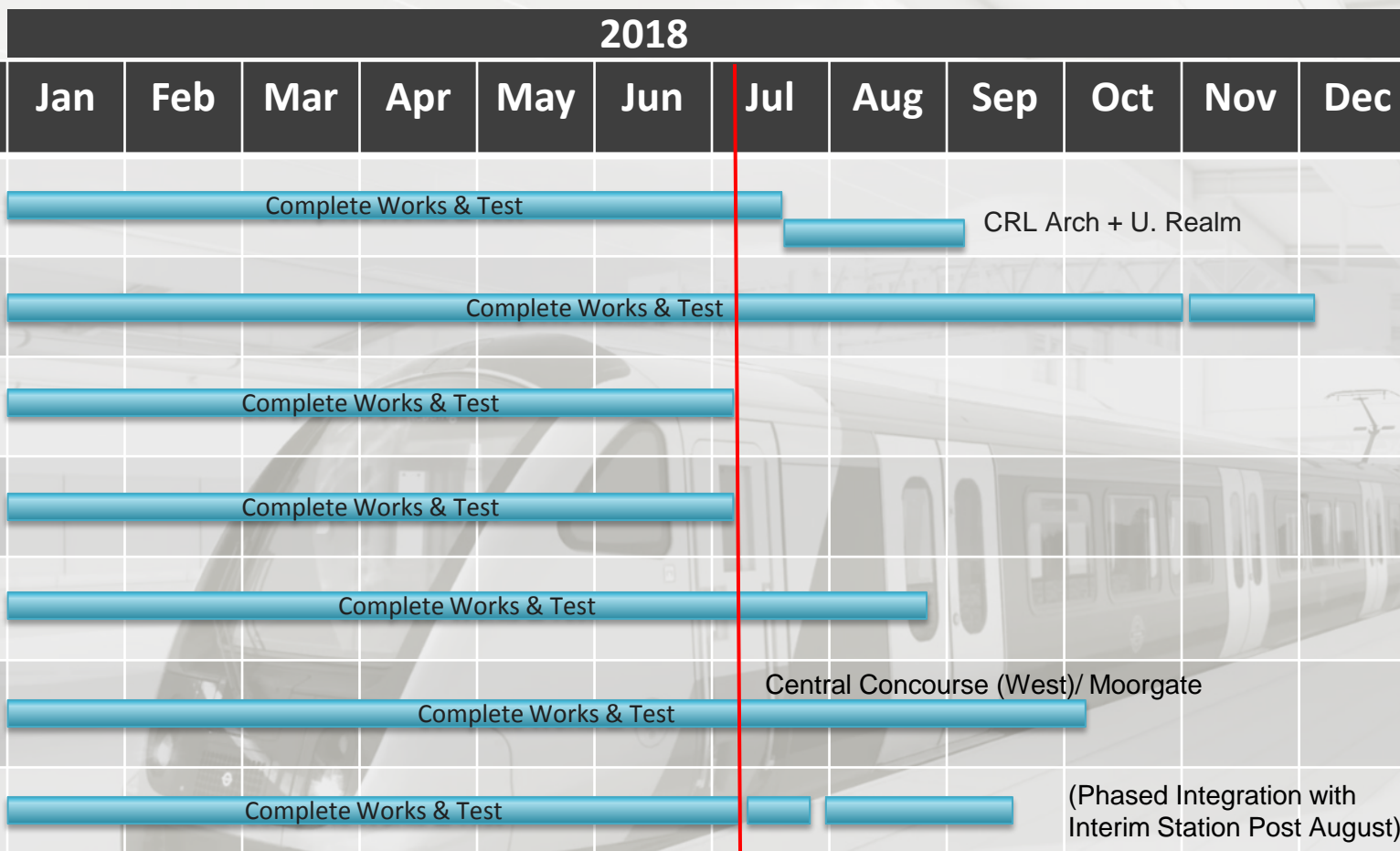
Stations & Shafts – Zones 1&2 (31 Jan)



- Notes:**
- 1) Phase 3 Integration Testing – Schedule Risk.
 - 2) Need to identify solutions for integration testing & where C610 systems installation are running later than SS&Ps e.g. tunnel lighting, tunnel drainage & radio.
 - 3) C660 SMS & CMS dates are critical & require further review.
 - 4) Handover Activities – not included. These are being reviewed by CRL.



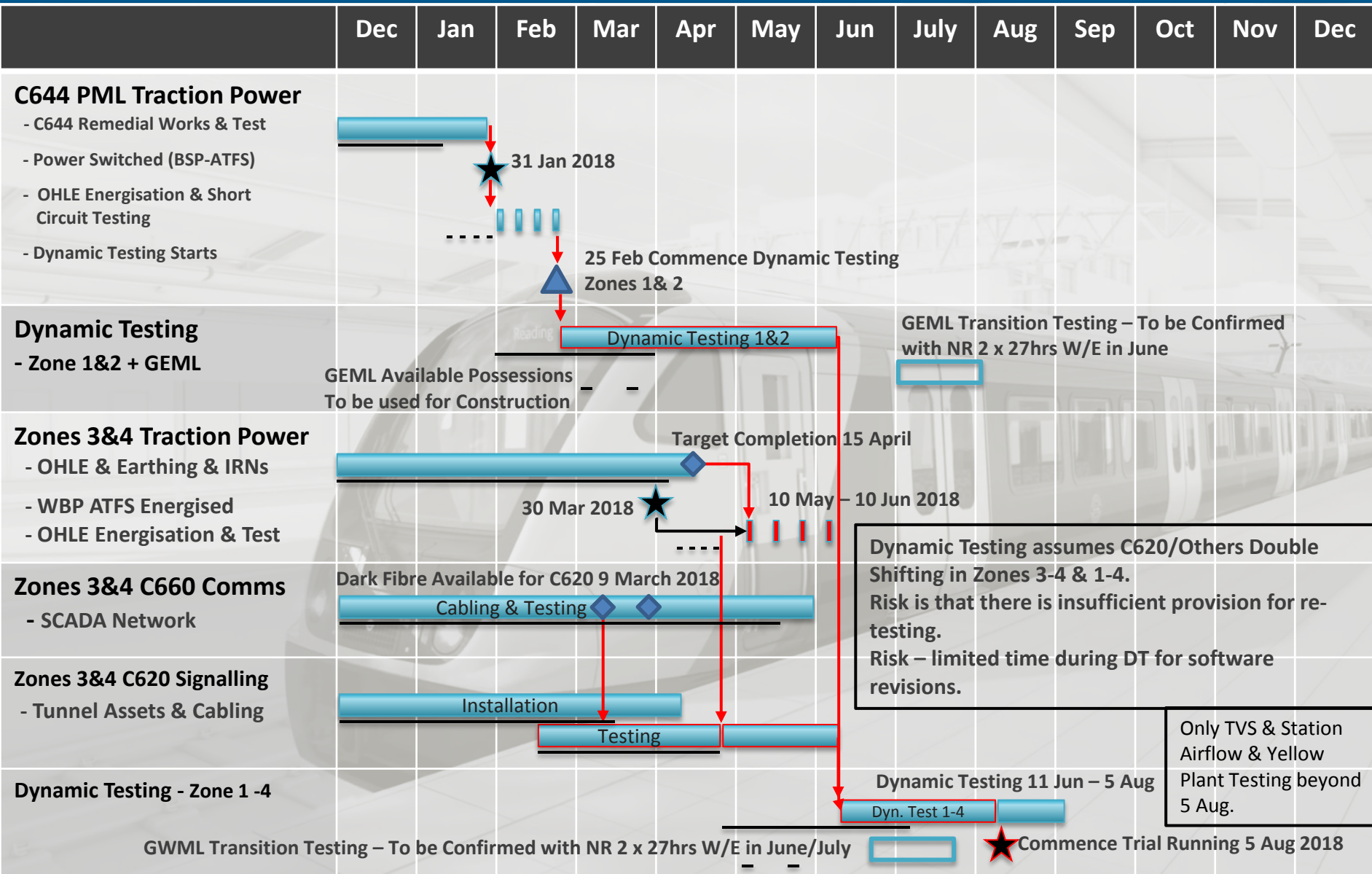
Stations & Shaft – Zones 3&4 (31 Jan)



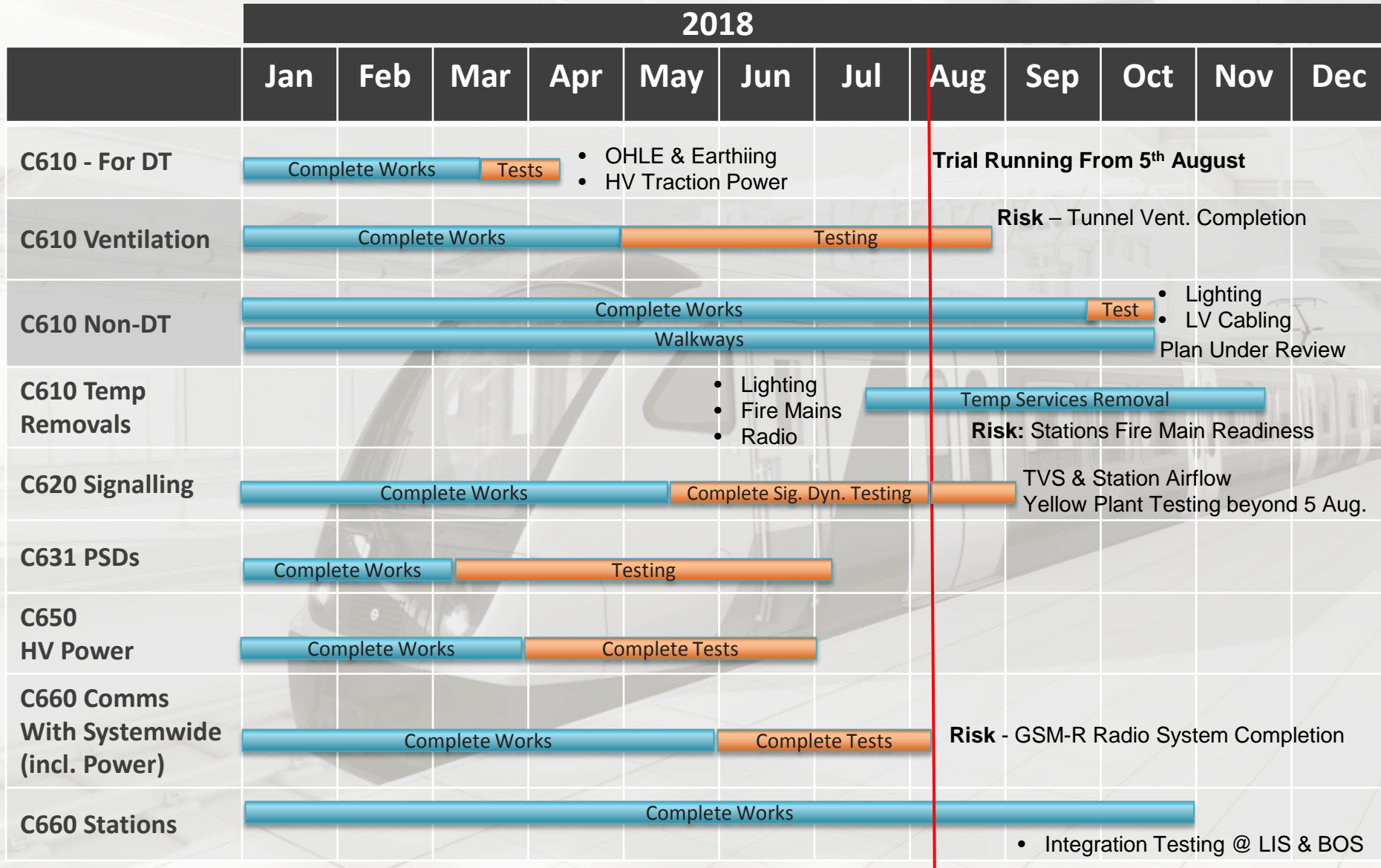
Notes:

- 1) Phase 3 Integration Testing – Schedule Risk. Up to 4 weeks on activities above.
- 2) Handover Activities – not shown; under review by CRL.
- 3) Risk - C660 Challenge to resource multiple concurrent sites.

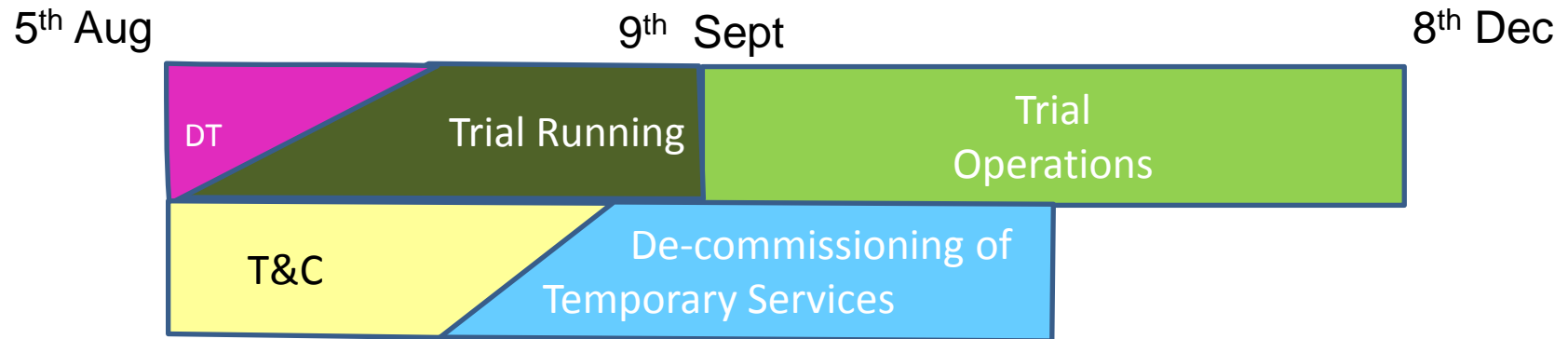
MOHS 2018 Update – 31 Jan 2018



MOHS 2018 Systemwide – Late Activities



Railway Systems - Principles of Overlap



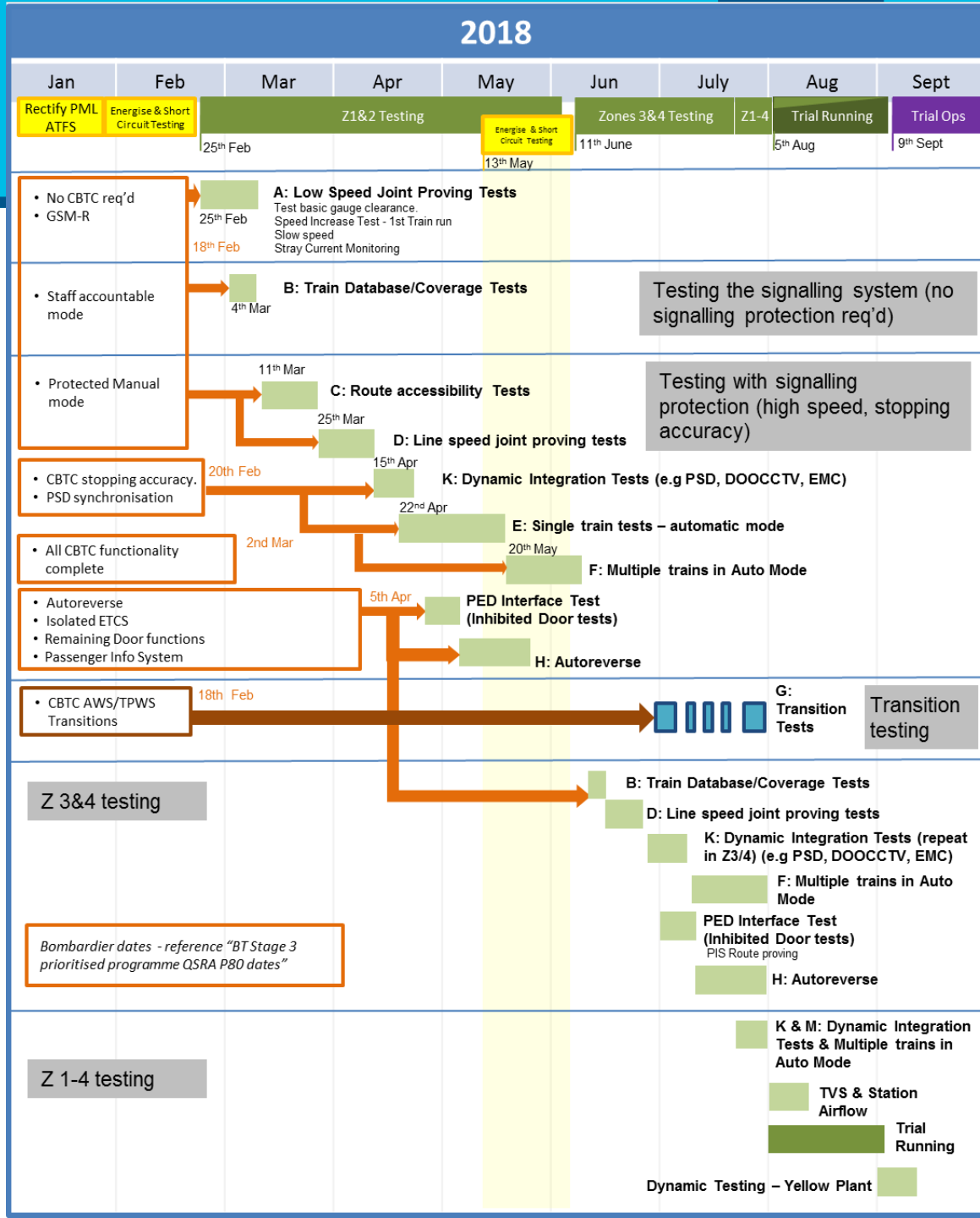
Railway Systems Only

Stage 3 MOHS 2018 - Bombardier



Stage 3	P50	P80
CBTC – AM/PM Tests Complete (Report)		18 Feb 18*
CBTC AWS/TPWS Transition Tests (Report)	6 Feb 18	18 Feb 18*
CBTC Stopping Accuracy, PSD Sync. Report	13 Feb 18	20 Feb 18
CBTC Auto Reverse & Isolated ETCS Testing (Report)	28 Mar 18	5 Apr 18
All CBTC Functionality Complete	26 Feb 18	2 Mar 18
Authorised 9 Car with CBTC for Trial Running	11 Jun 18	22 Jun 18
Authorised 9 Car with CBTC for Passenger Service	23 Aug 18	10 Oct 18

Dynamic Test Plan

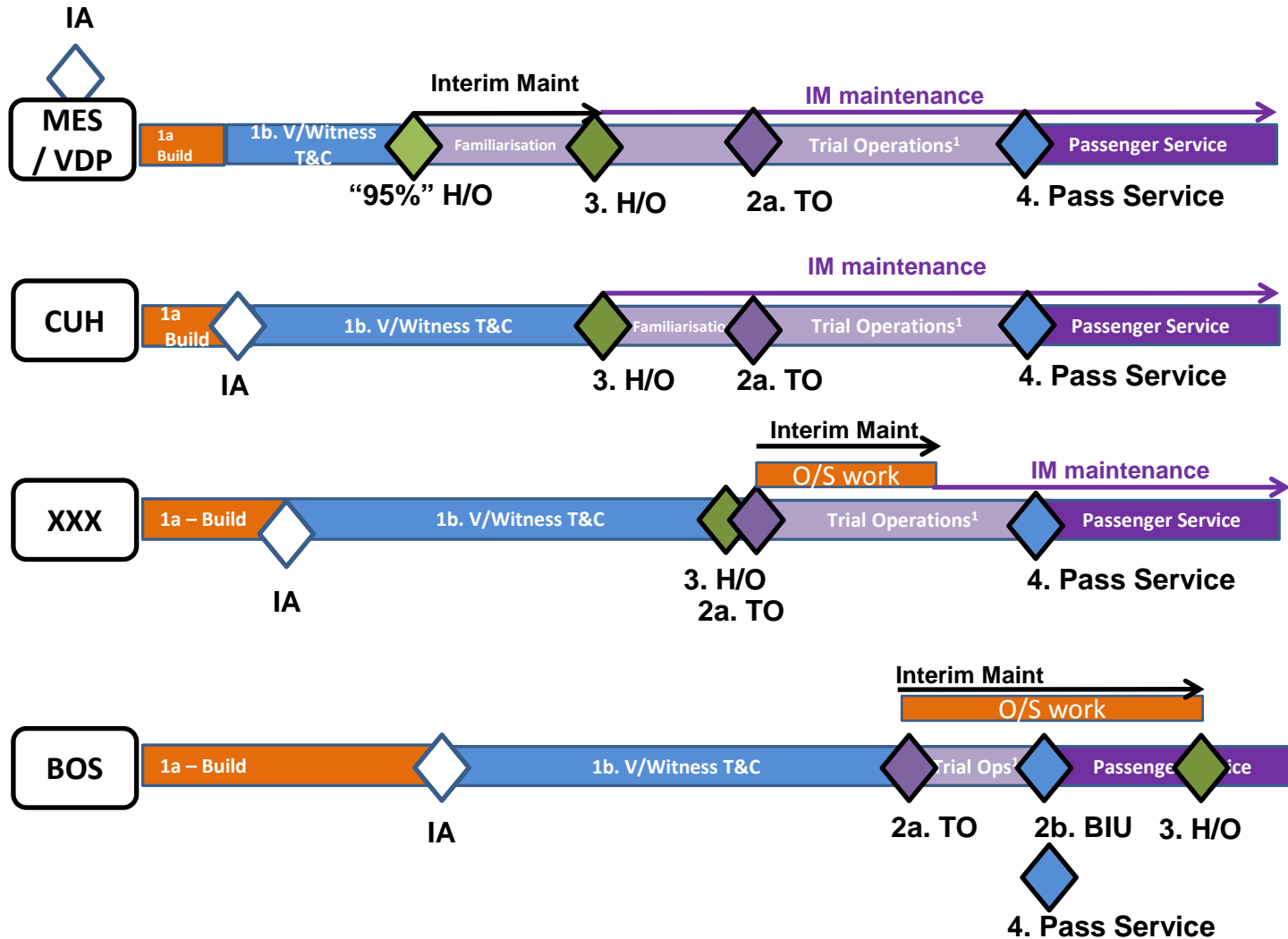


Proposed “stages”



1	IM verification & witnessing	<p>a) Works under build/phase 2.1/2.2 T&C – e.g. to support IA (PPE)</p> <p>b) Maintainer/Engineering and Operations “representatives” witnessing testing and commissioning during phase 2.3, 3 or 4 (with PPE)</p>
2a	<i>Start of Trial Operations</i>	OPTION if (3) H/O not possible for <u>whole</u> Element prior to <u>main Trial Ops</u> period – IM could take over assets for day-to-day op control for trial operations (<i>not maintenance</i>)
2b	<i>Bringing into Use (BIU)</i>	OPTION if (3) H/O not possible for whole Element prior to <u>Stage 3</u> – IM could bring assets into use for revenue service
3	Handover	Nine requirements complete – IM has full responsibility and accountability for ops and maintenance (all legals done)
4	Start of Passenger Service	APIS req’d from the ORR for the RfL stations IM prove that they are content to start passenger service
5	Final Completion	All snags and defects resolved, generally at H/O + 12 months (CRL fully off the hook)

Handover staging for SPS Elements (note: work in progress)



1. Early / "Trial" H/O

2. Baseline H/O

3. H/O later but before Stage 3

4. H/O potentially beyond Stage 3

Summary of Key Issues

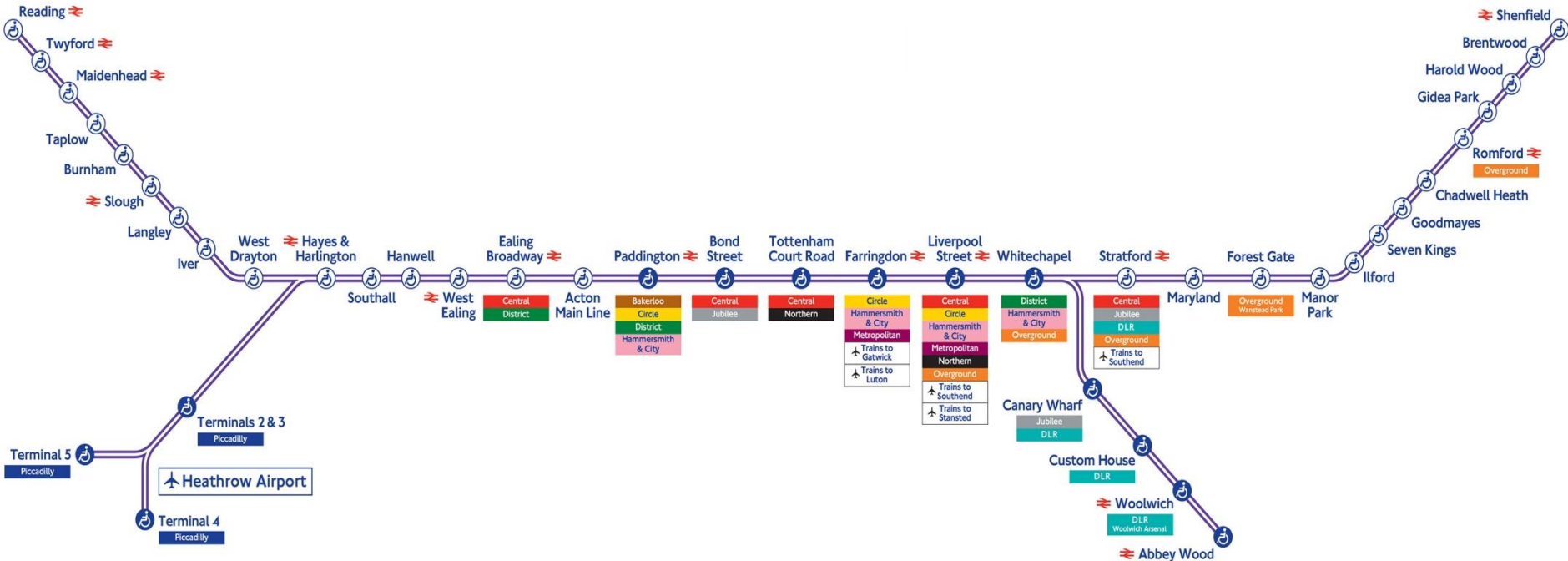


- ▶ The delivery of MOHS requires close collaboration between CRL and RfL/LU
- ▶ The strategy for handover to be revised and joint detailed plans prepared by mid February
- ▶ The priority for handover will be the routeway and associated systems along with transitions
- ▶ Handover plans will ensure that safety is not compromised and asset reliability is optimised
- ▶ Documentation to support handover is to be prioritised



Elizabeth Line Readiness Board

9 MARCH 2018



2 Agenda



ELIZABETH LINE

Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Wright

Andrew Wolstenholme

David Hughes

Vernon Everitt

Simon Kilonback

Shashi Verma

Graeme Craig

Lucy Findlay

Kevin Lynch

Andy Brown

Martin Stuckey
(secretariat)

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	Stage 2 Readiness	10 minutes
4.	Stage 3 Readiness	25 minutes
5.	Stages 4 & 5 Readiness	5 minutes
6.	Sponsor & Integration Issues	5 minutes
7.	Financial Summary	5 minutes

3 Actions from meeting of 9 February 2018



No.	Meeting date	Issue	Owner	Target date	Status
17.028	9/2/18	Undertake passenger modelling to understand potential impact of through running at Bond Street station	Howard Smith	9/3/18	Complete. Verbal update
17.029	9/2/18	Use MOHS overview slides as basis for the format of Stage 3 discussions at ELRB meetings	Martin Stuckey	9/3/18	Complete
17.030	9/2/18	Establish what "Exit IDs" signage and "legible London" guides are being used at Tottenham Court Station	Howard Smith	9/3/18	Complete. Verbal update
17.031	9/2/18	Consider benefits of a special "Level 1" session with NR focussed on Crossrail issues	Simon Adams	9/3/18	Open

4 Safety



Construction

In Period 11, the HSPI increased to 2.60 (P10 = 2.48) with 11 of 11 key contracts achieving an HSPI score of 2.20 and all scored 8% or more above this. The RIDDOR rate increased to 0.08 (P10 = 0.07) and the lost time case AFR increased to 0.17 (P10 = 0.16).

RIDDOR Major Injuries

01 February 2018 – [REDACTED]
[REDACTED]
14 January 2018 – [REDACTED]

Lost Time Injuries (LTI)

18 January 2018 – [REDACTED]
[REDACTED]
16 January 2018 – [REDACTED]

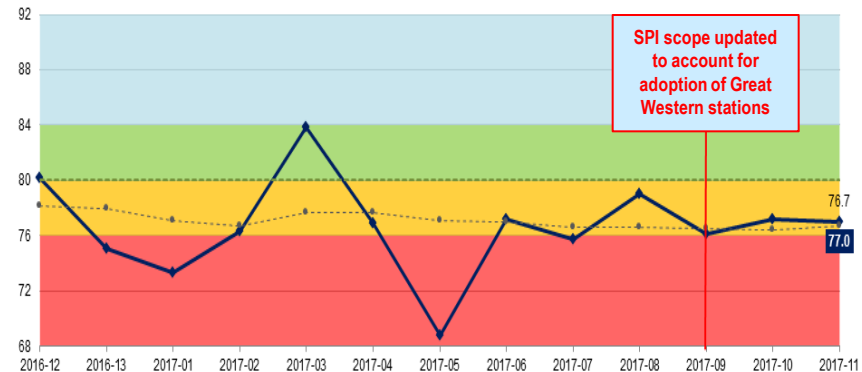
High Potential Near Misses

23 January 2018 – [REDACTED]
[REDACTED]
09 January 2018 – [REDACTED]
[REDACTED]

Operations

In Period 11, the SPI was 77.0 (P10 = 77.2) and the 13 period moving average score is at 76.7 both 'below target performance' in the amber zone. TfL Rail: There were 8 passenger accidents and one MTR workforce accident resulting in a minor injury, a significant decrease on the previous two periods. In all but 2 cases the investigations established that the passenger incidents were caused by behaviours such as running for trains or losing balance whilst walking - the balance being attributed to sub-standard conditions. There was one significant close call where a train saloon door came off its runner.

Crossrail Operations team: No injuries or incidents.



Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018

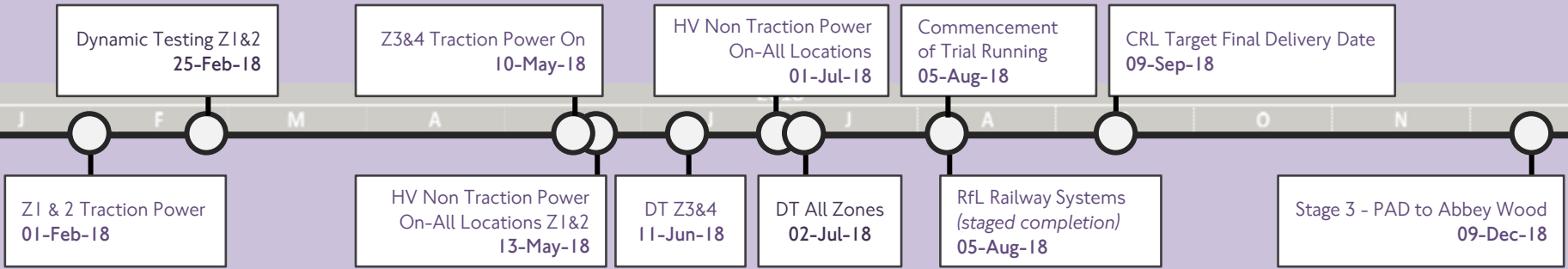
Phase 2 - 28 October 2018



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Risk to timely installation of TVM and Gate lines at Heathrow and elsewhere	20May18	Gate line at Heathrow planned by 07May18. Paddington forecast Sep18	Shashi Verma	
Phase 1 – 2 tph Paddington to Heathrow T4 CI360; 2 tph CTA to Heathrow T4 CI360; 2 tph Paddington to Hayes & Harlington CI345RLU						
Infrastructure & Trains	Yellow	Timely completion & handover of OOC including signalling commissioned	Sect A BIU Complete Sect B1 & 2 BIU 11Apr & 23May18	Interfaces being managed and contingency plans for delayed commissioning of signalling	Howard Smith	
	Yellow	2 FLUs & 5 RLUs for driver training, route familiarisation and passenger service	2 FLUs: 5Mar18 5 RLUs: 5Apr18	Use of odd number platforms at Paddington if RLU SDO unavailable	Howard Smith	
MTR, NR & RfL Readiness	Yellow	Timely completion, acceptance and handover of DOO, Hayes & Harlington turn back and other KO4 deliverables from NR	DOO Handover 31Mar18	DOO testing commences Mar18. H&H bay extension not required for RLU operation.	Simon Wright	
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU						
Infrastructure & Trains	Red	████████████████████ ████████████████████ ████████	On-train testing start (R6.2 & MR1.1) 4May18	Heathrow testing restarted 23Feb18 (TCMS R4.2.20.2). Further release 7.3 likely required for passenger service	Howard Smith	
MTR, NR & RfL Readiness	Yellow	Timely completion of driver training and Ops proving	Driver training commences TBC	Detailed MTRC schedule for Phase 2 to be developed based on BT P80 dates	Howard Smith	

MOHS 2018 Key Dates



Signalling — Ready for Transition Testing

- GEML 30-Jun-18
- GWML 14-Jul-18

Traction Power

- ONW KD33 Power from KG ATFS 28-Feb-18
- WBP ATS Energised 07-Apr-18

Non Traction Power

- Griffith House Energised 28-Mar-18

Engineering Safety Management

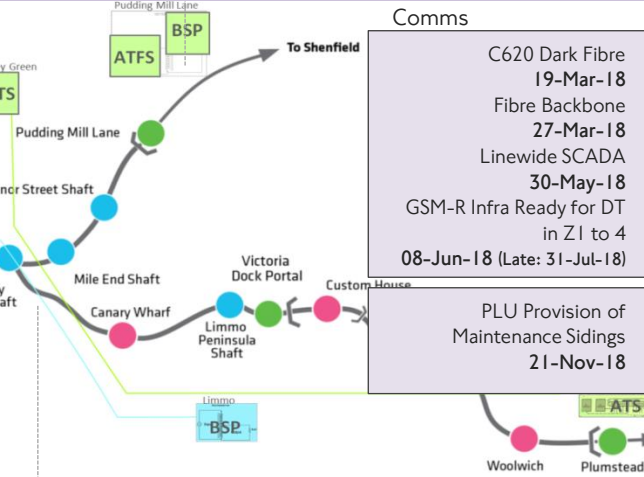
- Contractors submit draft ESJs to CRL 31-Mar-18

Training

- Training material submitted in readiness for training delivery 05-May-18
- Training completed for LU in support of Handover 30-May-18
- Training completed for MTR in support of Handover 30-May-18

Trains

- Train Software Ready for Dynamic Testing (CBTC AM/PM, TPWS) 28-Feb-18
- Stage 2 - Trains (FLUs) Available for Driver Training 28-Feb-18
- Stage 3 All (4No.) Trains Available for Dynamic Testing 23-Mar-18
- 22 No. Full Length Units Available for Trial Running 13-Aug-18
- CBTC Authorised for Passenger Service 10-Oct-18



Comms

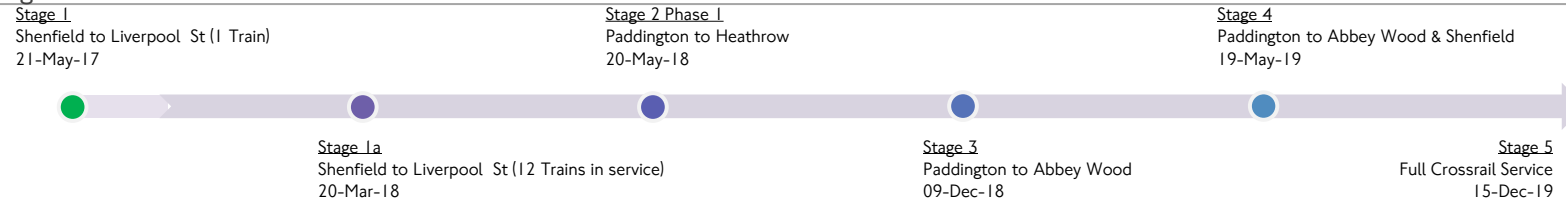
- C620 Dark Fibre 19-Mar-18
- Fibre Backbone 27-Mar-18
- Linewise SCADA 30-May-18
- GSM-R Infra Ready for DT in Z1 to 4 08-Jun-18 (Late: 31-Jul-18)
- PLU Provision of Maintenance Sidings 21-Nov-18

	STG	MES	ELS	PML
Phase 3 Complete	05-Jul-18	29-May-18	05-Jun-18	12-May-18
Staged Completion	N/A	TBA	TBA	TBA
Handover to IM	31-Jul-18	29-Jun-18	03-Jul-18	25-Jun-18

SSP T&C & Handover

	ROP	PAD	BOS	TCR	FIS	FAR	LIS	WHI	CWG	LIM	VDP	CUH	CON	NWP	WOO	PLU
Phase 3 Complete	30-May-18	28-Jul-18	31-Oct-18	05-Jul-18	05-Jul-18	22-Jul-18	5-Oct-18	10-Sep-18	Jun-18	22-May-18	07-May-18	30-Jun-18	05-Jul-18	14-Jun-18	30-Sep-18	05-Jul-18
Staged Completion	N/A	TBA	TBA	TBA	N/A	22-Jul-18	TBA	As Agreed	N/A	N/A	N/A	N/A	N/A	N/A	TBA	N/A
Handover to IM	29-Jun-18	08-Sep-18	28-Nov-18	10-Aug-18	02-Aug-18	17-Aug-18	24-Oct-18	08-Oct-18	5-Jul-18	29-Jun-18	4-Jun-18	28-Jul-18	02-Aug-18	12-Jul-18	31-Oct-18	02-Aug-18

Staged Opening



7 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing	Red	Programme 90.6% complete against plan 92.2% Key contract for Energisation and Dynamic testing C610 79% complete against plan 90%	D Testing Z1&2: 25Feb18 Z3&4: 11Jun18	MOHS 2018 finalised – rebaselines activities required to successfully handover the railway starting in July, ahead of opening safely and on time in December.	Simon Wright	
	Red	Timely completion of infrastructure works (tunnel ventilation, stations MEP, cable management systems)	Commence Trial Running 5Aug18	Prioritise systemwide activities and continue to seek programme mitigations.	Simon Wright	
	Red	Timely provision of design assurance information, asset data, key operations/ maintenance information	Handover systemwide 5Aug18	Maintain improved design assurance close out rate Drive Tier 1 contractors to provide relevant information in good time.	Simon Wright	
	Yellow	[REDACTED]	[REDACTED]	[REDACTED]	Howard Smith	
	Red	Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Commence Transition Testing GEML: 30Jun18 GWML: 14Jul18	Confirm and maintain blockades. Confirm the programme for installation of wayside equipment, on board software and testing at PML.	Simon Wright	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness		Risk that there is insufficient time to procure spares and maintenance services. Asset Information (Drops 1-3) forecast complete mid/end May 18.	Info req. 1 Mar 18	CRL continues to work with contractors on resourcing and prioritisation of key information .	Howard Smith & Simon Wright	
		RFLI readiness – risk maintenance staff not being fully trained. Less than 50% of maintenance training materials due have been received to date (All IMs).	All training material complete 5 May 18	TUCA available. CRL supporting contractors with information sharing. Train the trainer replaced by end user training and provision of contractor support post handover.	Simon Wright & Howard Smith	
		Risk of insufficient time to undertake trial operations activity.	Trial Ops 09 Sept 18	Complete infrastructure and testing as early as possible to allow unimpeded trial operations. Prepare station Handover plans.	Simon Wright & Howard Smith	
		Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training .	Trial Ops 09 Sept 18	Station by station Handover execution plans being agreed between CRL and LU.	Howard Smith	

9 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	9Dec18	Interim on-train wifi solution proposed. Positive initial engagement with MNOs with procurement planned for Mar18	Shashi Verma	
	Green	Marketing launch and customer information activities	9Dec18	Launch plan to be prepared and managed by EL Comms Board	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Ilford Depot exit London end works and wire heights to be completed to support Stage 4&5 timetable (& stabling to support Stage 3)	19May19 Programme TBC Stabling required Dec-18	Exit speed works not required following agreement with AGA. Wire height works review, prioritisation and proposal complete (CCSC 6Mar18)	Andrew Wolstenholme / David Hughes	Yes
	Yellow	Timely completion of Stage 4 power upgrade works (KD22). Current forecast Mar-19.	KD22 (S4) 31Aug18	Close management of NR	Simon Wright	
	Yellow	Stage 5 ETCS availability – Stockley to Paddington	15Dec19	Mitigations being developed for ETCS programme slippage and lack of integration testing	Andrew Wolstenholme	Yes
	Green	Stage 5 power upgrade works (KD30) ATS sites at Slough & West Ealing still to be brought online	KD30 (S5) 31Aug18	Conversion to AT power forecast May18	Simon Wright	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Key Date	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR & RfL Readiness		Timely completion of staff accommodation at Maidenhead sidings	KD24 (S5) 10Sep18	Maidenhead staff accommodation delivery by MTR to be confirmed	Simon Wright	
Customer		Uncertainty over NR construction programme for station upgrades	KD22 (S4) 31Aug18 KD24 (S5) 10Sep18	NR schedule for six west enhanced stations shows a phased completion from Sep19 to Dec19. Main ITT's issued with award expected May18	Simon Wright	

¹² Integration and Sponsor Issues

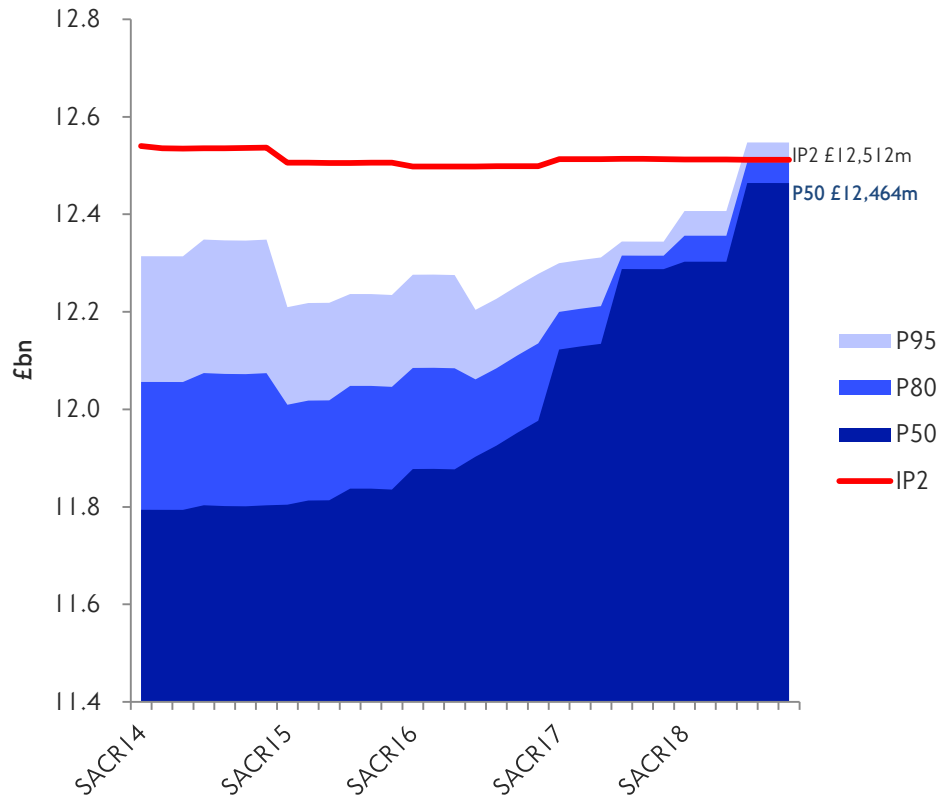


No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Chairman's reappointment confirmed. Transition of governance being discussed	Andrew Wolstenholme & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Close out organisation included in approved business plan - key roles to be filled via internal appointments to retain knowledge	Andrew Wolstenholme

PI I Financial Summary



Crossrail



- The P50 AFDCDC decreased by £0.1m to £12,464m in the Period, £43m below the P80 AFDCDC and £48m below IP2.
- Cost increases were funded by a drawdown from risk, giving a net reduction in AFDCDC.
- In the Period, Crossrail spent £60.7m above the 2017/18 Business Plan. This is predominantly due to lower than planned productivity, delays and prolongation and payment of NR Delivery incentives.
- Current actions to remain within funding :
 - Review of cost efficiencies internally within CRL, and available savings within the supply chain.
 - Review of remaining scope to be delivered by CRL.
 - Continuing the focus of cost reviews to challenge the Tier 1 contractor teams directly.

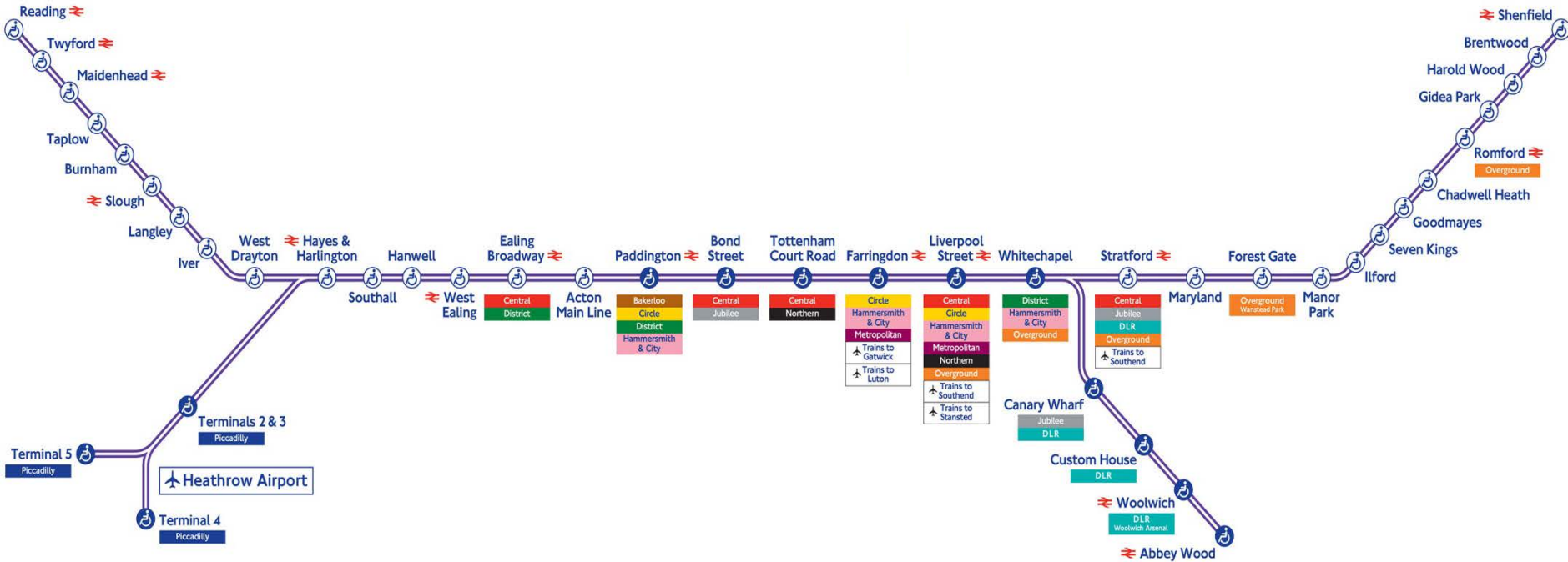
On Network Works

- The Forecast Final Outturn Cost (FFOC) has reduced to £2,396m to reflect £22m funded via the Funding Agreement between CRL and NR, the £28m and £84m cash funding NR secured via DfT Grant Funded Agreement.
- NR cumulative (gross) spend (which excludes adjustments for Traction Power / Accelerated Renewals) is £2,616.4m and represents 93% complete (inc VN's).



Elizabeth Line Readiness Board

10 APRIL 2018



2 Agenda



ELIZABETH LINE

Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Wright

Shashi Verma

David Hughes

Vernon Everitt

Simon Kilonback

Andy Brown

Graeme Craig

Lucy Findlay

Kevin Lynch

Martin Stuckey (secretariat)

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	Stage 2 Readiness	10 minutes
4.	Stage 3 Readiness	20 minutes
5.	Elizabeth Line Launch Plan	5 minutes
6.	Stages 4 & 5 Readiness	5 minutes
7.	Sponsor & Integration Issues	5 minutes
8.	Financial Summary	5 minutes

Actions from meeting of 9 March 2018



No.	Meeting date	Issue	Owner	Target date	Status
17.032	9/3/18	Papers for meeting to include clearer information on progress and forecasts against MOHS dates and any resultant impacts on opening of each stage	Martin Stuckey	10/4/18	Complete
17.033	9/3/18	Concerns with the issue identified this week with Bombardier train software and their quality assurance processes to be raised with them	Mike Brown & Howard Smith	10/4/18	Ongoing
17.034	9/3/18	Consider the relative costs and benefits of the 2 options for interim provision of back-haul wifi and agree way forward	Howard Smith & Shashi Verma	10/4/18	Complete. Will award on a baseline requirement but seek to leave open the option for consideration of minor improvements from the winner
17.035	9/3/18	Specific concerns with NR activities which overall present a strategic risk to Elizabeth line operations to be raised with NR Chairman	Howard Smith	10/4/18	Open
17.036	9/3/18	Meet prior to TfL Board deep-dive to discuss overall financial status	Simon Kilonback & Andrew Wolstenholme	10/4/18	Complete

4 Safety



Construction

In Period 12, the HSPI decreased to 2.57 (PII = 2.60) with 11 of 11 key contracts achieving an HSPI score of 2.20 and 8 of 11 scored at least 2.50 or more.

The RIDDOR rate remained at 0.08 (PII = 0.08) and the lost time case AFR decreased to 0.16 (PII = 0.17).

RIDDOR 7+ Days

19 February 2018 – [REDACTED]

12 February 2018 – [REDACTED]

High Potential Near Misses

20 February 2018 – [REDACTED]

13 February 2018 – [REDACTED]

7 February 2018 – [REDACTED]

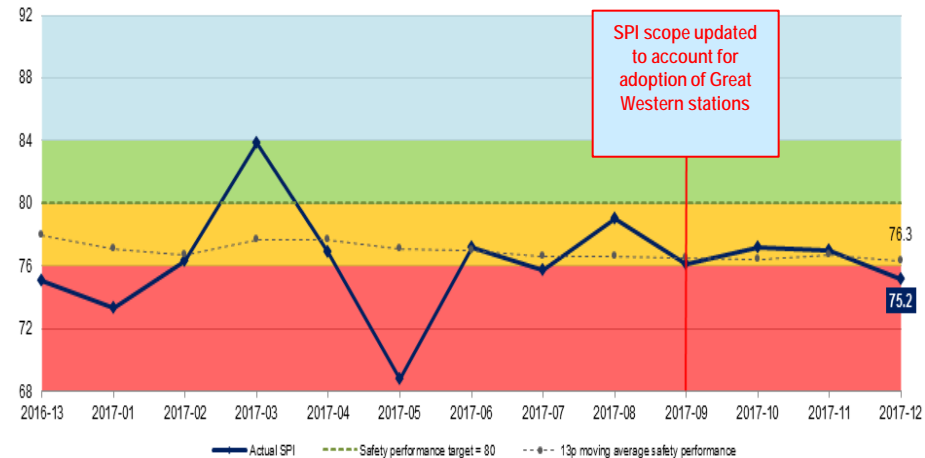
5 February 2018 – [REDACTED]

Operations

In Period 12, the SPI was 75.2 (PII = 77.0) in the 'poor performance' red zone and the 13 period moving average score is at 76.3 'below target performance' in the amber zone.

TfL Rail: Passenger accidents increased to above average levels in the period. There were two lost-time workforce injuries reported, the most significant was a driver sustaining a cut hand at Shenfield Sidings. There were seven workforce assaults reported, five verbal and two physical assaults. There was a TPWS intervention approaching L601 at Shenfield after the driver was late to cancel an AWS alarm. There was also a close call at Old Oak Common depot where a Class 345 was incorrectly routed towards a construction possession.

Crossrail Operations team: No injuries or incidents.



Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018

Phase 2 - 28 October 2018



Key Milestones		MOHS 2018 Baseline Date	Actual / Forecast (P12)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 2 Phase 1 - Paddington to Heathrow						
2.1	5No.RLUs Available for Driver Training (Non ETCS)	23-Apr-18	23-Apr-18	0	Green	↔
2.2	Opening of Stage 2 – Heathrow to Paddington High Level @T/T Change 20 May 18	20-May-18	20-May-18	0	Green	↔
Stage 2 Phase 2 - Paddington to Heathrow						
2.3	ETCS Ready for Formal Heathrow Testing	24-Aug-18	24-Aug-18	0	Green	↔
2.4	██	24-Aug-18	12-Oct-18	-49	Red	↓
2.5	ORR Authorisation for On-board Signalling	28-Sep-18	19-Nov-18	-52	Red	↓
2.6	Commence Stage 2 Phase 2 with ETCS functionality.	28-Oct-18	TBC	<i>(Dependent on MTRC driver training duration)</i>		

6 Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018

Phase 2 - 28 October 2018



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Risk to timely installation of TVM and Gate lines at Heathrow and elsewhere	Heathrow forecast 07May18 (T5 completion 5Mar18). Paddington forecast Sep18	Shashi Verma	
Phase 1 – 2 tph Paddington to Heathrow T4 CI360; 2 tph CTA to Heathrow T4 CI360; 2 tph Paddington to Hayes & Harlington CI345RLU					
Infrastructure & Trains	Yellow	Timely completion & handover of OOC including signalling commissioned	Interfaces being managed and contingency plans for delayed commissioning of signalling	Howard Smith	
	Yellow	Timely completion, acceptance and handover of DOO, Paddington gauge clearance and other NR deliverables	Paddington track, OLE & platform adjustments forecast complete early May. DOO testing commenced Mar18	Simon Wright	
MTR, NR & RfL Readiness	Yellow	2 FLUs & 5 RLUs for driver training, route familiarisation and passenger service	Use of odd number platforms at Paddington if RLU SDO unavailable, & updated ASDO database, release 10April, approved 30April	Howard Smith	
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU					
Infrastructure & Trains	Red	[REDACTED]	[REDACTED]	Howard Smith	
MTR, NR & RfL Readiness	Yellow	[REDACTED]	[REDACTED]	Howard Smith	

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Key Milestones		MOHS 2018 Baseline Date	Actual / Forecast (P12)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 3 - Paddington to Abbey Wood						
Dynamic Testing						
3.1	WBP ATFS Energised	31-Mar-18	24-Apr-18	-24	Red	↓
3.2	CBTC Software Available for Zones 1 & 2 Protective Manual (PM) & Automatic Modes (AM)	09-Apr-18	09-Apr-18	0	Green	↔
3.2	PSD Ready for Dynamic Testing in Zone 1	09-Apr-18	28-Apr-18	-19	Red	↓
3.3	CBTC Software Available for Zones 1 & 2 Auto Reverse & Isolated ETCS Testing	23-Apr-18	23-Apr-18	0	Green	↔
3.4	Provide all Trains to Systemwide for Dynamic Testing (3rd & 4th FLUs)	14-May-18	09-May-18	5	Green	↓
3.5	Linewide SCADA available in Zones 3 & 4	30-May-18	30-May-18	0	Green	↔
3.6	Signalling infrastructure ready for DT in Zones 3 & 4	07-Jun-18	07-Jun-18	0	Green	↔
3.7	GSM-R infrastructure ready for DT in Zones 1 to 4	08-Jun-18	13-Jun-18	-5	Red	↓
3.8	Permanently energise OHLE Zones 3 & 4	10-Jun-18	09-Jun-18	1	Green	
3.9	Start Dynamic Testing (Zones 3 & 4)	11-Jun-18	11-Jun-18	0	Green	↔
3.10	Start Dynamic Testing (Zones 1,2,3 & 4)	30-Jun-18	30-Jun-18	0	Green	↔
Trial Running						
3.11	All 11 kV S,S&P locations energized	15-Apr-18	15-Apr-18	0	Green	↔
3.12	ORR Issue Safety Authorisation to RfLI	07-Jun-18	07-Jun-18	0	Green	↔
3.13	Commence Transition Testing @ GEML	30-Jun-18	30-Jun-18	0	Green	↔
3.14	All 22 kV S,S&P locations energized	30-Jun-18	30-Jun-18	0	Green	↔
3.15	ORR Issue Amended safety Cert. & Authorisation to MTRC	04-Jul-18	04-Jul-18	0	Green	↔
3.16	Training completed for RFL in support of Handover of Routeway	05-Jul-18	31-Jul-18	-26	Red	↓
3.17	Commence Transition Testing @ GWML	14-Jul-18	14-Jul-18	0	Green	↔
3.18	Delivery Yellow Plant (RPM, ET01, ET02)	27-Jul-18	27-Jul-18	0	Green	↔
3.19	Sufficient RFLI Ops & Maint. Staff Trained and Competent as IM	03-Aug-18	03-Aug-18	0	Green	↔
3.20	Training Delivered to allow the Introduction of the RFLI Rule Book	03-Aug-18	03-Aug-18	0	Green	↔
3.21	Handover - Railway Systems	05-Aug-18	05-Aug-18	0	Green	↔
3.22	CBTC Authorised for FLU for Trial Running	05-Aug-18	26-Jun-18	40	Green	↓
3.23	Handover to Operator / Commencement of Trial Running	05-Aug-18	05-Aug-18	0	Green	↔
3.24	22no. CI.345 FLUs Available for Trial Running	13-Aug-18	13-Aug-18	0	Green	↔

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P12)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 3 - Paddington to Abbey Wood					
Trial Operations					
3.25 All Stations 'Brought Into use'	09-Sep-18	TBC	(Stations 'Staged Completion' dates TBC)		
3.26 Final COS safety case updated and submitted to RABC	31-Aug-18	31-Aug-18	0	Green	↔
3.27 Commence Trial Operations	09-Sep-18	09-Sep-18	0	Green	↔
Passenger Service					
3.28 Submit Technical File to ORR	17-Sep-18	17-Sep-18	0	Green	↔
3.29 CBTC Authorised for Passenger Service	10-Oct-18	15-Aug-18	56	Green	
3.30 PML ATS Re-energised including NR feed	15-Oct-18	12-Oct-18	3	Green	
3.31 Temporary services recovery complete	09-Nov-18	14-Nov-18	-5	Red	↓
3.32 Opening of Stage 3 - Central Section Paddington L/L to Abbey Wood	09-Dec-18	09-Dec-18	0	Green	↔
Substantial Completion of Stage 3					
3.33 Plumstead Maintenance Facility Completion (final IM access)	21-Nov-18	31-Oct-18	21	Green	↔
3.34 Final Handover of all Stations, Shafts and Portals	28-Nov-18	28-Nov-18	0	Green	↔
3.35 Plumstead Stabling Sidings Completion	29-Mar-19	29-Mar-19	0	Green	↔

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing	Red	Programme 91.4% complete against plan 93.0% Key contract for Energisation and Dynamic testing C610 79% complete against plan 90%	MOHS 2018 provides baseline of activities required to successfully handover the railway starting in July, ahead of opening safely and on time in December	Simon Wright	
	Red	Timely completion of infrastructure & communication systems	Prioritise systemwide activities including traction & non traction power and communication software	Simon Wright	
	Red	Timely completion of testing & commissioning activities (stations & systemwide).	Senior Management focus on this activity, now being monitored weekly and in some cases, daily	Simon Wright	
	Red	Timely provision of design assurance information, asset data, key operations/ maintenance information	Maintain focus on design assurance close out rate and drive Tier I contractors to provide information in good time	Simon Wright	
	Yellow	[REDACTED]	[REDACTED]	Howard Smith	
	Yellow	Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Confirm blockades June & July 18. Confirm the programme for installation of wayside equipment, on board software and testing at PML	Simon Wright	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness		Risk that there is insufficient time to procure spares and maintenance services. Asset Information (Drops 1-3) forecast complete mid/end May 18.	CRL continues to work with contractors on resourcing and prioritisation of key information	Howard Smith & Simon Wright	
		RFLI readiness – risk maintenance staff not being fully trained. Provision of training materials and delivery of training courses remains behind plan.	TUCA available. CRL supporting contractors with information sharing. Train the trainer replaced by end user training and provision of contractor support post handover	Simon Wright & Howard Smith	
		Risk of insufficient time to undertake trial operations activity.	Complete infrastructure and testing as early as possible to allow unimpeded trial operations. Clear definition of minimum requirements. Modelling systems reliability.	Simon Wright & Howard Smith	
		Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training	Station by station Handover execution plans being agreed between CRL and LU due end of March	Howard Smith	

11 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	Interim on-train wifi solution proposed. Positive initial engagement with MNOs. Commence procurement.	Shashi Verma	
	Green	Marketing launch and customer information activities	Launch plan to be prepared and managed by EL Comms Board. Update to 10 April meeting	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

Key Milestones		MOHS 2018 Baseline Date	Actual / Forecast (P12)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 4 - Paddington to Abbey Wood & Shenfield						
4.1	Required no. units available for Stage 4 services (55 FLU & 5 RLU)	17-May-19	14-May-19	3		↓
4.2	Opening of Stage 4 - Paddington L/L to Abbey Wood and Shenfield	19-May-19	19-May-19	0		↔
Stage 5 - Full Crossrail Service						
5.1	70 Trains Delivered for Stage 5.	13-Dec-19	16-Oct-19	58		
5.2	Opening of Stage 5 - Reading & Heathrow to Abbey Wood and Shenfield	15-Dec-19	15-Dec-19	0		↔

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Ilford Depot wire heights to be completed to support Stage 4&5 timetable (& stabling to support Stage 3)	Wire height works funding agreed. Agreement with AGA and programme required (target completion Oct 18).	Simon Wright	
	Yellow	Timely completion of Stage 4 power upgrade works (KD22).	Close management of NR. Current forecast Mar 19.	Simon Wright	
	Yellow	Stage 5 ETCS availability – Stockley to Paddington	Mitigations being developed for ETCS programme slippage and lack of integration testing	Simon Wright	Yes
	Yellow	Timely completion of 9 car DOO CCTV (Stratford & Shenfield)	Liaison with AGA regarding manual dispatch /line of sight concerns	Simon Wright	
	Red	Timely completion of Plumstead facilities including Stage 4 stabling	Handover of site by systemwide contractor required - programme under review.	Simon Wright	
	Green	Stage 5 power upgrade works (KD30). ATS sites at Slough & West Ealing still to be brought online	Conversion to AT power forecast Sep 18	Simon Wright	
MTR, NR & RfL Readiness	Green				
Customer	Yellow	Uncertainty over NR construction programme for station upgrades	NR schedule for six west enhanced stations shows a phased completion from Sep 19 to Dec 19. Main ITT's issued with awards expected May 18	Simon Wright	

14 Integration and Sponsor Issues

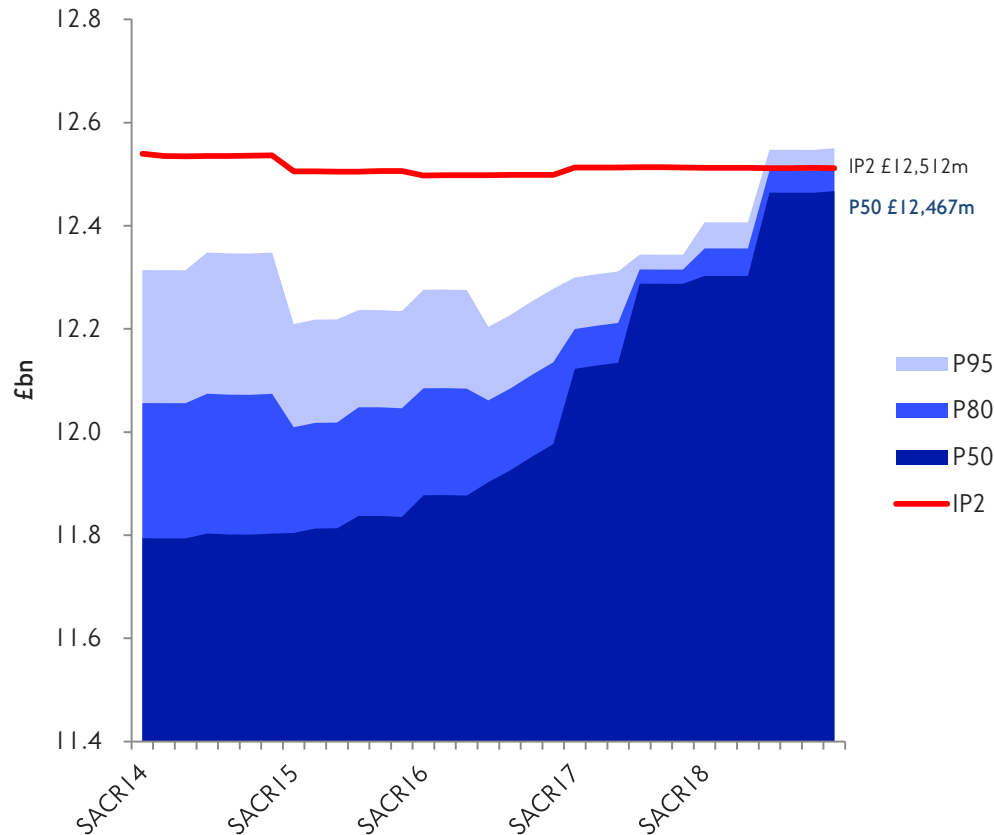


No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Chairman's reappointment confirmed. Transition of governance being discussed	Simon Wright & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Close out organisation included in approved business plan - key roles to be filled via internal appointments to retain knowledge	Simon Wright

P12 Financial Summary



Crossrail



- The P50 AFDCD increased by £3.1m to £12,467m in the Period, £42.7m below the P80 AFDCD and £44.9m below IP2.
- Cost increases were funded in part by a £75.2m drawdown from risk.
- In the Period, Crossrail spent £67.4m above the 2017/18 Business Plan. This is predominantly due to lower than planned productivity, delays and prolongation and other net overspends.
Current actions to remain within funding :
 - Review of cost efficiencies internally within CRL, and available savings within the supply chain.
 - Review of remaining scope to be delivered by CRL.
 - Continuing the focus of cost reviews to challenge the Tier 1 contractor teams directly.
 - Review & challenge of URTs and preparation of the Q4 QRA.

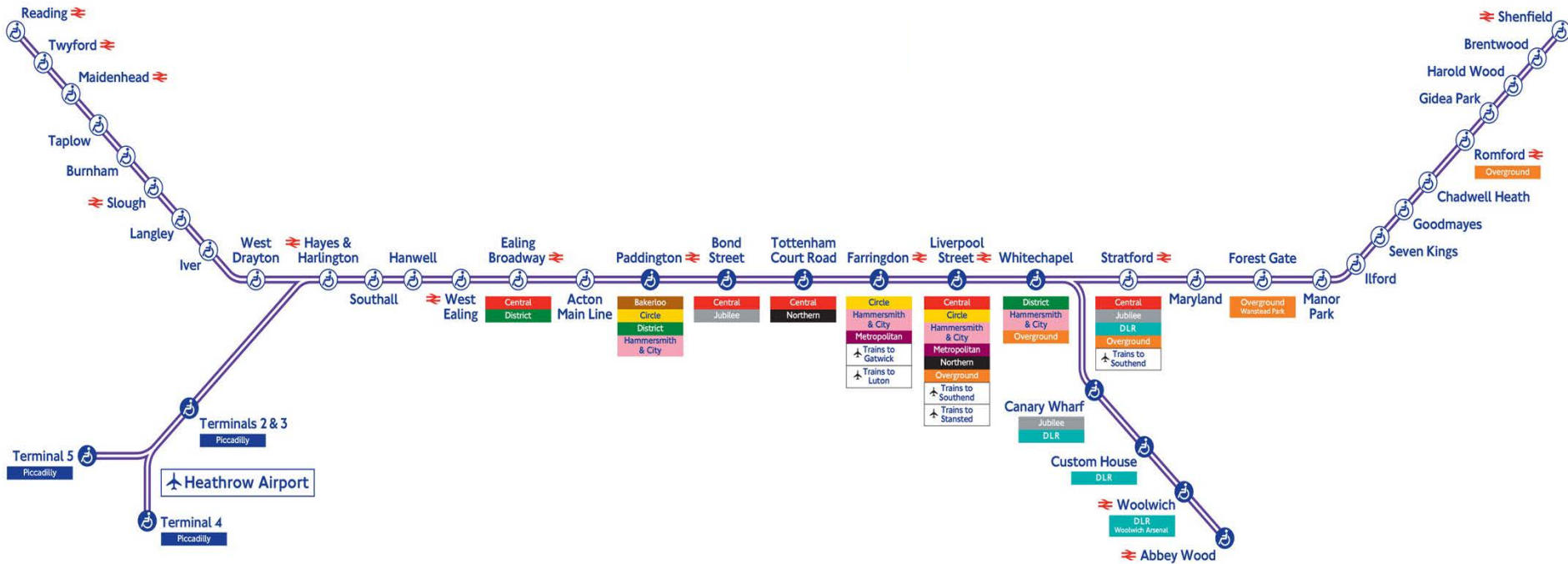
On Network Works

- The Forecast Final Outturn Cost (FFOC) remains at £2,396m which reflects £22m funded via the Funding Agreement between CRL and NR, the £28m and £84m cash funding NR secured via DfT Grant Funded Agreement. NR to confirm mechanism for their £20m funding contribution.
- NR cumulative (gross) spend (which excludes adjustments for Traction Power / Accelerated Renewals) is £2,628.7m and represents 93.3% complete (inc VN's).



Elizabeth Line Readiness Board

4 MAY 2018





Agenda



Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Martin Stuckey (secretariat)

Shashi Verma

David Hughes

Vernon Everitt

Simon Kilonback

Andy Brown

Graeme Craig

Lucy Findlay

Kevin Lynch

Chris Sexton (for Simon Wright)

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	Stage 2 Readiness	10 minutes
4.	Stage 3 Readiness, including T Minus Tracker	25 minutes
5.	Stages 4 & 5 Readiness	5 minutes
6.	Sponsor & Integration Issues	5 minutes
7.	Financial Summary	5 minutes

Actions from meeting of 10 April 2018



No.	Meeting date	Issue	Owner	Target date	Status
17.035	9/3/18	Specific concerns with NR activities which overall present a strategic risk to Elizabeth line operations to be raised with NR Chairman	Howard Smith	4/5/18	Open
17.037	10/4/18	Alternate meetings to be held at Canary wharf	Andy Brown & Martin Stuckey	4/5/18	Jul, Sep & Nov meetings at CW
17.038	10/4/18	Customer proposition for on-train wifi (non-PCN solution) to be confirmed and issued to the Commissioner	Shashi Verma	4/5/18	Complete
17.039	10/4/18	Seek to get NR to reinstate the 19/20 May possession on GW route	Simon Wright	4/5/18	Ongoing – working with NR to achieve the possession on 20/21 May
17.040	10/4/18	Papers to include specific dates in relation to each station completion/Handover	Martin Stuckey	4/5/18	Complete



4

Safety



Construction

In Period 13, the HSPI increased to 2.59, second highest ever (P12 = 2.57) and remains significantly above the 2.20 target. 11 of 11 key contracts achieved an HSPI score of 2.20 and 55% scored at least 2.60 or more. The RIDDOR rate increased to at 0.09 (P12 = 0.08) and the lost time case AFR increased to 0.17 (P11 = 0.16).

RIDDOR 7+ Days

21 March - [Redacted]

Lost Time Case

22 March - [Redacted]
19 March - [Redacted]
6 March - [Redacted]

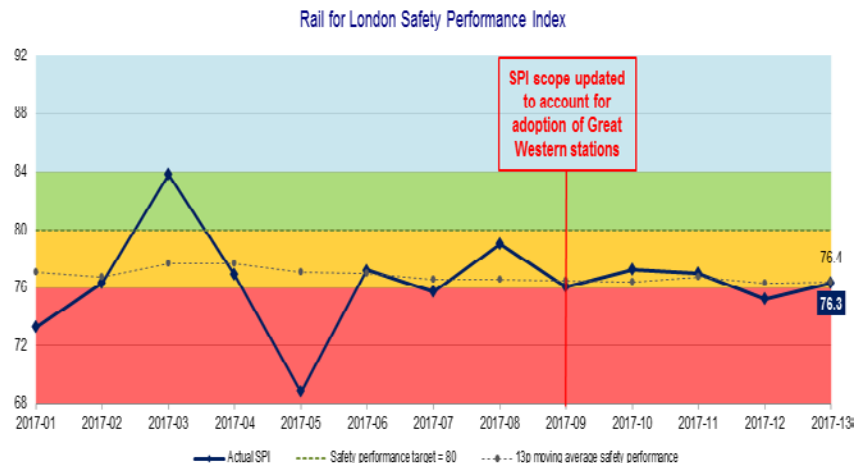
High Potential Near Misses

18 March - [Redacted]

Operations

Tfl Rail: There were eight passenger minor injuries on the eastern section and four on the western section. There was one MTR workforce minor injury at Romford. There were twelve workforce assaults - five verbal and seven physical. The number of assaults is a key concern to MTR and a workstream to refresh training in conflict management has been established. There were eight operational incidents, the most significant was a customer's rucksack strap became trapped in the doors of a class 345 train at Brentwood. There was one station related operational incident where a passenger was over carried on empty coaching stock to Gidea Park sidings but was safely returned to the station.

Crossrail Operations team: No injuries or incidents.



Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018

Phase 2 - 28 October 2018



Elizabeth Line Readiness Key Milestones		MOHS 2018 Baseline Date	Actual / Forecast (P13)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 2 Phase 1 - Paddington to Heathrow						
2.1	5 No.RLUs Available for Passenger Service (Non ETCS)	23-Apr-18	23-Apr-18	0	Green	↔
2.2	Opening of Stage 2 - Heathrow to Paddington High Level @T/T Change 20 May 18	20-May-18	20-May-18	0	Green	↔
Stage 2 Phase 2 - Paddington to Heathrow						
2.3	ETCS Ready for Formal Heathrow Testing	24-Aug-18	24-Aug-18	0	Green	↔
2.4	██	24-Aug-18	12-Oct-18	-49	Red	↔
2.5	ORR Authorisation for On-board Signalling	28-Sep-18	19-Nov-18	-52	Red	↔
2.6	Commence Stage 2 Phase 2 with ETCS functionality.	28-Oct-18	TBC			<i>(Dependent on Unit Availability for Driver Training)</i>

6 Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018

Phase 2 - 28 October 2018



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Risk to timely installation of TVM and Gate lines at Heathrow and elsewhere	T4 & T5 works complete, CTA works & testing ongoing. Heathrow forecast 07May18. Paddington forecast Sep18	Shashi Verma	
Phase 1 – 2 tph Paddington to Heathrow T4 CI360; 2 tph CTA to Heathrow T4 CI360; 2 tph Paddington to Hayes & Harlington CI345RLU					
Infrastructure & Trains	Yellow	Timely completion & handover of OOC including signalling commissioned	Interfaces being managed and contingency plans for delayed commissioning of signalling	Howard Smith	
	Yellow	Timely completion, acceptance and handover of DOO, Paddington gauge clearance and other NR deliverables	Positive results from DOO testing – no failures. Paddington track, OLE & platform adjustments forecast complete early May	Simon Wright	
MTR, NR & RfL Readiness	Yellow	2 FLUs & 5 RLUs for driver training, route familiarisation and passenger service	Timetable and ARS solutions at Paddington if RLU SDO unavailable. MTR targeting 40 drivers trained for 19 May (min 20 required for start of service)	Howard Smith	
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU					
Infrastructure & Trains	Red	Timely completion of ETCS testing and BT on board signalling approval	Close monitoring of software development for passenger service and prioritised joint lab testing @ Charleroi	Howard Smith	
MTR, NR & RfL Readiness	Yellow	Timely completion of driver training and Ops proving	Development of MTR schedule for Phase 2 ongoing	Howard Smith	

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P13)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 3 - Paddington to Abbey Wood					
Dynamic Testing					
3.1 WBP ATFS Energised	31-Mar-18	27-Apr-18	-27		↓
3.2 PSD Ready for Dynamic Testing in Zone 1	09-Apr-18	09-May-18	-30		↓
3.3 CBTC Software Available for Zones 1 & 2 Auto Reverse & Isolated ETCS Testing	23-Apr-18	27-Apr-18	-4		↓
3.4 Provide all Trains to Systemwide for Dynamic Testing (3rd & 4th FLUs)	14-May-18	15-May-18	-1		↓
3.5 Linewise SCADA available in Zones 3 & 4	30-May-18	30-May-18	0		↔
3.6 Signalling infrastructure ready for DT in Zones 3 & 4	07-Jun-18	07-Jun-18	0		↔
3.7 GSM-R infrastructure ready for DT in Zones 1 to 4	08-Jun-18	08-Jun-18	0		↑
3.8 Permanently energise OHLE Zones 3 & 4	10-Jun-18	10-Jun-18	0		↓
3.9 Start Dynamic Testing (Zones 3 & 4)	11-Jun-18	11-Jun-18	0		↔
3.10 Start Dynamic Testing (Zones 1,2,3 & 4)	30-Jun-18	30-Jun-18	0		↔
Trial Running					
3.11 All 11 kV S,S&P locations energized	15-Apr-18	21-Apr-18	-6		↓
3.12 ORR Issue Safety Authorisation to RFLI	07-Jun-18	07-Jun-18	0		↔
3.13 Commence Transition Testing @ GEML	30-Jun-18	30-Jun-18	0		↔
3.14 All 22 kV S,S&P locations energized	30-Jun-18	30-Jun-18	0		↔
3.15 ORR Issue Amended Safety Cert. & Authorisation to MTRC	04-Jul-18	04-Jul-18	0		↔
3.16 Training completed for RFLI in support of Handover of Routeway	05-Jul-18	03-Aug-18	-29		↓
3.17 Commence Transition Testing @ GWML	14-Jul-18	14-Jul-18	0		↔
3.18 Delivery Yellow Plant (RPM, ET01, ET02)	27-Jul-18	27-Jul-18	0		↔
3.19 Sufficient RFLI Ops & Maint. Staff Trained and Competent as IM	03-Aug-18	03-Aug-18	0		↔
3.20 Training Delivered to allow the Introduction of the RFLI Rule Book	03-Aug-18	03-Aug-18	0		↔
3.21 Handover - Railway Systems	05-Aug-18	05-Aug-18	0		↔
3.22 CBTC Authorised for FLU for Trial Running	05-Aug-18	26-Jun-18	40		↔
3.23 Handover to Operator / Commencement of Trial Running	05-Aug-18	05-Aug-18	0		↔
3.24 22no. CI.345 FLUs Available for Trial Running	13-Aug-18	17-Aug-18	-4		↓

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P13)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 3 - Paddington to Abbey Wood					
Trial Operations					
3.25 All Stations 'Staged Completion' - for RFLI/LU/MTR Familiarisation and Trial Ops.	Refer to detailed Station Table (next slide)				
3.26 Final COS safety case updated and submitted to RABC	31-Aug-18	31-Aug-18	0		↔
3.27 Commence Trial Operations	09-Sep-18	09-Sep-18	0		↔
Passenger Service					
3.28 Submit Technical File to ORR	17-Sep-18	17-Sep-18	0		↔
3.29 CBTC Authorised for Passenger Service	10-Oct-18	02-Aug-18	69		↑
3.30 PML ATS Re-energised including NR feed	15-Oct-18	15-Oct-18	0		↓
3.31 Temporary services recovery complete	09-Nov-18	05-Dec-18	-26		↓
3.32 Opening of Stage 3 - Central Section Paddington L/L to Abbey Wood	09-Dec-18	09-Dec-18	0		↔
Substantial Completion of Stage 3					
3.33 Plumstead Maintenance Facility Completion (Initial IM access)	21-Nov-18	01-Nov-18	20		↓
3.34 Final Handover of all Stations, Shafts and Portals	28-Nov-18	28-Nov-18	0		↔
3.35 Plumstead Stabling Sidings Completion	29-Mar-19	29-Mar-19	0		↔

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P13)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 3 - Paddington to Abbey Wood					
LU Stations 'Staged Completion' - for LU Familiarisation and Trial Ops.					
3.251 Whitechapel Station	16-Aug-18	16-Aug-18	0		↔
3.252 Bond Street Station	31-Oct-18	31-Oct-18	0		↔
3.253 Liverpool Street Station	02-Sep-18	02-Sep-18	0		↔
3.254 Tottenham Court Road Station	02-Aug-18	02-Aug-18	0		↔
3.255 Farringdon Station	17-Aug-18	17-Aug-18	0		↔
RFLI Stations 'Staged Completion' - for RFLI/MTR Familiarisation and Trial Ops.					
3.256 Paddington Station	29-Jul-18	29-Jul-18	0		↔
3.257 Custom House Station	28-Jul-18*	28-Jul-18	0		↔
3.258 Woolwich Station	09-Sep-18	09-Sep-18	0		↔
3.259 Canary Wharf Station	05-Jul-18	05-Jul-18	0		↔

Date with * = Final Handover date not Staged Completion

10 Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing	Yellow	Programme 92.1% complete against plan 93.9% Key contract for Energisation and Dynamic testing C610 81% complete against plan 91%	MOHS 2018 remains achievable. Commencing T-minus review process tracking progress towards criteria for start of trial running, trial operations and passenger service (Draft Tracker attached)	Simon Wright	
	Red	Timely completion of infrastructure & communication systems	Prioritise systemwide activities including traction & non traction power and communication software	Simon Wright	
	Red	Timely completion of testing & commissioning activities (stations & systemwide).	Revised approach for dynamic testing confirmed. Senior management focus on this activity, now being monitored weekly and in some cases, daily	Simon Wright	
	Red	Timely provision of design assurance information, asset data, key operations/ maintenance information	Maintain focus on design assurance close out rate and drive Tier 1 contractors to provide information in good time	Simon Wright	
	Yellow	[REDACTED]	[REDACTED]	Howard Smith	
	Red	Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Maintain blockades June & July 18. Confirm the programme for installation of wayside equipment, on board software and testing at PML	Simon Wright	

11 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness		Risk that there is insufficient time to procure spares and maintenance services. Asset Information (Drops 1-3) forecast complete mid/end May 18.	Revised, prioritised programme for asset information transfer established. CRL continues to work with contractors on resourcing and prioritisation of key information	Howard Smith & Simon Wright	
		RFLI readiness – risk maintenance staff not being fully trained. Provision of training materials and delivery of training courses remains behind plan.	TUCA available. CRL supporting contractors with information sharing. Train the trainer replaced by end user training and provision of contractor support post handover including care & custody for non-routeway assets may be necessary	Simon Wright & Howard Smith	
		Risk of insufficient time to undertake trial operations activity.	Complete infrastructure and testing as early as possible to allow unimpeded trial operations. Clear definition of minimum requirements. Modelling systems reliability	Simon Wright & Howard Smith	
		Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training	Station Handover execution plans received	Howard Smith	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	Interim on-train wifi solution proposed. Appointment of MNO forecast end of May 18	Shashi Verma	
	Green	Marketing launch and customer information activities	Launch plan to be prepared and managed by EL Comms Board	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P13)	Variance [BL - Forecast]	RAG	Change from Last Period
Stage 4 - Paddington to Abbey Wood & Shenfield					
4.1 Required no. units available for Stage 4 (55 FLU & 5 RLU)	17-May-19	14-May-19	3		↔
4.2 Opening of Stage 4 - Paddington L/L to Abbey Wood and Shenfield	19-May-19	19-May-19	0		↔
Stage 5 - Full Crossrail Service					
5.1 70 Trains Delivered for Stage 5. (Including RLU to FLU Reconfiguration)	13-Dec-19	16-Oct-19	58		↔
5.2 Opening of Stage 5 - Reading & Heathrow to Abbey Wood and Shenfield	15-Dec-19	15-Dec-19	0		↔

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Ilford Depot wire heights to be completed to support Stage 4&5 timetable (& Stage 3 stabling)	Wire height works funding agreed. Agreement with AGA and programme required (target completion Oct 18).	Simon Wright	
	Yellow	Timely completion of Stage 4 power upgrade works (KD22).	Close management of NR. Current forecast Mar 19.	Simon Wright	
	Yellow	Timely completion of Plumstead facilities including Stage 4 stabling	Handover of site by systemwide contractor required. Programme under review	Simon Wright	
	Green	Stage 5 power upgrade works (KD30). ATS sites at Slough & West Ealing still to be brought online	Conversion to AT power forecast Sep 18	Simon Wright	
MTR, NR & RfL Readiness	Green				
Customer	Yellow	Uncertainty over NR construction programme for station upgrades	NR schedule for six enhanced western stations shows completion from Sep 19 to Dec 19. Main ITT's issued with awards expected June & July 18. Enhanced Ilford & Romford Dec 19.	Simon Wright	

15 Integration and Sponsor Issues



No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Transition of governance being discussed	Simon Wright & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Extended multiple roles to support completion of Stage 3. Key roles in close out organisation to be filled via internal appointments to retain knowledge	Simon Wright

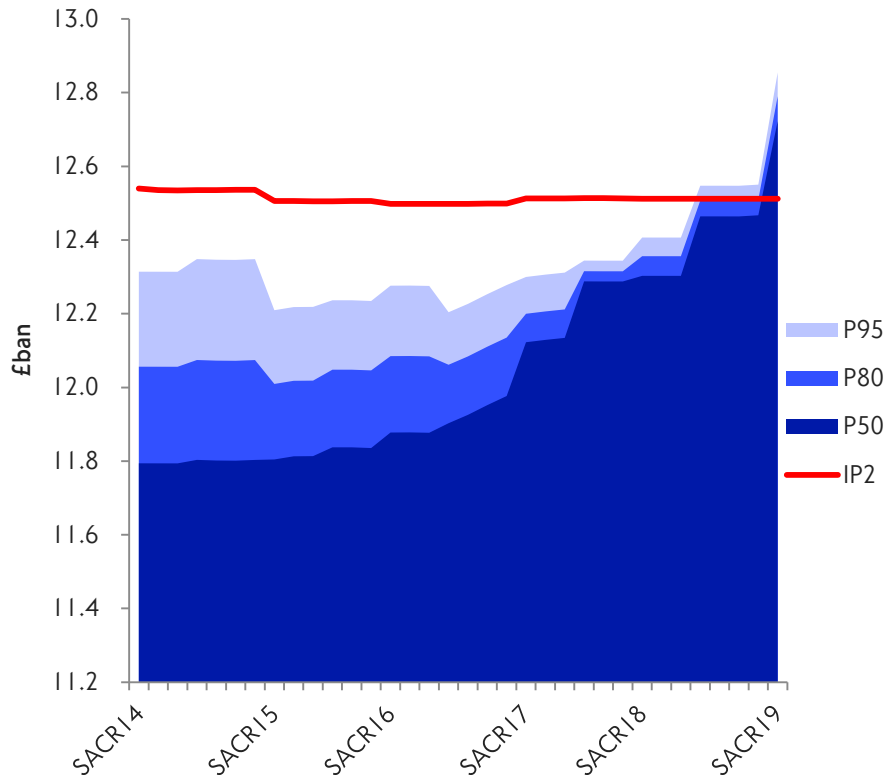
P13 Financial Summary

CONFIDENTIAL
Not for onward circulation



ELIZABETH LINE

Crossrail



- The P50 AFDCDC increased by £255.6m to £12,723m in the Period, and is now £210.7m above IP2, and £215.6m above the reported Financial Budget. The AFDCDC increase is predominantly due to a net increase to the Programme risk provision following the Q4 QRA (£243.0m).
- In the Period, Crossrail spent £107.5m above the 2017/18 Business Plan. This is predominantly due to delays to the reimbursement of oversite development costs, ongoing lower than planned productivity, delays and prolongation.
- The full year overspend is £438m against the 2017/2018 Business Plan.

Current actions:

- Review of cost efficiencies internally within CRL, and available savings within the supply chain.
- Preparation and submission of the SACRI 19 report.
- Preparation of the 2017/18 Financial Statements for statutory audit.

On Network Works

- The Forecast Final Outturn Cost (FFOC) remain has reduced to £2,376 which reflects £22m funded via the Funding Agreement between CRL and NR, the £28m and £84m cash funding NR secured via DfT Grant Funded Agreement and now NR's £20m funding contribution.
- NR cumulative (gross) spend (which excludes adjustments for Traction Power / Accelerated Renewals) is £2,640.0m and represents 93.7% complete (inc VN's).

Elizabeth line Countdown Board Tracker

KEY	Enter	Shows as
Not yet assessed	(blank)	
Pass - GO	1	■
Proceed at RISK	2	■
Fail - No-Go	3	■

Index Countdown readiness tests and supporting evidence

Accountable

Governance

Index	Countdown readiness tests and supporting evidence	Programme	Operator
CT0100	Are Rolling Stock, Depot & Yellow Plant available, commissioned and integrated?	N/A	P Clarke
CT0101	Class 345 approved for operation for TR/TO/Passenger Service incl. fully functional DOO CCTV	N/A	P Clarke
CT0102	Are there sufficient numbers of rolling stock available?	N/A	P Clarke
CT0103	Train Passenger Information Systems fully functioning, commissioned and integrated with RCC	N/A	P Clarke
CT0104	On-train signalling delivers full functionality per system design	N/A	P Clarke
CT0105	Old Oak Common Depot commissioned (suitable for TR/TO) and integrated	N/A	P Clarke
CT0106	Yellow plant fully functional per yellow plant design (incl. CBTC signalling).	N/A	J Jarrett
CT0200	Are Trace Assets safe, functional, commissioned and integrated?	Bill Tucker	D Canham
CT0201	Signalling for passenger trains commissioned & integrated with functionality per system design	J Lacey	D Canham
CT0202	Signalling for Yellow Plant commissioned & integrated	J Lacey	D Canham
CT0203	Signalling possession management commissioned & integrated for RFLI maintenance under ROGS	J Lacey	J Jarrett
CT0204	RCC/BUCF commissioned & integrated including RCM and Asset Information Systems	J Lacey	D Canham
CT0205	GSM-R train radio commissioned & integrated - incl. handsets	J Lacey	D Canham
CT0206	Emergency Services radio commissioned and reliable for back-up during TO (route-way and stations)	J Lacey	D Canham
CT0207	Track fully functional, commissioned & integrated including track lubrication	C Enoch	D Canham
CT0208	Traction Power & OHLE (Including E&B) fully functional, commissioned and integrated	C Gainsford	D Canham
CT0209	Platform CIS commissioned, integrated & linked to On Network CIS	B Wheeldon	D Canham
CT0210	Tunnel Lighting commissioned and full functionality integrated & available with RCC	C Gainsford	D Canham
CT0211	Tunnel LV power sockets commissioned and integrated	C Gainsford	D Canham
CT0212	Points heating functioning incl. temporary controls in place for Trial Running	C Gainsford	D Canham
CT0213	Junction lighting commissioned and integrated	C Gainsford	D Canham
CT0214	Tunnel walkway commissioned and brought into use	C Gainsford	D Canham
CT0215	Tunnel Fire Main commissioned and bought into use incl. Safety Case for 15TPH	C Gainsford	D Canham
CT0216	Tunnel pumps and drainage functioning, commissioned and integrated	C Gainsford	D Canham
CT0217	Temporary services recovery where this impacts delivery of Stage 3	C Gainsford	D Canham
CT0218	Platform Screen doors commissioned and integrated incl. detection at RCC	C Gainsford	D Canham
CT0219	Platform Areas clear for access to controls: PSDs, CIS, DOO, plat. lighting + as emergency escape routes	T Easthorpe	D Canham
CT0220	Shafts and Portals functioning, commissioned and detected at RCC	T Easthorpe	D Canham
CT0221	Cross-passages commissioned, brought into use and detected at RCC.	C Gainsford	D Canham
CT0222	Tunnel signage installed per design incl. required driver signage for TR and remaining signage for TO.	C Gainsford	D Canham
CT0223	Tunnel ventilation commissioned and integrated	C Gainsford	D Canham
CT0224	HV non-traction power commissioned and integrated for railway systems support	C Gainsford	D Canham
CT0225	Network Comms/SCADA commissioned and integrated	J Lacey	D Canham
CT0226	DOO Trackside CCTV systems functioning, commissioned and integrated	J Lacey	D Canham
CT0227	Plumstead Maintenance Facility commissioned and integrated	C Gainsford	D Canham
CT0228	Asset information received, accepted and populated into systems	M Taylor	D Canham
CT0229	Signalling & control of GE transition (U&D) to CRL EB/WB commissioned & integrated	J Lacey	D Canham
CT0230	Signalling & control of GW transition (L5/L6) to CRL EB/WB commissioned & integrated	J Lacey	D Canham
CT0231	All Dynamic Testing successfully completed	K Sibley	N/A
CT0300	Are Critical Assets' Reliability/Availability/Maintainability (RAM) targets met?	Bill Tucker	R Parish
CT0301	C345 rolling stock has proven fault-free running for reliability targets	J Bates	P Clarke
CT0302	Platform Screen Doors - complete platform success criteria achieved	J Bates	R Parish
CT0303	Platform Screen Doors - individual door set success criteria achieved	J Bates	R Parish
CT0304	Signalling - Infrastructure success criteria achieved	J Bates	R Parish
CT0305	Train-based - ATO success criteria achieved	J Bates	P Clarke
CT0306	Track systems (incl. points heating) success criteria achieved	J Bates	R Parish
CT0307	S&C systems success criteria achieved	J Bates	R Parish
CT0308	OHLE systems success criteria achieved	J Bates	R Parish
CT0309	Tunnel Systems - Ventilation success criteria achieved	J Bates	R Parish
CT0310	Tunnel Systems - pumps and drainage success criteria achieved	J Bates	R Parish
CT0311	Tunnel Systems - Tunnel Lighting success criteria achieved	J Bates	R Parish
CT0312	Tunnel Fire Main success criteria achieved	J Bates	R Parish
CT0313	Power - Traction Power success criteria achieved	J Bates	R Parish
CT0314	Power - HV Non-Traction Power success criteria achieved	J Bates	R Parish
CT0315	Communications - CMS From the RCC success criteria achieved	J Bates	R Parish
CT0316	Communications - end-to-end availability from RCC to any field equipment success criteria achieved	J Bates	R Parish
CT0317	Stations - Lifts success criteria achieved	J Bates	R Parish
CT0318	Stations - Escalators success criteria achieved	J Bates	R Parish
CT0319	Stations - CIS systems success criteria achieved	J Bates	R Parish
CT0320	DOO Trackside-to-train reliability criteria achieved	N/A	D Canham
CT0321	East transitions success criteria achieved	J Bates	R Parish
CT0322	West transitions success criteria achieved	J Bates	R Parish
CT0323	GSM-R Station radio all COS Stns incl.LU - success criteria achieved	J Bates	R Parish
CT0324	PPM performance measures achieved for each phase	N/A	R Schofield
CT0325	Headway performance measures achieved for each phase	N/A	R Schofield

IM1 criterion	Status	Mitig.
Class 345 approved for TR operation	■	
22 FLUs available for Trial Running	■	
On-train signalling fully functioning	■	
OOO Depot commissioned for TR	■	
Yellow Plant functioning per design	■	
C345 signalling working & fully functional	■	
Yellow Plant sig. commiss. & integrated	■	
Signalling Possess. Mgmt commiss.		
RCC/BUCF commiss. & integrated		
GSM-R commissioned & integrated		
Construction Radio functioning		
Track systems fully functioning		
OHLE commissioned		
CIS commissioned & integrated		
Tunnel lighting commissioned.		
Tunnel LV power T&C & integrated		
Points Heating temp controls functioning		
Junction Lighting functioning		
Temporary Tunnel Fire Main functioning		
Pumps & drainage functioning		
PSDs commissioned and integrated		
Platform Areas clear for access to controls		
Driver signage installed per design (TR)		
HV non-traction power commissioned		
Net Comms & SCADA commissioned		
DOO Trackside CCTV functioning	■	
Plumstead facility commissioned	■	
CEAMS populated with critical Trace asset data for TR	■	■
500 fault free miles per unit running in CBTC area		
1 platform failure / 3 months		
250k cycles / 2.9 door set failures per week		
Signalling reliability for TR achieved		
ATO available >8hrs (only small failures)		
In tunnel - avail. 150yrs/mile / 4yrs overall		
> 3 yrs MTBSAF and > 5 yrs (key points)		
Reliability 150yrs per mile		
Overall 1 fail / 1yr or 1 shaft / 3 mo.		
AVop 99.995% on-demand/crit.sump continuous		
Min. 99.995% intrinsic avail. (perm.lit sections)		
MTBSAF > 100,000Hrs		
AVop 99.997%		
AVop 99.9999% MTBSAF >200000 ROP- PLP		
99.998% Reliability		
99.95% Reliability		
90% availability		
90% availability		
30hrs platform / 10hrs full/partial Stn closure p.a		
*** DOO failure rate required ***		
GSM-R Station radio works in all COS Stns to support TR		
PPM results met during TR		
10 missed Headways per day		

IM2 criterion	Status	Mitig.
Class 345 approved for TO operation	■	
22 FLUs required for Trial Operations	■	
Train PIS commissioned & integrated		
On-train signalling fully functioning		
OOO Depot commissioned for TO	■	
Yellow Plant tested during Trial Ops	■	
Yellow Plant sig. ready for Trial Ops	■	
Permanent Points Heating functioning		
Tunnel Walkway commissioned for T.O.		
Permanent Tunnel Fire Main functioning		
Shafts & Portals commissioned & detected		
Cross-passages commiss. & detected		
Remaining signage installed (TO)		
Tunnel ventilation commissioned		
Plumstead facility fully integrated	■	
CEAMS populated with Asset data to allow TO		
9,000 miles per unit running in CBTC area		
1 platform failure p.a.		
1M cycles - 0.91 door set failures per week		
Signalling reliability for TO achieved		
ATO avail.>50kHrs for fleet		
In tunnel - avail. >150yrs/mile / 4yrs overall		
> 6.5 yrs MTBSAF and > 10 yrs (key points)		
Reliability 150yrs per mile		
Overall 1 fail / 5yr or 1 shaft fail / 1yr		
AVop 99.995% on-demand/crit.sump continuous		
Min. 99.995% intrinsic avail. (perm.lit sections)		
MTBSAF > 100,000Hrs		
AVop 99.997%		
AVop 99.9999% MTBSAF >200000 ROP- PLP		
99.998% Reliability		
99.95% Reliability		
90% availability		
95% avail. & "2 of 3" escalators for THs to open		
95% avail. Stn lifts operational as a minimum		
15hrs platform / 5hrs full/partial Stn closure p.a		
East Transitions achieve expected reliability for T.O.		
West Transitions achieve expected reliability for T.O.		
GSM-R Station radio works in all COS Stns to support TO		
PPM results met during Trial Ops		
2 missed Headways per day		

IM3 criterion	Status	Mitig.
Class 345 approved for Passenger operation	■	
22 FLUs required for Revenue Service	■	
OOO Depot consents & certification ready for Rev. Svc.		
Yellow Plant tests completed - ready for RS	■	
Yellow Plant sig. ready for Rev. Svc.	■	
Evidence of temporary services recovery		
Plumstead facility ready for Rev. Service	■	
CEAMS populated with all remaining asset data		
20,000 Miles per unit in CBTC area		
Signalling reliability for RS achieved		
ATO avail.>50kHrs for fleet		
In tunnel - avail. >150yrs/mile / 4yrs overall		
> 6.5 yrs MTBSAF and > 10 yrs (key points)		
Reliability 150yrs per mile		
Overall 1 fail / 5yr or 1 shaft fail / 1yr		
AVop 99.995% on-demand/crit.sump continuous		
Min. 99.995% intrinsic avail. (perm.lit sections)		
MTBSAF > 100,000Hrs		
AVop 99.997%		
AVop 99.9999% MTBSAF >200000 ROP- PLP		
99.998% Reliability		
99.95% Reliability		
99.6% availability		
99.6% availability		
15hrs platform / 5hrs full/partial Stn closure p.a		
East Transitions achieve expected reliability for R.S..		
West Transitions achieve expected reliability for R.S..		
GSM-R Station radio works in all COS Stns to support RS		
PPM results met during Trial Ops		
2 missed Headways per day		

COMMENTS

Elizabeth line Countdown Board Tracker

KEY	Enter	Shows as
Not yet assessed	(blank)	
Pass - GO	1	
Proceed at RISK	2	
Fail - No-Go	3	

Index Countdown readiness tests and supporting evidence

Accountable

Index	Countdown readiness tests and supporting evidence	Programme	Operator
CT0903	Sufficient MTR-C drivers mobilised, rostered, competent and confident to enter phase	N/A	R Schofield
CT0904	IM Maintenance staff mobilised and rostered ready for phase	N/A	J Jarrett
CT0905	LU station and maintenance staff mobilised, rostered, competent and confident for phase	N/A	K Kapur
CT0906	RFLI Engineering staff mobilised and rostered for phase	N/A	D Canham
CT0907	Customer contact centre mobilised ready for Revenue Service	N/A	L Thome
CT0908	TfL Ambassadors/SRTs/CAT teams recruited and briefed for launch week + any special requirements	N/A	L Thome
CT0909	Customer 'launch plans', incl. marketing, agreed between all parties and in place for Revenue Service	N/A	V Morley
CT0910	Full complement of RFLI, LU and MTR staff mobilised, rostered and ready for passenger service?	N/A	H Smith
CT0911	Sufficient MTR-C Control Staff recruited and trained	N/A	R Schofield
CT0912	LU maintenance regime in place for phase	N/A	K Kapur
CT0913	MTR maintenance contract in place for phase	N/A	R Schofield
CT0914	NR Signalling staff in place, competent, confident to enter phase	M White	D Fox
CT0915	MTRC station staff mobilised, rostered, competent and confident for phase	N/A	R Schofield
CT0916	Bombardier: train and depot Mtce and Ops support staff/ procedures/IT in place	N/A	P Clarke

Governance

IM1 criterion	Status	Mitig.
156 Drivers trained for TR.	 	
Staff recruited, trained and rostered for TR	 	
Sufficient RFLI Engineering staff for TR.		
MTR-C Control Staff recruited & trained (TR)		
Interim arrangements in place to support TR	 	
MTRC staff at Custom House Stn mobilised		
BT has required staff mobilised for TR		

IM1
 30/07/18

IM2 criterion	Status	Mitig.
Sufficient Stn staff mobilised, rostered & competent to undertake T.O.	 	
Maintenance regime to support T.O. agreed & in place	 	
Interim arrangements in place to support TO		
MTRC staff at PAD, CWG & WOO Stns mobilised		
BT has required staff mobilised for TO		

IM2
 03/09/18

IM3 criterion	Status	Mitig.
166 Drivers trained for Revenue Service.	 	
Sufficient Stn staff mobilised, rostered & competent to operate	 	
Customer Contact Centre mobilised for RS.	 	
TfL Ambassadors mobilised for RS.	 	
Customer launch plan in place for RS.	 	
All staff ready for revenue service.	 	
Maintenance regime to support Rev.Svc. agreed & in place	 	
Interim arrangements in place to support RS		
NR signalling staff in place, competent, confident		
Remaining MTRC Station staff mobilised		
BT has required staff mobilised for Rev. Svc.		

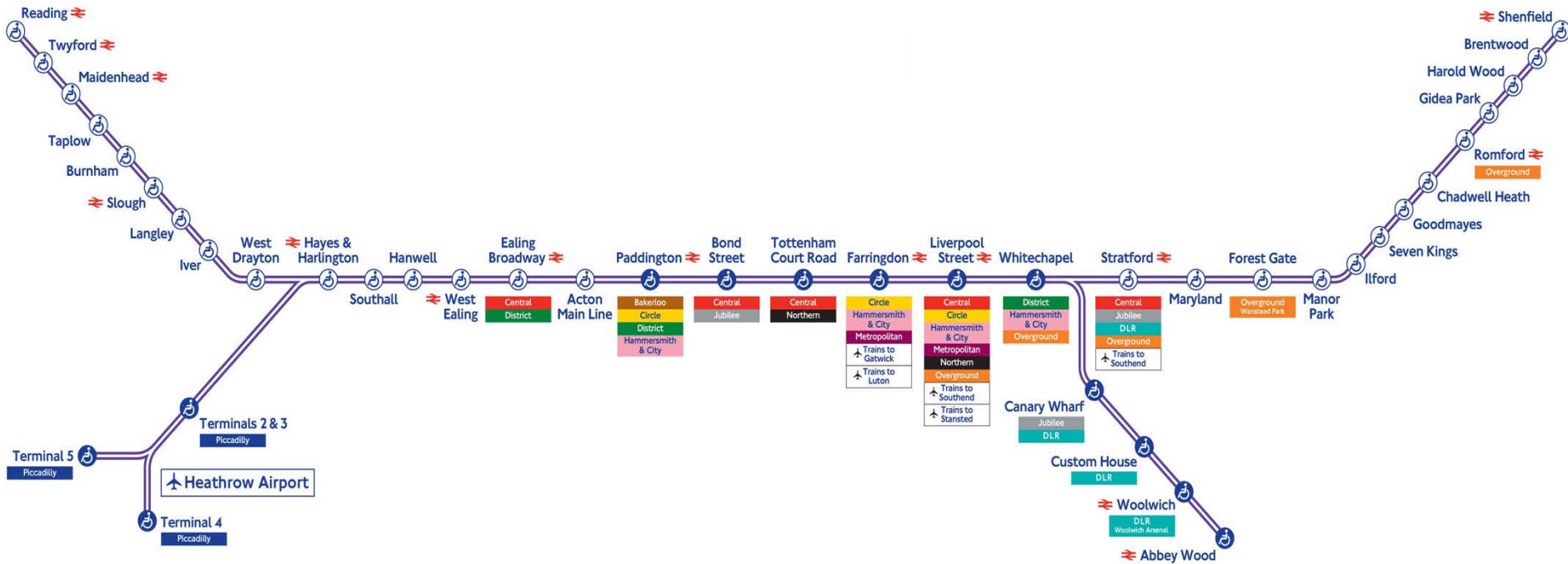
IM3
 03/12/18

COMMENTS



Elizabeth Line Readiness Board

4TH JUNE 2018



2 Agenda



ELIZABETH LINE

Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Kilonback

Simon Wright

David Hughes

Vernon Everitt

Lucy Findlay

Martin Stuckey (secretariat)

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	Stage 2 Readiness	10 minutes
4.	Stage 3 Readiness, including T Minus Tracker	25 minutes
5.	Stages 4 & 5 Readiness	5 minutes
6.	Sponsor & Integration Issues	5 minutes
7.	Financial Summary	5 minutes

Actions from meeting of 10 April 2018



No.	Meeting date	Issue	Owner	Target date	Status
17.035	9/3/18	Specific concerns with NR activities which overall present a strategic risk to Elizabeth line operations to be raised with NR Chairman	Howard Smith	4/6/18	Chairman visit booked
17.037	10/4/18	Alternate meetings to be held at Canary wharf	Andy Brown & Martin Stuckey	4/5/18	Jul, Sep & Nov meetings at CW
17.038	10/4/18	Customer proposition for on-train wifi (non-PCN solution) to be confirmed and issued to the Commissioner	Shashi Verma	4/5/18	Complete
17.039	10/4/18	Seek to get NR to reinstate the 19/20 May possession on GW route	Simon Wright	4/5/18	Closed
17.040	10/4/18	Papers to include specific dates in relation to each station completion/Handover	Martin Stuckey	4/5/18	Complete

Safety

Construction

In Period 1, the HSPI increased to 2.63, the highest ever (P13 = 2.59) and remains significantly above the 2.20 target. 11 of 11 key contracts achieved an HSPI score of 2.20 and C405 Paddington achieved 2.94 the highest ever score. The RIDDOR rate remained at 0.09 (P13 = 0.09) and the lost time case AFR remained at 0.17 (P13 = 0.17).



ELIZABETH LINE

RIDDOR 7+ Days

23 April - [REDACTED]

Lost Time Case

03 April - [REDACTED]

High Potential Near Misses

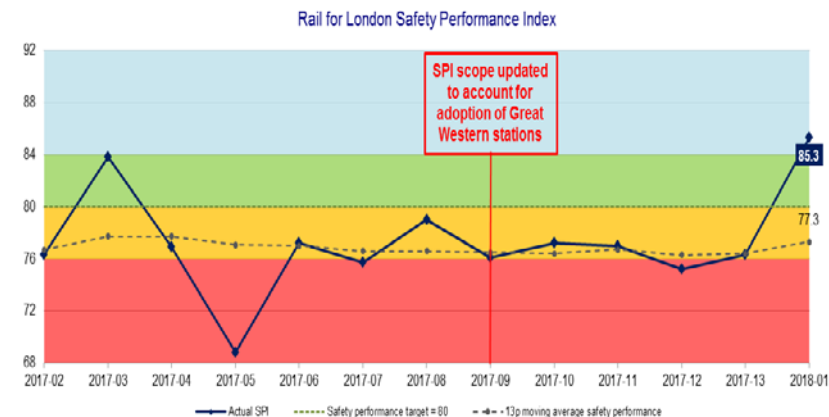
19 April - [REDACTED]

Operations

Tfl Rail: MTR SVP approved commencement of Stage 2 operations.

Period 1 SPI = 85.3, the highest ever follows initiatives by MTR Safety & Customer Services team. This period there were fourteen passenger accidents (two major, seven minor and five no-injury). There was one MTR workforce lost time minor injury due to a failure to follow training and process – a personal improvement plan has been put in place. Following delivery of personal safety training and targeted MTR and BTP patrols of high risk areas the number of workforce assaults has dropped from twelve in P13 to six. There were three operational incidents: the route is being checked after a TPWS intervention at Maryland due to an overspeed; and the process for train driver and station staff checking and confirming that a train has been cleared is under review following two incidents where passengers were over carried.

Crossrail Operations team: No injuries or incidents.



Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018 - Achieved

Phase 2 – End Feb 2019 (tbc)



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast [Draft P02]	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 2 Phase 1 - Paddington to Heathrow					
2.1 5 No.RLUs Available for Passenger Service (Non ETCS)	23-Apr-18	26-Apr-18	-3		↓
2.2 Opening of Stage 2 - Heathrow to Paddington High Level @T/T Change 20 May 18	20-May-18	20-May-18	0		↔
Stage 2 Phase 2 - Paddington to Heathrow					
2.3 ETCS Ready for Formal Heathrow Testing	24-Aug-18	24-Aug-18	0		↔
2.4 [REDACTED]	24-Aug-18	12-Oct-18	-49		↔
2.5 ORR Authorisation for On-board Signalling	28-Sep-18	19-Nov-18	-52		↔
2.6 Commence Stage 2 Phase 2 with ETCS functionality.	28-Oct-18	TBC		<i>(Dependent on Unit Availability for Driver Training)</i>	

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU					
Infrastructure & Trains	Red	[REDACTED]	[REDACTED]	Howard Smith	
MTR, NR & RfL Readiness	Yellow	[REDACTED]	[REDACTED]	Howard Smith	

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast [Draft P02]	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 3 - Paddington to Abbey Wood					
Dynamic Testing					
3.1 WBP ATFS Energised	31-Mar-18	17-May-18	-47	Yellow	↔
3.2 PSD Ready for Dynamic Testing in Zone 1	09-Apr-18	28-May-18	-49	Yellow	↔
3.4 Provide all Trains to Systemwide for Dynamic Testing (3rd & 4th FLUs)	07-Jun-18	07-Jun-18	0	Green	↔
3.5 Linewise SCADA available in Zones 3 & 4	30-May-18	31-May-18	-1	Green	↔
3.6 Signalling infrastructure ready for DT in Zones 3 & 4	07-Jun-18	19-Jul-18	-42	Red	↓
3.7 GSM-R infrastructure ready for DT in Zones 1 to 4	30-Jul-18	29-Jun-18	31	Yellow	↔
3.8 Permanently energise OHLE Zones 3 & 4	10-Jun-18	10-Jun-18	0	Green	↔
3.9 Start Dynamic Testing (Zones 3 & 4)	11-Jun-18	11-Jun-18	0	Green	↔
3.10 Start Dynamic Testing (Zones 1,2,3 & 4)	30-Jun-18	19-Jul-18	-19	Red	↓
Trial Running					
3.11 All 11 kV S,S&P locations energized	15-Apr-18	06-Jun-18	-52	Yellow	↓
3.13 Commence Transition Testing @ GEML	30-Jun-18	11-Aug-18	-42	Yellow	↓
3.14 All 22 kV S,S&P locations energized	30-Jun-18	18-Aug-18	-49	Red	↓
3.15 ORR Issue Amended Safety Cert. & Authorisation to MTR-C	04-Jul-18	04-Jul-18	0	Green	↔
3.17 Commence Transition Testing @ GWML	14-Jul-18	09-Sep-18	-57	Red	↓
3.18 Delivery Yellow Plant (RPM, ET01, ET02)	27-Jul-18	04-Aug-18	-8	Green	↔
3.22 CBTC Authorised for FLU for Trial Running	26-Jun-18	02-Jul-18	-6	Green	↓
3.23 Commencement of Trial Running under CRRB (Construction Rule Book)	05-Aug-18	11-Sep-18	-37	Red	↓
3.24 22no. CI.345 FLUs Available for Trial Running	13-Aug-18	10-Aug-18	3	Green	↓

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast [Draft P02]	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 3 - Paddington to Abbey Wood					
Trial Operations					
3.12 ORR Issue Safety Authorisation to RfLI	07-Jun-18	23-May-18	0	Green	↔
3.16 Training completed for RFL in support of Handover of Routeway	05-Jul-18	03-Aug-18	-29	Yellow	↔
3.19 Sufficient RFLI Ops & Maint. Staff Trained and Competent as IM	03-Aug-18	10-Sep-18	-38	Yellow	↓
3.25 All Stations 'Staged Completion' - for RFLI/LU/MTR Familiarisation and Trial Ops.	Refer to detailed Station Table (below)				
3.26 Final COS safety case updated and submitted to RABC	31-Aug-18	31-Aug-18	0	Green	↔
3.21 Handover of Routeway to RFLI	05-Aug-18	01-Oct-18	-57	Red	↓
3.27 Commence Combined Elizabeth Line Trials (Trial Operations)	09-Sep-18	01-Oct-18	-22	Red	↓
Passenger Service					
3.28 Submit Technical File to ORR	17-Sep-18	17-Sep-18	0	Green	↔
3.29 CBTC Authorised for Passenger Service	10-Oct-18	02-Aug-18	69	Green	↔
3.30 PML ATS Re-energised including NR feed	15-Oct-18	15-Oct-18	0	Green	↔
3.31 Temporary services recovery complete	09-Nov-18	30-Nov-18	-21	Red	↔
3.32 Opening of Stage 3 - Central Section Paddington L/L to Abbey Wood	09-Dec-18	09-Dec-18	0	Green	↔
Substantial Completion of Stage 3					
3.33 Plumstead Maintenance Facility Completion (Initial IM access)	21-Nov-18	21-Nov-18	0	Green	↔
3.34 Final Handover of all Stations, Shafts and Portals	28-Nov-18	28-Nov-18	0	Green	↔
3.35 Plumstead Stabling Sidings Completion	29-Mar-19	29-Mar-19	0	Green	↔

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



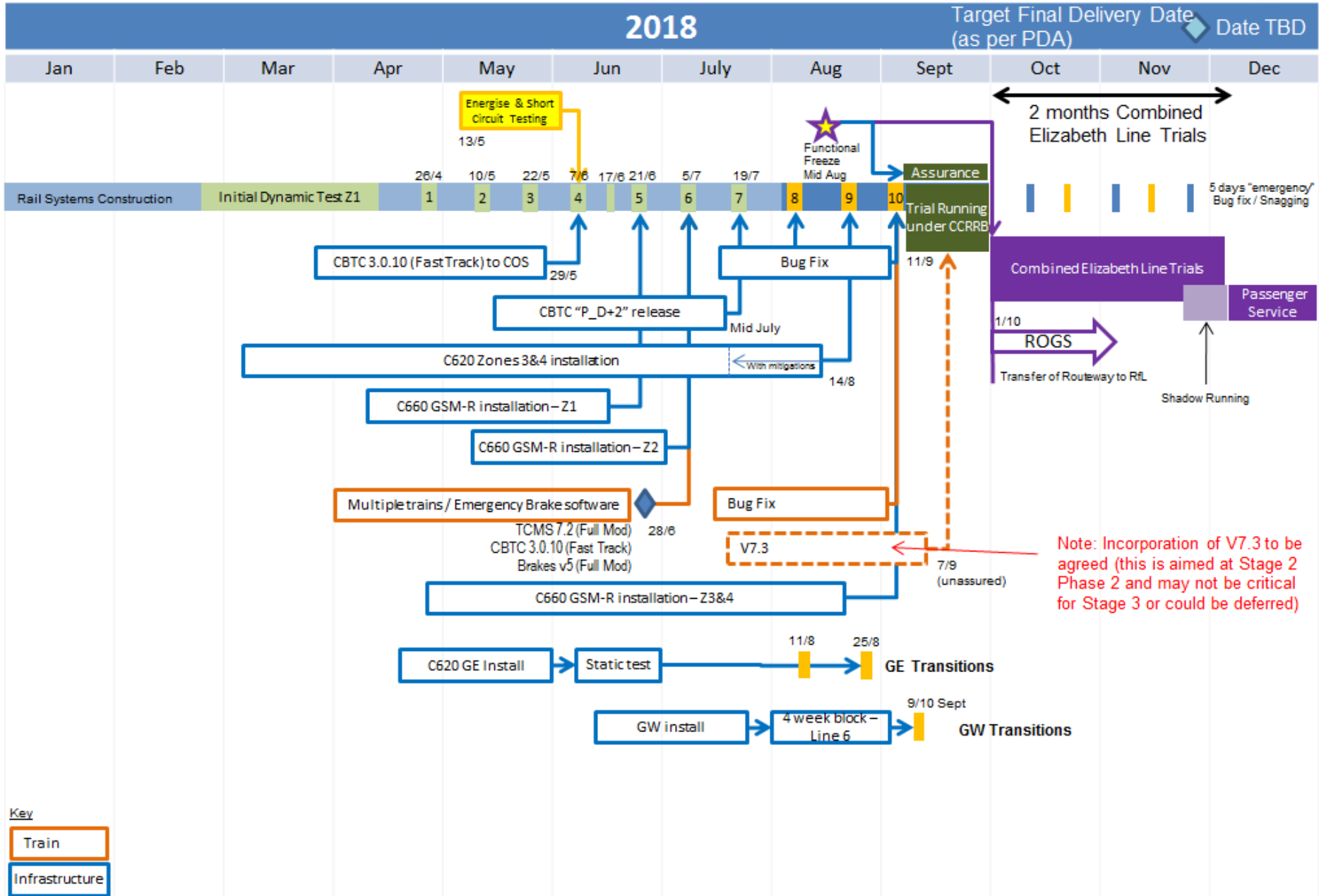
ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast [Draft P02]	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
LU Stations 'Staged Completion' - for LU Familiarisation and Trial Ops.					
3.251 Whitechapel Station	16-Aug-18*	16-Aug-18	0		↔
3.252 Bond Street Station	31-Oct-18*	31-Oct-18	0		↔
3.253 Liverpool Street Station	02-Sep-18*	02-Sep-18	0		↔
3.254 Tottenham Court Road Station	10-Aug-18	10-Aug-18	0		↔
3.255 Farringdon Station	17-Aug-18	17-Aug-18	0		↔
RFLI Stations 'Staged Completion' - for RFLI/MTR Familiarisation and Trial Ops.					
3.256 Paddington Station	29-Jul-18*	29-Jul-18*	0		↔
3.257 Custom House Station	28-Jul-18**	28-Jul-18**	0		↔
3.258 Woolwich Station	09-Sep-18*	09-Sep-18*	0		↔
3.259 Canary Wharf Station	05-Jul-18*	29-Aug-18	-55		↓

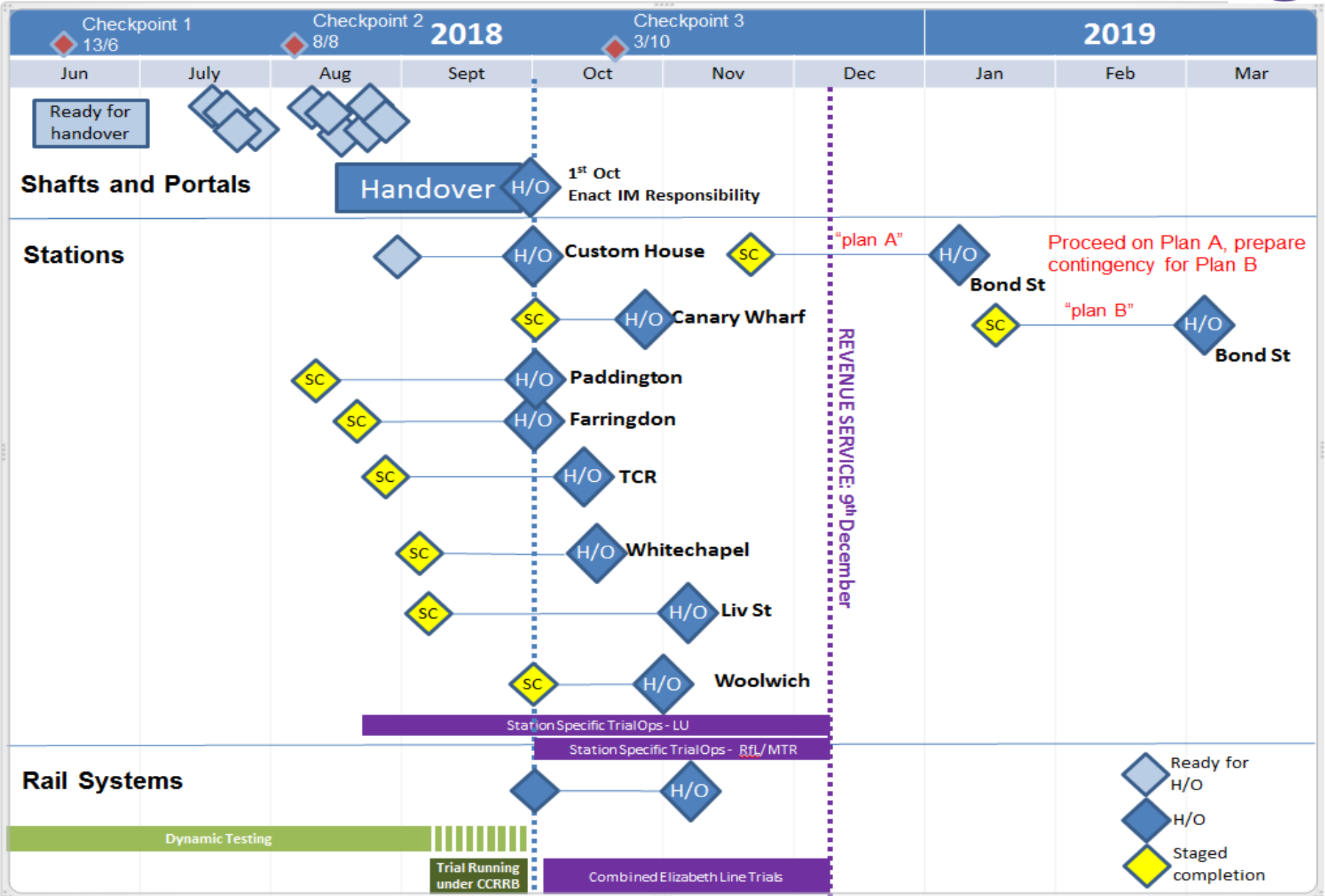
Date with * = 'TBA' in MOHS (Dates shown from 1st Draft Handover Execution Plans)

Date with ** = Final Handover date only

9 Stage 3 - Proposal – defer handover to RfL by 2 months (to Oct 1st)



10 Stage 3 – Stations / Handover Dates



11 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing	Yellow	Programme 92.6% complete against plan 93.9%	MOHS 2018 being updated with trial running now due to commence mid-Sep 18 followed by Handover and commencement of trial operations 01 Oct 18.	Simon Wright	
	Red	Timely completion of infrastructure & communication systems	Prioritise systemwide activities including traction & non traction power and communication software	Simon Wright	
	Red	Timely completion of testing & commissioning activities (stations & systemwide).	Testing being done in windows. Senior management focus on this activity, now being monitored weekly and in some aspects, daily	Simon Wright	
	Red	Timely provision of design assurance information, asset data, key operations/ maintenance information	Maintain focus on design assurance close out rate and drive Tier 1 contractors to provide information in good time	Simon Wright	
	Yellow	[REDACTED]	[REDACTED]	Howard Smith	
	Red	Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Confirm and maintain blockades Aug/Sep 18. Confirm the programme for installation of wayside equipment, on board software and testing at PML	Simon Wright	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness	Yellow	Risk that there is insufficient time to procure spares and maintenance services and plan maintenance activity. Asset Information (Drops 1-3) forecast complete end May 18.	Revised, prioritised programme for asset information transfer established. CRL continues to work with contractors on resourcing and prioritisation of key information	Howard Smith & Simon Wright	
	Yellow	RFLI readiness – risk maintenance & operations staff not being fully trained. Provision of training materials, simulators and delivery of training courses remains behind plan.	TUCA available. CRL supporting contractors with information sharing. Train the trainer replaced by end user training and provision of contractor support post handover including care & custody for non-routeway assets may be necessary	Simon Wright & Howard Smith	
	Red	Risk of insufficient time to undertake trial operations activity.	Complete infrastructure and testing as early as possible to allow unimpeded trial operations. Clear definition of minimum requirements. Modelling systems reliability	Simon Wright & Howard Smith	
	Yellow	Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training	Station Handover Execution Plans received	Howard Smith	
	Red	Staged Handover requirements are not agreed	Complete Handover Execution Plans by end of May. Ensure Trace assets are prioritised.	Simon Wright & Howard Smith	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	Interim on-train wifi solution proposed. Appointment of MNO forecast delayed to Jul 18	Shashi Verma	
	Green	Marketing launch and customer information activities	Launch plan to be prepared and managed by EL Comms Board	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast [Draft P02]	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 4 - Paddington to Abbey Wood & Shenfield					
4.1 Required no. units available for Stage 4 (55 FLU & 5 RLU)	17-May-19	08-May-19	9		↑
4.2 Opening of Stage 4 - Paddington L/L to Abbey Wood and Shenfield	19-May-19	19-May-19	0		↔
Stage 5 - Full Crossrail Service					
5.1 70 Trains Delivered for Stage 5. (Including RLU to FLU Reconfiguration)	13-Dec-19	16-Oct-19	58		↔
5.2 Opening of Stage 5 - Reading & Heathrow to Abbey Wood and Shenfield	15-Dec-19	15-Dec-19	0		↔

Stage 4

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Ilford Depot wire heights to be completed to support Stage 4&5 timetable (& Stage 3 stabling)	Wire height works funding agreed. Confirmation of physical works, agreement with AGA and programme required (target completion Oct 18).	Simon Wright	
	Yellow	Timely completion of Stage 4 power upgrade works (KD22).	Close management of NR to bring current forecast of May 19 back in line with CRL requirement of Mar 19.	Simon Wright	
	Yellow	DOO CCTV installed and operational at Stratford and Shenfield	Proposed operational concept at Shenfield requires additional cameras. Publication and review of NR survey report required to enable progress at Stratford.	Simon Wright	
MTR, NR & RfL Readiness	Green				
Customer	Green				

16 Stage 5

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Completion and approvals for ETCS (Stages B&C) and transition to CBTC	Commencement of Charleroi lab testing. Confirmation of virtual balise cover solution. NR progress with ORR extension to exemption. Confirmation of transition testing requirements and programme with NR.	Simon Wright	
	Yellow	Stage 5 power upgrade works (KD30). ATS sites at Slough & West Ealing still to be brought online	Conversion to AT power for Sep 18 at risk due to additional access requirement. Modelling being reviewed, if works are required, these are expected to be programmed Dec 18.	Simon Wright	
	Yellow	Timely completion of Liverpool St M/L platform (16/17) extensions	Selection of full platform extension option. Tender pricing expected June, followed by selection of delivery contractor Aug 18.	Howard Smith	
MTR, NR & RfL Readiness	Green				
Customer	Yellow	Uncertainty over NR construction programme for station upgrades	NR schedule for six enhanced western stations shows completion from Sep 19 to Dec 19. Contract awards expected 14 Jun & 20 Jul 18. Enhanced Ilford & Romford Dec 19.	Simon Wright	

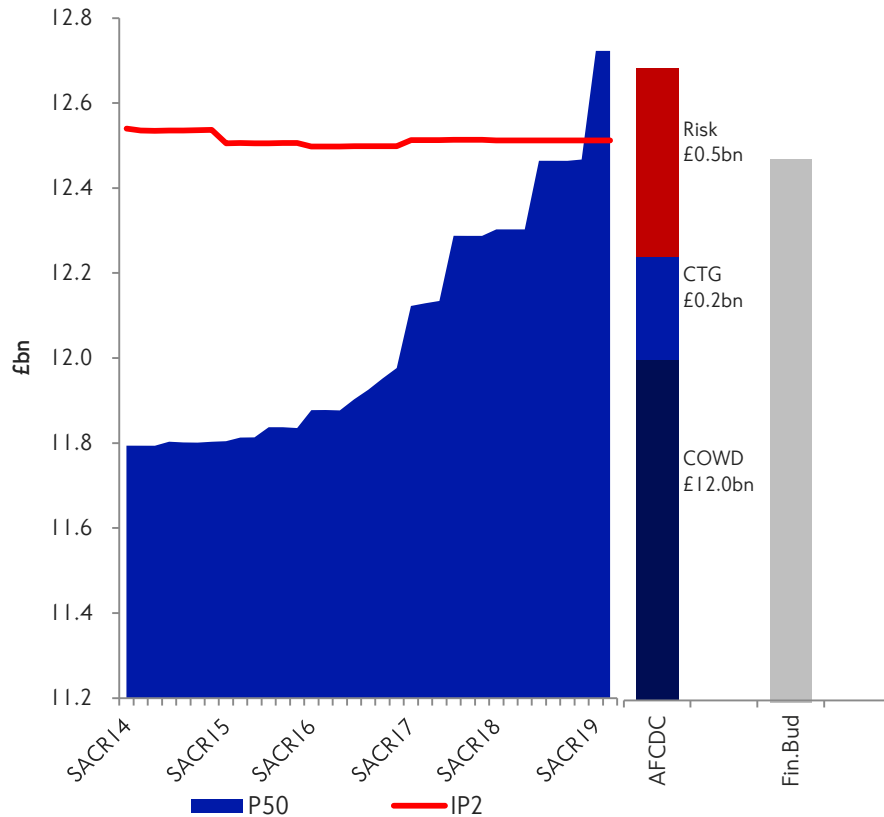
17 Integration and Sponsor Issues



No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	2xTfL Board members now appointed onto CRL Board commencing 1 July. 1xDfT nominee to be appointed onto CRL Board commencing 1 July.	Simon Wright & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Extended multiple roles to support completion of Stage 3. Key roles in close out organisation to be filled via internal appointments to retain knowledge	Simon Wright



Crossrail



- The AFDC remained at £12,723m in the Period, £211m in excess of TfL contingency.
- In the Period, Crossrail spent £46.3m above the 2018/19 Business Plan. The Business Plan for Direct Costs was set in Period 6 2017/18, and since then there has been a significant increase to the AFDC (£0.4bn) and delays to MOHS dates for the key contracts. Therefore variances to Business Plan are to be expected.
- The overspend is predominantly due to lower than expected productivity, additional scope, prolongation, access delays and cost increases for construction and logistics as a result of delays to energisation and dynamic testing.

Current actions:

- Review of remaining scope to be delivered by CRL and consideration of cost scenarios.
- Finalisation of the 2017/18 Financial Statements.
- Bookend scenarios now finalised and discussed with Sponsors.

On Network Works

- The Forecast Final Outturn Cost (FFOC) remains at £2,376 (net of funding contributions).
- The ONW are 95% complete.

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Elizabeth Line Readiness Board

29TH JUNE 2018



² Agenda



ELIZABETH LINE

Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Wright

David Hughes/Simon Adams

Lucy Findlay

Martin Stuckey (secretariat)

Vernon Everitt / Chris MacLeod

Simon Kilonback

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	Stage 2 Readiness	5 minutes
4.	Stage 3 Readiness	25 minutes
5.	Stages 4 & 5 Readiness	5 minutes
6.	Sponsor & Integration Issues & Financial Summary	5 minutes
7.	Communications Update	10 minutes

Elizabeth Line Readiness Board

Actions from meeting of 4 June 2018



No.	Meeting date	Issue	Owner	Target date	Status
17.041	4/6/18	Next meeting to update / review communications activities / plan	Vernon Everitt	29/6/18	Update to be provided to 29 June meeting
17.042	4/6/18	Check contingency arrangements for provision of drivers for operation of 3 separate rail services (Stage 3)	Howard Smith	29/6/18	Verbal update to be provided

4 Safety



Construction

In Period 2, the HSPI increased to 2.64, the highest ever (PI = 2.63) and remains significantly above the 2.20 target. 11 of 11 key contracts achieved an HSPI score of 2.20 or above. The RIDDOR rate remained at 0.09 (PI = 0.09) and the lost time case AFR fell to 0.16 (PI3 = 0.17).

RIDDOR 7+ Days

22 May – [Redacted]

High Potential Near Misses

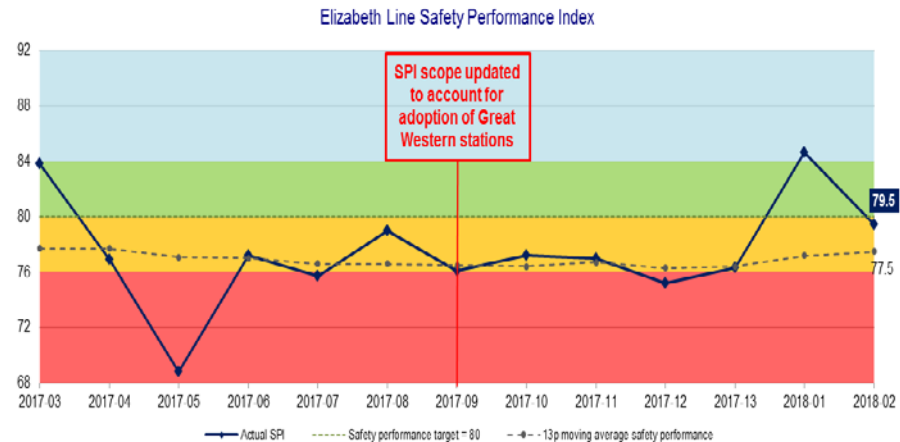
22 May – [Redacted]

02 May – [Redacted]

Operations

TfL Rail: Period 2 SPI = 79.5 (PI = 84.7 adjusted), and is at the threshold of the 'above target performance' zone due to maintaining a low levels of passenger injuries, assaults on MTR staff and operational incidents. There were twelve passenger accidents, eleven minor injury and one major injury accident when a passenger sustained a fractured elbow after falling from the lowest step on stairs at Stratford station. The passenger was under the influence of alcohol and prescription drugs and lost their balance. There were no MTR workforce minor injuries. Only three workforce assaults were reported, two verbal and one physical, which appears to be the result of MTR's additional personal safety training, the use of body cameras and a heightened presence on GW from BTP. There were three operational incidents: one wrong side door incident at Heathrow, one dispatch irregularity at Gidea Park and one passenger over carry into Gidea Park sidings.

Crossrail Operations team: No injuries or incidents.



Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018 - Achieved

Phase 2 – 24 Feb 2019 (target)



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones		MOHS 2018 Baseline Date	Actual / Forecast (P03)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 2 Phase 2 - Paddington to Heathrow						
2.3	ETCS Ready for Formal Heathrow Testing	24-Aug-18	24-Aug-18	0		↔
2.4	[REDACTED]	12-Oct-18	12-Oct-18	0		↔
2.5	ORR Authorisation for On-board Signalling	19-Nov-18*	19-Nov-18	0		↔
2.6	Commence Stage 2 Phase 2 with ETCS functionality	28-Oct-18	24-Feb-19	<i>(Dependent on Unit Availability for Driver Training)</i>		

* MOHS 2018 Baseline Dates revised. Change Paper signed to adopt baseline Contract Dates in accordance with BT Deed of Amendment.

RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU				
	[REDACTED]	[REDACTED]	Howard Smith	
	Timely completion of driver training and Ops proving	Development of MTR schedule for Phase 2 ongoing.	Howard Smith	

6 Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P03)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 3 - Paddington to Abbey Wood					
Dynamic Testing					
3.2 PSD Ready for Dynamic Testing in Zone 1	09-Apr-18	07-Jun-18	-59	Yellow	↓
3.4 Provide all Trains to Systemwide for Dynamic Testing (3rd & 4th FLUs)	07-Jun-18	07-Jun-18	0	Green	↔
3.5 Linewise SCADA available in Zones 3 & 4	30-May-18	30-May-18	0	Green	↔
3.6 Signalling infrastructure ready for DT in Zones 3 & 4	07-Jun-18	19-Jul-18	-42	Red	↔
3.7 GSM-R infrastructure ready for DT in Zones 1 to 4	30-Jul-18	09-Sep-18	-41	Red	↓
3.8 Permanently energise OHLE Zones 3 & 4	10-Jun-18	11-Jun-18	-1	Green	↓
3.9 Start Dynamic Testing (Zones 3 & 4)	11-Jun-18	11-Jun-18	0	Green	↔
3.10 Start Dynamic Testing (Zones 1,2,3 & 4)	30-Jun-18	17-Aug-18	-48	Red	↓
Pre-trial Running					
3.11 All 11 kV S,S&P locations energized	15-Apr-18	21-Jun-18	-67	Yellow	↓
3.13 Commence Transition Testing @ GEML	30-Jun-18	12-Aug-18	-43	Yellow	↔
3.14 All 22 kV S,S&P locations energized	30-Jun-18	29-Jul-18	-29	Red	↔
3.15 ORR Issue Amended Safety Cert. & Authorisation to MTR-C	04-Jul-18	04-Jul-18	0	Green	↔
3.17 Commence Transition Testing @ GWML	14-Jul-18	10-Sep-18	-58	Red	↔
3.18 Delivery Yellow Plant (RPM, ET01, ET02)	27-Jul-18	15-Sep-18	-50	Green	↓
3.22 Train CBTC Authorised for FLU for Trial Running	26-Jun-18	02-Jul-18	-6	Green	↔
3.23 Commencement of 'Pre-trial running' under CCRRB (Construction Rule Book)	05-Aug-18	12-Sep-18	-38	Red	↔
3.24 22no. Cl.345 FLUs Available for Trial Running	13-Aug-18	13-Aug-18	0	Green	↔

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P03)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Combined Elizabeth line Trials					
3.16 Training completed for RFL in support of Handover of Routeway	05-Jul-18	14-Sep-18	-71		↔
3.19 Sufficient RFLI Ops & Maint. Staff Trained and Competent as IM	03-Aug-18	10-Sep-18	-38		↔
3.25 All Stations 'Staged Completion' - for RFLI/LU/MTR Familiarisation and Trial Ops.	Refer to detailed Station Table (below)				
3.26 Final COS safety case updated and submitted to RABC	31-Aug-18	31-Aug-18	0		↔
3.21 Handover of Routeway under ROGS to RFLI as IM	05-Aug-18	01-Oct-18	-57		↔
3.27 Commence Combined Elizabeth Line Trials	09-Sep-18	01-Oct-18	-22		↔
Passenger Service					
3.28 Submit Technical File to ORR	17-Sep-18	17-Sep-18	0		↔
3.29 Train CBTC Authorised for Passenger Service	10-Oct-18	03-Aug-18	68		↔
3.30 PML ATS Re-energised including NR feed	15-Oct-18	09-Oct-18	6		↔
3.31 Temporary services recovery complete	09-Nov-18	30-Sep-18	40		↔
3.32 Opening of Stage 3 - Central Section Paddington L/L to Abbey Wood	09-Dec-18	09-Dec-18	0		↔
Substantial Completion of Stage 3					
3.33 Plumstead Maintenance Facility Completion (Initial IM access)	21-Nov-18	21-Nov-18	0		↔
3.34 Final Handover of all Stations, Shafts and Portals	28-Nov-18	28-Nov-18	0		↔
3.35 Plumstead Stabling Sidings Completion	29-Mar-19	29-Mar-19	0		↔

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P03)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period	Handover to IM
LU Stations 'Staged Completion' - for LU Familiarisation and Trial Ops						
3.251 Whitechapel Station	16-Aug-18*	16-Aug-18	0		↔	08-Oct-18
3.252 Bond Street Station	31-Oct-18*	31-Oct-18	0		↔	28-Nov-18
3.253 Liverpool Street Station	02-Sep-18*	02-Sep-18	0		↔	24-Oct-18
3.254 Tottenham Court Road Station	10-Aug-18	14-Sep-18	-35		↓	12-Oct-18
3.255 Farringdon Station	17-Aug-18	17-Aug-18	0		↔	28-Oct-18
RFLI Stations 'Staged Completion' - for RFLI/MTR Familiarisation and Trial Ops						
3.256 Paddington Station	29-Jul-18*	08-Sep-18	-41		↓	15-Oct-18
3.257 Custom House Station	N/A	N/A	0		↔	27-Jul-18 'Ready for H/O', Care & Custody until 01-Oct-18
3.258 Woolwich Station	09-Sep-18*	09-Sep-18*	0		↔	31-Oct-18
3.259 Canary Wharf Station	05-Jul-18*	31-Aug-18	-57		↓	01-Oct-18

Date with * = 'TBA' in MOHS (Dates shown from 1st Draft Handover Execution Plans)

N.B. Handover Execution Plans are to be agreed with IMs by the end of this month (June 18).

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing	Yellow	Programme 93.4% complete against plan 94.7%	MOHS 2018 updated with <i>Pre-Trial Running</i> mid-Sep 18 followed by Handover and commencement of Combined EL Trials 01 Oct 18.	Simon Wright	
	Red	Timely completion of infrastructure & communication systems	Prioritise systemwide activities including traction & non traction power and communication software. Energised and commenced Dynamic Testing in Z3&4.	Simon Wright	
	Red	Timely completion of testing & commissioning activities (stations & systemwide)	Increased number of testing windows. T&C programme recovery plans. Senior management focus with weekly and in some aspects daily monitoring in place.	Simon Wright	
	Red	Timely provision of design assurance information, asset data, key operations/ maintenance information	Maintain focus on design assurance close out rate and build on improvements in provision of asset data.	Simon Wright	
	Yellow	[REDACTED]	TCMS R7.2.1.3 testing at Melton and load to COS test train. Functionality defects mitigated for COS testing but R7.2.2 planned for revenue service.	Howard Smith	
	Red	Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Confirm and maintain blockades Aug/Sep 18. Confirm the programme for installation of wayside equipment, on board software and testing at PML.	Simon Wright	Yes

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness		Risk that there is insufficient time to procure spares and maintenance services and plan maintenance activity due to delayed provision of asset data and O&M manuals	Improvement in provision of asset data while CRL continues to work with contractors on resourcing and prioritisation of key information.	Howard Smith & Simon Wright	
		RFLI readiness – risk maintenance & operations staff not being fully trained. Provision of training materials, simulators and delivery of training courses remains behind plan	TUCA available. CRL supporting contractors with information sharing. Train the trainer replaced by end user training and provision of contractor support post handover including care & custody for non-routeway assets.	Simon Wright & Howard Smith	
		Risk of insufficient time to undertake trials activity	Secure ROGS exemption to run increased number of units under CCRB during pre-trial running. Handover of trace assets on 1 Oct 18 is essential.	Simon Wright & Howard Smith	
		Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training	Agree Station Handover Execution Plans.	Howard Smith	
		Staged Handover requirements are not agreed	Handover Execution Plans including for Railway Systems to be agreed by end of June. Improved quality of plans received to date have increased confidence this will be achieved.	Simon Wright & Howard Smith	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Red	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	Single non compliant tender return from MNOs. Commercial & technical options under review.	Shashi Verma	
	Green	Marketing launch and customer information activities	Launch plan to be prepared and managed by EL Comms Board.	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P03)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 4 - Paddington to Abbey Wood & Shenfield					
4.1 Required no. units available for Stage 4 (55 FLU & 5 RLU)	17-May-19	08-May-19	9		↔
4.2 Opening of Stage 4 - Paddington L/L to Abbey Wood and Shenfield	19-May-19	19-May-19	0		↔
Stage 5 - Full Crossrail Service					
5.1 70 Trains Delivered for Stage 5. (Including RLU to FLU Reconfiguration)	13-Dec-19	16-Oct-19	58		↔
5.2 Opening of Stage 5 - Reading & Heathrow to Abbey Wood and Shenfield	15-Dec-19	15-Dec-19	0		↔

Stage 4

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Timely completion of Stage 4 power upgrade works (KD22)	Close management of NR to bring current forecast of May 19 back in line with CRL requirement of Mar 19.	Simon Wright	
	Yellow	DOO CCTV installed and operational at Stratford and Shenfield	Confirm solution & programme to remedy canopy and signage clashes at Stratford. NR retender of works to implement agreed solution at Shenfield.	Simon Wright	
	Yellow	Ilford Depot wire heights to be completed to support Stage 4&5 timetable (& Stage 3 stabling)	Wire height works funding agreed. Confirmation of physical works, agreement with AGA and programme required (target completion Oct 18).	Simon Wright	
MTR, NR & RfL Readiness	Green				
Customer	Green				

Stage 5

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Completion and approvals for ETCS (Stages B&C) and transition to CBTC	Commencement of Charleroi lab testing. Confirmation of virtual balise cover solution. NR progress new exemption with ORR. Confirmation of transition testing requirements and programme with NR.	Simon Wright	
	Yellow	Stage 5 power upgrade works (KD30). ATS sites at Slough & West Ealing still to be brought online	Conversion to AT power for Sep 18 at risk due to additional access requirement. Modelling being reviewed, if works are required, these are expected to be programmed Dec 18.	Simon Wright	
	Yellow	Timely completion of Liverpool St M/L platform (16/17) extensions	Selection of full platform extension option. Tender pricing expected June, followed by selection of delivery contractor Aug 18.	Howard Smith	
MTR, NR & RfL Readiness	Green				
Customer	Red	Non compliant tender returns and & track access concerns to deliver western inner station upgrades	Enabling works continuing. NR procurement of essential long lead items. Request to DfT to intervene in access dispute with GWR.	Simon Wright	Yes

15 Integration and Sponsor Issues



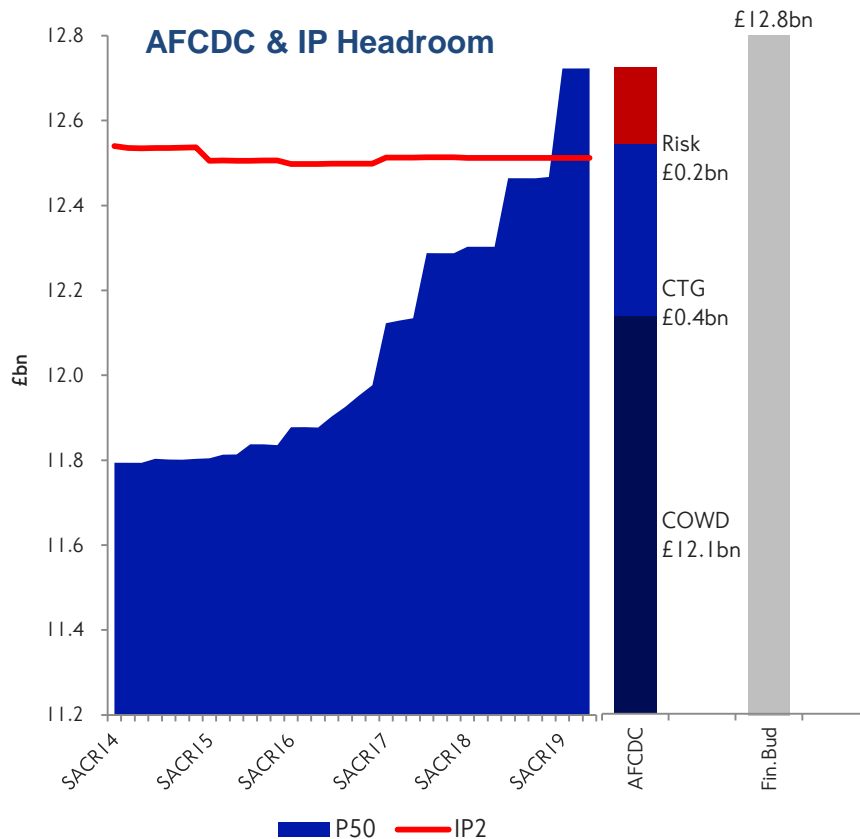
No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	2xTfL Board members now appointed onto CRL Board commencing 1 July. 1xDfT nominee now appointed onto CRL Board commencing 1 July.	Simon Wright & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Extended multiple roles to support completion of Stage 3. Key roles in close out organisation to be filled via internal appointments to retain knowledge.	Simon Wright

P2 Financial Summary

Crossrail

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ELIZABETH LINE



- The AFCDC increased by £0.2m in the Period to £12,723m, and £277m of risk was used to fund Delivery, Indirect and Property cost increases.
- In the Period, Crossrail spent £52.2m above the 2018/19 Business Plan. The Business Plan for Direct Costs was set in Period 6 2017/18, and since then there has been a significant increase to the AFCDC (£0.4bn) and delays to MOHS dates for the key contracts. Therefore variances to Business Plan are to be expected.
- The overspend is predominantly due to complexity of interfaces, lower than expected productivity, additional scope, prolongation, access delays and cost increases for construction and logistics as a result of delays to energisation and dynamic testing.

Current actions:

- Review of remaining scope to be delivered by CRL and consideration of cost scenarios.
- Preparation for detailed cost and risk review meetings for the major projects.

On Network Works

- The Forecast Final Outturn Cost (FFOC) remains at £2,376m (net of funding contributions).
- The ONW are 95% complete.



ELIZABETH LINE:

Customer Marketing & Information update

25 June 2018

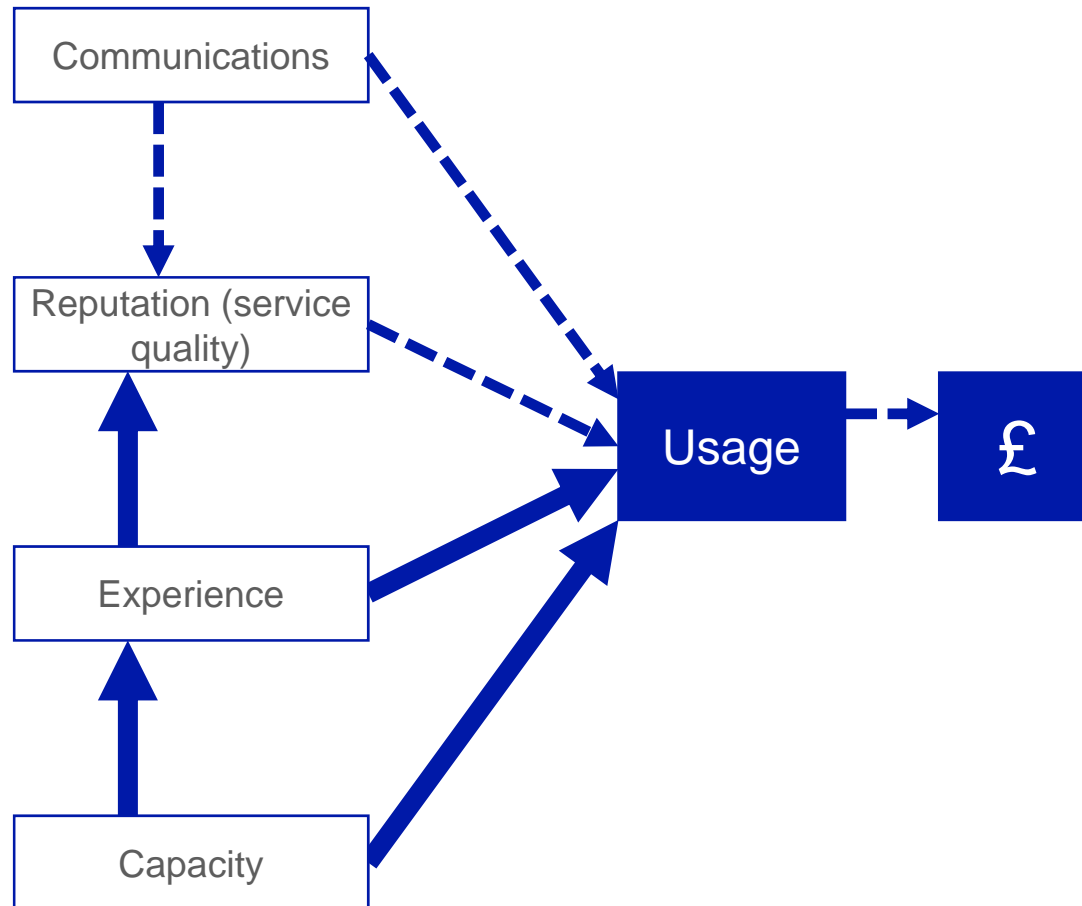


EVERY JOURNEY MATTERS

Summary/Status - topline

- Nearly 60% of Londoners already aware of line and a quarter of these quite or very familiar with where it will go
- Detailed MarComms plans in place for all phases
- Includes 'day of launch' planning
- Activity ramps up according to service/revenue potential
- Key dependency is operational dates
- Flexibility in plans to update/amend as we go
- Customer information all planned and being implemented (Some scoping budget and timing issues but being managed)
- Comprehensive metrics in place to monitor progress and outcomes

Marketing objectives for the Elizabeth line



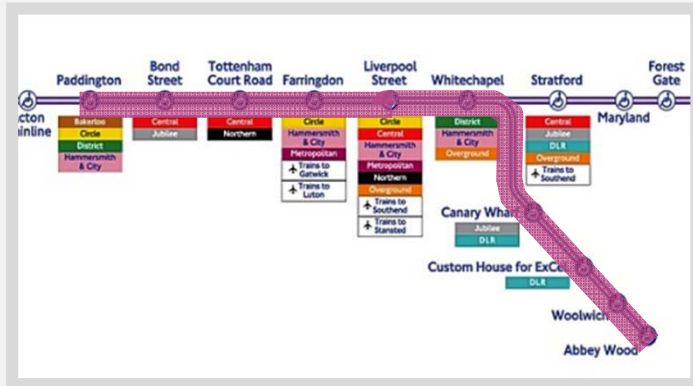
There are 2 overall objectives for the Elizabeth line which are not mutually exclusive but are interconnected and interdependent:

1. Transform reputation
2. Generate revenue

Given that the driving of one objective depends on the other, the focus needs to shift throughout the stages.

5 Stage 3 Overview – Dec 2018

Stage Details



Target Audience

- Non-TfL rail commuters and leisure users travelling to/from:
 - South East London ↔ Central London ↔ West London
- Tube commuters travelling on:
 - Jubilee Line – Central to Canary Wharf
 - Central line – Liverpool Street to Paddington

Success Measures

- Maintaining existing market share
- Reputation
- Education

Media coverage

- Heavy-weight coverage
- Coverage 79.8% / frequency 6.5*
- Media activity planned to start early Nov 2018

* Coverage = total line areas for London and Reading corridor

Funding & Timings












- Fully funded with total integrated spend - £842,500 (Stage 2 - £180,000)
- Media booking deadline 31 August - with total media value at risk £552,500
- An additional £500,000 would be required in order to:
 1. Bring forward planned activity
 2. Introduce additional high impact sites at this stage (which are not required based on current objectives)



ELIZABETH LINE

EVERY JOURNEY MATTERS

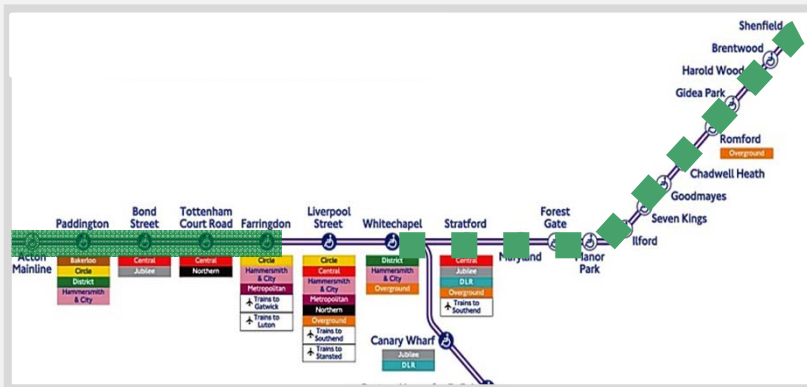
6 Media Channels - Stage 3

Channel	Examples
RADIO 	
OOH 	
PRESS 	
DIGITAL 	
PARTNERSHIP 	
DOOR DROP 	
FACE TO FACE 	
CIRCUITS & CONTRA 	
CRM 	

On system digital OOH using traditional formats and radio are lead channels

7 Stage 4 Overview – May 2019

Stage Details



Target Audience

- Non-TfL rail commuters and leisure users travelling to/from East London ⇌ Central London
- Tube commuters travelling on Central line: Liverpool Street ⇌ Paddington and Jubilee line – Paddington ⇌ Canary Wharf
- Commuters, solo/couple tourists and leisure users travelling to/from Heathrow

Success Measures

- Campaign recognition
- Reputation
- Education
- Congestion relief for EL stations and on other nearby TfL lines

Media coverage

- Medium-weight coverage
- Coverage 68.3% / frequency 7.9*
- Media activity planned for early May 2019








* Coverage = total line areas for London and Reading corridor

Funding & Timings

- Expected to be fully funded within the 19/20 CCT baseline
- Total integrated spend - £310,000
- Potential risks if savings are required across CCT



8 Media Channels - Stage 4

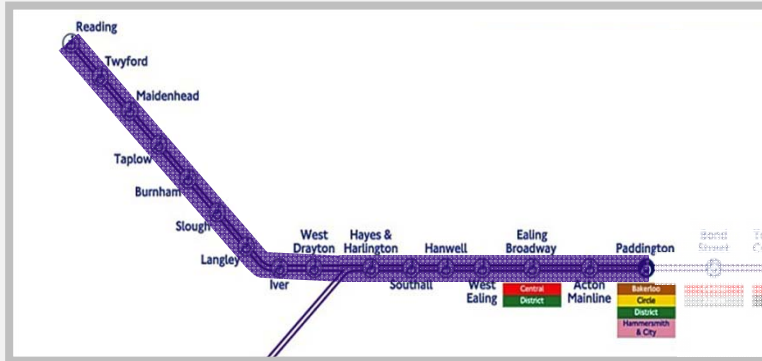
Channel	Examples
OOH 	 <p data-bbox="1503 608 1832 699">Meridian Steps Westfield, Stratford</p>
PRESS 	
DIGITAL 	<p data-bbox="748 930 1032 1074">High impact, off system OOH introduced</p>  <p data-bbox="913 1177 1211 1241">Liberty Shopping Centre, Romford</p>
FACE TO FACE 	
CIRCUITS & CONTRA 	
CRM 	

Creative for illustrative purposes only as Stage 4&5 look and feel has not yet been finalized



9 Stage 5 Overview – Dec 2019

Stage Details



Target Audience

- Commuters and leisure users travelling Reading ↔ Central London
- Regular / Leisure Drivers or Off-Peak users of other modes travelling to/from West London ↔ Central London
- Commuters, solo/couple tourists travelling to/from Heathrow, International Arrivals/Departures to/from Heathrow
- Tube commuters travelling on Central line + Jubilee lines
- Commuters from Shenfield and Abbey Wood

Success Measures

- Fully running service
- Usage statistics and passenger numbers
- Sustained usage of line by target audiences (both primary and secondary)
- Lessened congestion on other lines

Media coverage

- Heavy-weight coverage
- Coverage 91%/ frequency 10*
- Media activity planned for early Dec 2019












* Coverage = total line areas for London and Reading corridor

Funding & Timings

- Expected to be fully funded within the CCT baseline
- Total integrated spend - £790,500
- Potential risks if savings are required across CCT



10 Media Channels - Stage 5

Channel	Examples
RADIO 	 <p data-bbox="831 587 1144 671">Heathrow Terminal 5</p>  <p data-bbox="1659 963 1966 1048">Reading Rail Station</p>
OOH 	
PRESS 	
DIGITAL 	
PARTNERSHIP 	
DOOR DROP 	
FACE TO FACE 	
CIRCUITS & CONTRA 	
CRM 	

Creative for illustrative purposes only as Stage 4&5 look and feel has not yet been finalized



EVERY JOURNEY MATTERS

Customer Information:

The largest network wide update we have ever undertaken - will include:

- **617** LU Trains with new Automated Announcements
- **149** DLR Trains with new Automated Train Announcements
- **1,700** Route Maps in LU stations, plus thousands of directional wall mounted and overhead signs
- **70,000** Car Line Diagrams across LU, DLR & London Overground
- Between **150 and 800** spider maps would need to be updated (central or all, with cost implications)

Constraints include:

- Old LU Rolling stock that is laborious and time consuming to update
- Number of hours to access stations within engineering hours to update wayfinding
- The complex nature of the project with different teams and organisation responsible for updating the information
- Delivering this in the most cost effective way

(Crossrail wayfinding scope and standards were frozen in 2010. Changes to standards and best practice since this time are therefore outside of Crossrail scope, for example the current TfL accessibility Wayfinding)



Customer information – general principles:

1) The Elizabeth Line brand will be updated once the service is operational:

- Some touchpoints will take several weeks to complete
- This is to avoid customer confusion that they can use the service before it is operational

2) Materials will be selected based on delivery of good and consistent customer experience, while maximising cost effectiveness in the current financial environment

- Vinyls will be used where necessary for in-station signage and wayfinding updates
- Longer term maintenance costs may be higher*, and we recommend that this to be added to maintenance business planning

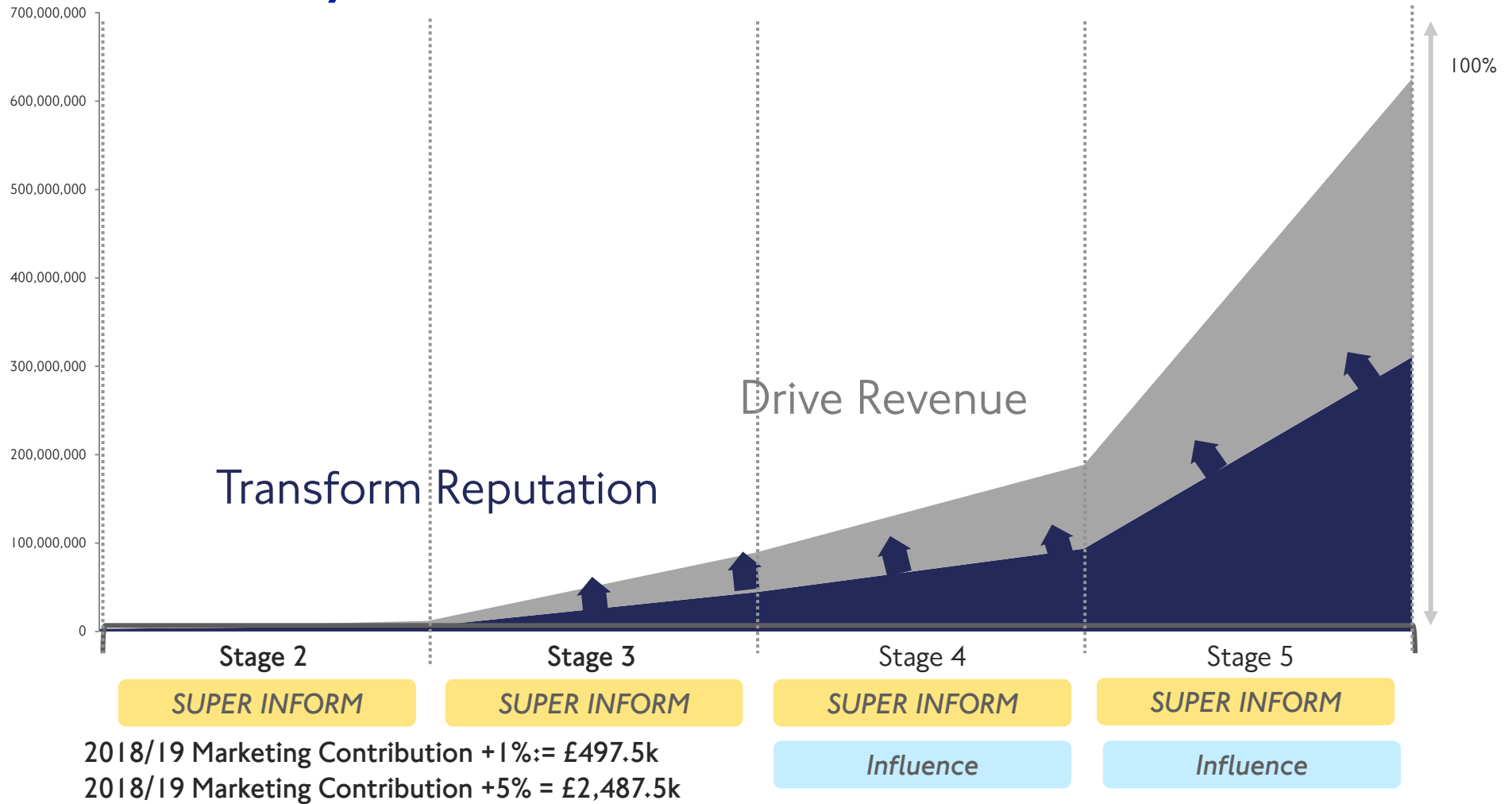
3) Customer information will be installed in a single process wherever possible, to minimise costs and avoid the need to make multiple updates

- All signs in LU, DLR & NR stations will be installed once and covered with a vinyl overlay
- Signs will be installed no later than 4 weeks before launch, with overlays removed by staff on 9 Dec
- High level signage (above two metres) will need special overlays which can be easily removed by volunteer staff. If material samples are not appropriate, high level signs will not be covered, but will be installed no earlier than 4 weeks before launch.

**Vitreous enamel has a life span of 40 years; Aluminium of 20 years, vinyl's up to 7 years*

Appendix

Revenue projections (total business revenue)



Source: Elizabeth Line Demand and Revenue Forecasts (TfL January 2018)



Metrics & Measurement – Stages 2-5

	Metrics, sources & other information	April 2017	Targets						
INPUTS	Context: e.g. Comms delivery (weight)	Total							
OUTPUTS	Awareness of the line	-	<table border="1"> <thead> <tr> <th>Mar 19</th> <th>Mar 20</th> <th>Mar 21</th> </tr> </thead> <tbody> <tr> <td>20% Uplift on Wave 5</td> <td>30% Uplift on Mar 19</td> <td>20% Uplift on Mar 20</td> </tr> </tbody> </table>	Mar 19	Mar 20	Mar 21	20% Uplift on Wave 5	30% Uplift on Mar 19	20% Uplift on Mar 20
Mar 19	Mar 20	Mar 21							
20% Uplift on Wave 5	30% Uplift on Mar 19	20% Uplift on Mar 20							
OUTTAKES	Feeling well informed about the line (based on those aware) Intention to use the line (based on those aware)	- -	<table border="1"> <tbody> <tr> <td>20% uplift</td> <td>30% uplift</td> <td>20% uplift</td> </tr> <tr> <td>20% uplift</td> <td>30% uplift</td> <td>20% uplift</td> </tr> </tbody> </table>	20% uplift	30% uplift	20% uplift	20% uplift	30% uplift	20% uplift
20% uplift	30% uplift	20% uplift							
20% uplift	30% uplift	20% uplift							
OUTCOMES	TfL is an organisation on the way up (reputation tracker) Sustained usage of EL line (journeys) Rev gen from usage of EL line (Revenue) Congestion relief (from drivers)	62% — — —	NB. No targets set for this by the business						

NB: The recommendation is not to set a target figure without a benchmark being put in place, but to set an uplift figure based on a benchmark from Wave 5 scores (which will be conducted in June.). This applies to Awareness of line, understanding of line and Intention to Use line.

- March 19 – 20% uplift on Wave 5 scores
- March 20 – 30% uplift against March 19 scores
- March 21 – 20% uplift against March 20 scores



Activated through Media:

- Today's the day you've been waiting for
- The Elizabeth line is open for business
- Travel from Abbey Wood to Bond Street in just 25 minutes on the Elizabeth Line
- The average journey time from Paddington to Abbey Wood is just 28 mins on the Elizabeth line
- Travel from Paddington to Canary Warf in only 17 minutes, a journey which currently takes 34 minutes

Activated through other channels:

- 26 miles of new tunnels and today is the day
- Ten new stations and we're now open for business
- 35 miles of new track and today we're open for business

Partnership (in planning)

- Wrap on the day of launch with a pan-London Press title
- Or
- Launch day special radio take over

Partnership main activity will continue in January in the back to work / school theme with students

	What?	Where?	Coverage / Frequency
Radio	30" ad during peak / drivetime	Pan-London across Capital, Kiss, Magic. Radio X, LBC, First Radio London	28,760 impacts 187 ratings, 379 spots, 2.5-3.5 OTH per station/week
OOH	LU LCDs	Abbey Wood and stations along the Elizabeth Line	6,370,000 impacts, 9.1%@8.2
On-System	Double Royals	London Underground, Circuit 1 and 2 (split)	(450 DRs in ticket halls, platforms + concourse) 986 GRP per week
Press	25x4s plus Page in TimeOut	Pan-London coverage, including Metro, Evening Standard, Time Out, City AM	Circulation 2,199,908, Reach 3,3mil OTS 3.37*, 15 insertions
Digital Display	Mobile banner, MPU, interstitial	Pan-London + route specific using WEVE targeting	Reach 1,292,794 (200,000 - 300,000 per week), avg frequency of 2.6
Paid Search	Extended text ads	Pan-London, geo-targeted around Abbey Wood + stations along the open Elizabeth Line route, UK-wide for long-tail searches	69,519 clicks
Paid Social	Static ads	Pan-London, geo-targeted around Abbey Wood + stations along the open Elizabeth Line route	1,443,317 reach, frequency of 2
Door Drops	Door drop leaflet	Within 1 mile of Abbey Wood station (will have already dropped end Nov)	17,439 households (will have already dropped end Nov)
F2F	F2F	LHR T1, T2, T3 & T4 - Paddington - Ealing Broadway - Liverpool St - Canary Wharf - Stratford - Tottenham Court Road - Bond St - Abbey Wood - Waterloo - Farringdon - Oxford Circus - Holborn - Moorgate - One New Exchange. Royal Exchange, Canary Wharf Shopping Centre, Angel Shopping, East Shopping Upton Park, Exchange Mall, Liberty Centre, Surrey Quays Shopping Centre, Old Spitalfields Market, Brick Lane Market, Greenwich Shopping Centre, Beckton Retail Park, Cannon Retail Park	Locations to the left



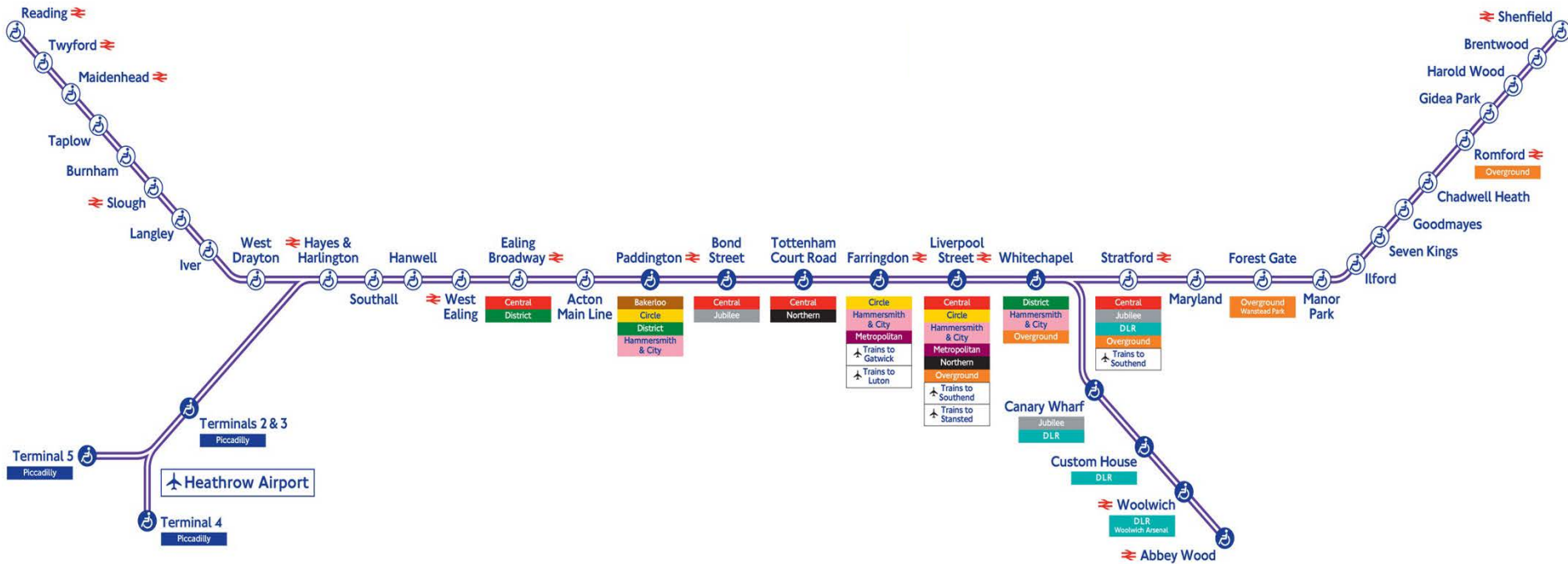
Note: channels with tailored message for the day of launch, then reverting to a post-launch message highlighted in yellow

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Elizabeth Line Readiness Board

27TH JULY 2018



2 Agenda



Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Wright

David Hughes/Simon Adams

Lucy Findlay

Martin Stuckey (secretariat)

Vernon Everitt

Simon Kilonback

No	Item	Suggested time
1.	Safety	10 minutes
2.	Programme review - update (separate slide deck will be issued at the meeting)	30 minutes
3.	Stage 2 Readiness	5 minutes
4.	Stage 3 Readiness	5 minutes
5.	Stages 4 & 5 Readiness	5 minutes
6.	Sponsor & Integration Issues & Financial Summary	5 minutes

3 Safety



Construction

In Period 3, although the HSPI fell to 2.59 (P2 = 2.64) it is within the top 5 scores on the programme and remains significantly above the 2.20 target. 11 of 11 key contracts achieved an HSPI score of 2.20 or above. The RIDDOR rate remained at 0.09 (P2 = 0.09) and the lost time case AFR remained at 0.16 (P2 = 0.16).

RIDDOR 7+ Days

7 June – [Redacted]

Lost Time Case

04 June – [Redacted]

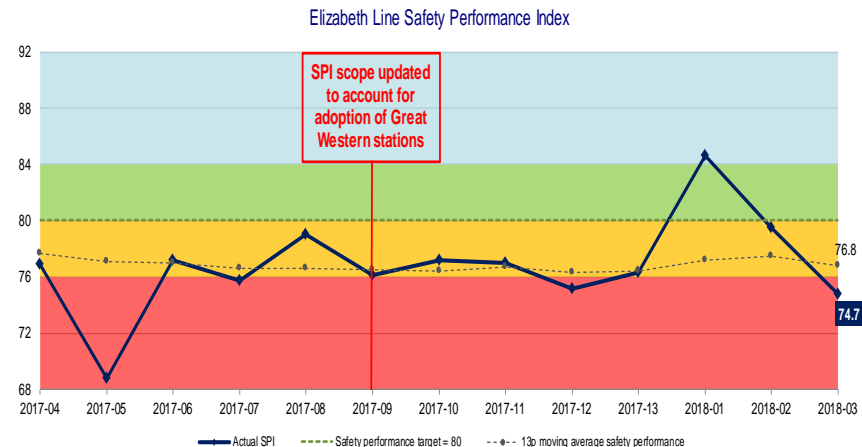
High Potential Near Misses

30 May [Redacted]
 04 June – [Redacted]
 16 June – [Redacted]

Operations

TfL Rail: Period 3 SPI = 74.7 (P2 = 79.5) fell into the 'below target performance' red zone due to an increased number of passenger accidents, MTR workforce accidents & assaults and operational incidents. Sixteen passenger accidents were reported comprising fifteen minor injury and one no injury accident. Two minor injuries occurred on the Western route, thirteen on the Eastern. There were two MTR workforce minor injuries. There were twelve staff assaults, nine verbal and three physical. None of the physical assaults caused injury. MTR are working closely with the BTP to ensure all assaults are seen through to conviction. There were five operational incidents during the period, the most significant of which involved a Signal Passed At Danger (SPAD) at Ilford, the driver was distracted in the cab and had a lapse of concentration.

Crossrail Operations team: No injuries or incidents.



Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018 - Achieved

Phase 2 – 24 Feb 2019 (target)



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 2 Phase 2 - Paddington to Heathrow					
2.3 ETCS Ready for Formal Heathrow Testing	24-Aug-18	07-Sep-18	-14		↓
2.4 ETCS Approval to Operate for Driver Training	12-Oct-18	12-Oct-18	0		↔
2.5 ORR Authorisation for On-board Signalling	19-Nov-18	26-Nov-18	-7		↓
2.6 Commence Stage 2 Phase 2 with ETCS functionality.	28-Oct-18	24-Feb-19	-119		↔

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU					
Infrastructure & Trains				Howard Smith	
MTR, NR & RfL Readiness		Timely completion of driver training and Ops proving	Development of MTR schedule for Phase 2 ongoing.	Howard Smith	

5 Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Dynamic Testing					
3.6 Signalling infrastructure ready for DT in Zones 3 & 4	07-Jun-18	23-Jul-18	-46	Yellow	↓
3.7 GSM-R infrastructure ready for DT in Zones 1 to 4	30-Jul-18	09-Sep-18	-41	Red	↔
3.1 Start Dynamic Testing (Zones 1,2,3 & 4)	30-Jun-18	27-Jul-18	-27	Yellow	↑
Pre-trial Running					
3.11 All 11 kV S,S&P locations energized	15-Apr-18	04-Jul-18	-80	Grey	
3.13 Commence Transition Testing @ GEML	30-Jun-18	12-Aug-18	-43	Yellow	↔
3.14 All 22 kV S,S&P locations energized	30-Jun-18	08-Aug-18	-39	Red	↓
3.15 ORR Issue Amended Safety Cert. & Authorisation to MTR-C	04-Jul-18	26-Jul-18	-22	Green	↔
3.17 Commence Transition Testing @ GWML	14-Jul-18	09-Sep-18	-57	Red	↔
3.18 Delivery Yellow Plant to PLU (RPM, ET01, ET02)	27-Jul-18	17-Sep-18	-52	Green	↓
3.22 Train CBTC Authorised for FLU for Trial Running	26-Jun-18	23-Jul-18	-27	Green	↓
3.23 Commencement of 'Pre-trial Running' under CCRRB (Construction Rule Book)	12-Sep-18	12-Sep-18	0	Red	↔
3.24 22no. Cl.345 FLUs Available for Trial Running	13-Aug-18	13-Aug-18	0	Green	↔

6 Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Combined Elizabeth line Trials					
3.16 Training completed for RFL in support of Handover of Routeway	05-Jul-18	14-Sep-18	-71	Yellow	↔
3.26 Final COS safety case updated and submitted to RABC	31-Aug-18	20-Sep-18	-20	Green	↓
3.21 Handover of Routeway under ROGS to RFLI as IM	05-Aug-18	01-Oct-18	-57	Yellow	↔
3.27 Commence Combined Elizabeth Line Trials	01-Oct-18	01-Oct-18	0	Yellow	↔
Passenger Service					
3.28 Submit Technical File to ORR	17-Sep-18	09-Nov-18	-53	Yellow	↓
3.29 Train CBTC Authorised for Passenger Service	10-Oct-18	02-Aug-18	69	Green	↔
3.30 PML ATS Re-energised including NR feed	15-Oct-18	15-Oct-18	0	Green	↓
3.31 Temporary services recovery complete	09-Nov-18	27-Oct-18	13	Yellow	↓
3.32 Opening of Stage 3 - Central Section Paddington L/L to Abbey Wood	09-Dec-18	09-Dec-18	0	Yellow	↓
Substantial Completion of Stage 3					
3.33 Plumstead Maintenance Facility Completion (Initial IM access)	21-Nov-18	21-Nov-18	0	Green	↔
3.34 Final Handover of all Stations, Shafts and Portals	28-Nov-18	28-Nov-18	0	Green	↔
3.35 Plumstead Stabling Sidings Completion	29-Mar-19	29-Mar-19	0	Green	↔

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period	Handover to IM
LU Stations 'Staged Completion' - for LU Familiarisation and Trial Ops.						
3.251 Whitechapel Station	16-Aug-18*	16-Aug-18	0		↔	16-Nov-18
3.252 Bond Street Station	31-Oct-18*	31-Oct-18	0		↔	28-Nov-18
3.253 Liverpool Street Station	02-Sep-18*	28-Sep-18	-26		↓	24-Oct-18
3.254 Tottenham Court Road Station	10-Aug-18	01-Oct-18	-52		↓	26-Oct-18
3.255 Farringdon Station	17-Aug-18	28-Aug-18	-11		↓	29-Oct-18
RFLI Stations 'Staged Completion' - for RFLI/MTR Familiarisation and Trial Ops.						
3.256 Paddington Station	29-Jul-18*	01-Oct-18	-64		↓	26-Nov-18
3.257 Custom House Station	N/A	N/A	0		↔	24-Aug-18 Station 'Ready for H/O', Care & Custody until 01-Oct-18
3.258 Woolwich Station	09-Sep-18*	01-Oct-18	-22		↓	14-Nov-18
3.259 Canary Wharf Station	05-Jul-18*	28-Sep-18	-85		↓	08-Dec-18 (Project 2&3 Additional Works Scope)

Date with * = 'TBA' in MOHS (Dates shown from P03 Update)

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing	Yellow	Programme 93.8% complete against plan 95.6%	Ongoing programme reviews to deliver Stage 3 opening in Dec-18.	Simon Wright	
	Red	Timely completion of infrastructure & communication systems	Prioritisation of critical systems installation including fire integration, GSM-R/Connect Radio and Public Address /Voice Alarm systems.	Simon Wright	
	Red	Timely completion of testing & commissioning activities (stations & systemwide)	Revised weekend dynamic testing windows. T&C programme recovery plans. Senior management focus with weekly and in some aspects daily monitoring in place.	Simon Wright	
	Red	Timely provision of design assurance information, asset data, key operations/ maintenance information	Maintain focus on design assurance close out rate and build on improvements in provision of asset data.	Simon Wright	
	Yellow	[REDACTED]	[REDACTED]	Howard Smith	
	Red	Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Maintain blockades Aug/Sep 18. Confirm the programme for installation of wayside equipment, on board software and testing at PML.	Simon Wright	

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness		Risk that there is insufficient time to procure spares and maintenance services and plan maintenance activity due to delayed provision of asset data and O&M manuals	Improvement in provision of asset data while CRL continues to work with contractors on resourcing and prioritisation of key information. Complete process review of O&M production & acceptance.	Howard Smith & Simon Wright	
		RFLI readiness – risk maintenance & operations staff not being fully trained. Provision of training materials, simulators and delivery of training courses remains behind plan	TUCA available. CRL supporting contractors with information sharing. Train the trainer replaced by end user training and provision of contractor support post handover including care & custody for non-routeway assets.	Simon Wright & Howard Smith	
		Risk of insufficient time to undertake trials activity	Secure ROGS exemption to run increased number of units under CCRB during pre-trial running. Handover of trace assets on 1 Oct 18 is essential.	Simon Wright & Howard Smith	
		Risk of LU Readiness being impacted by ongoing construction at stations, spares availability and completion of staff training	Delivery of Station Handover Execution Plans.	Simon Wright	

¹⁰ Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Red	Preferred delivery option and programme for wifi and 4G for passengers from stage opening and Maintenance teams from handover	Single non compliant tender return from MNOs. Commercial & technical options under review.	Shashi Verma	
	Green	Marketing launch and customer information activities	Launch plan prepared and managed by EL Comms Board.	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 4 - Paddington to Abbey Wood & Shenfield					
4.1 Required no. units available for Stage 4 (55 FLU & 5 RLU)	17-May-19	08-May-19	9		↔
4.2 Opening of Stage 4 - Paddington L/L to Abbey Wood and Shenfield	19-May-19	19-May-19	0		↔
Stage 5 - Full Crossrail Service					
5.1 70 Trains Delivered for Stage 5. (Including RLU to FLU Reconfiguration)	13-Dec-19	16-Oct-19	58		↔
5.2 Opening of Stage 5 - Reading & Heathrow to Abbey Wood and Shenfield	15-Dec-19	15-Dec-19	0		↔

Stage 4

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Red	Timely completion of Stage 4 power upgrade works (KD22)	Conclude NR remodelling and subsequent partial upgrade option determination with ORR (PML to Ilford or Gidea Park)	Simon Wright	
	Yellow	DOO CCTV installed and operational at Stratford and Shenfield	Solutions confirmed. Complete award of works at Shenfield. Programme with agreed access at Stratford required.	Simon Wright	
	Yellow	Station Information and Security System (SISS)	Confirm programme for implementing interim solution including local MTR control at 6 stations and design and programme for final solution with connection to RCC.	Simon Wright	
	Yellow	Ilford Depot wire heights to be completed to support Stage 4&5 timetable (& Stage 3 stabling)	Confirm if required with AGA. Funding agreed but programme (for Oct 18) to be confirmed if works required.	Simon Wright	
MTR, NR & RfL Readiness	Green				
Customer	Green				

Stage 5

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Yellow	Completion and approvals for ETCS (Stages B&C) and transition to CBTC	Confirmation & monitoring of NR/Alstom ETCS programme. NR progress new exemption with ORR. Development of interim line speed transition to TPWS solution.	Simon Wright	
	Yellow	Timely completion of western outer platform extensions & DOO CCTV	Secure revised access requirements with GWR.	Simon Wright	Yes
	Yellow	Stage 5 power upgrade works (KD30). ATS sites at Slough & West Ealing still to be brought online	Conversion to AT power for Sep 18 at risk due to additional access requirement. Modelling being reviewed, if works are required, these are expected to be programmed Dec 18.	Simon Wright	
	Yellow	Timely completion of Liverpool St M/L platform (16/17) extensions	Full platform extension option confirmed. Early contractor involvement of MTR. Complete GRIP4 design (Sep 18) for full funding approval.	Howard Smith	
MTR, NR & RfL Readiness	Green				
Customer	Red	Deferred contract award and track access concerns to deliver western inner station upgrades	Enabling works continuing. NR procurement of essential long lead items. Secure additional funding and beneficial access requests to be identified in tender returns expected Jul/Aug.	Simon Wright	

14 Integration and Sponsor Issues



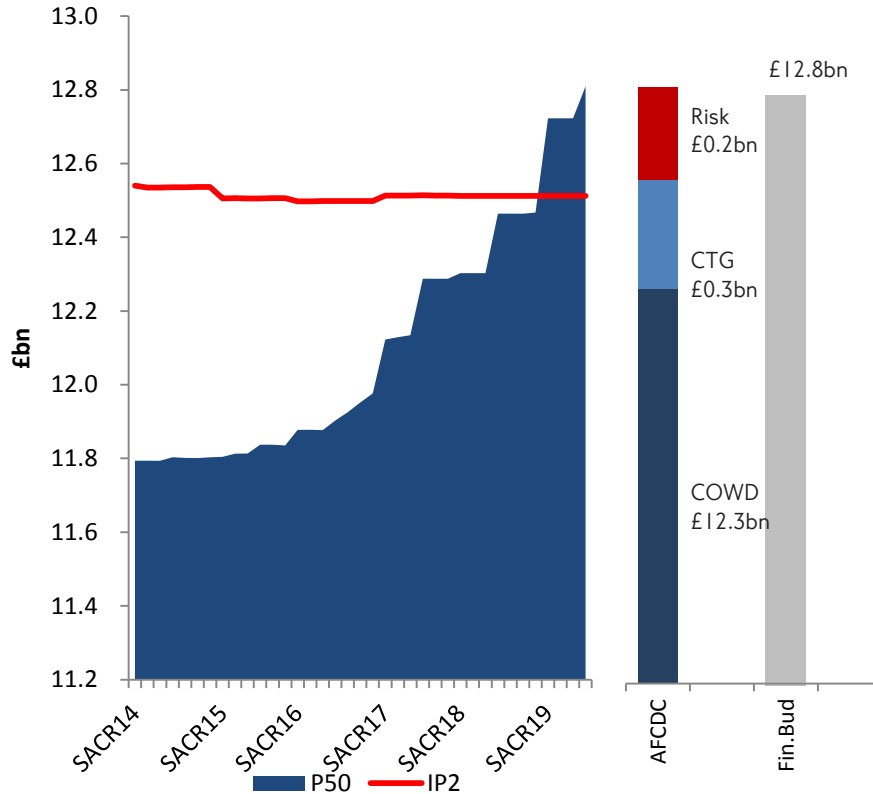
No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Appointment of 2xTfL Board members and 1x DfT nominee onto CRL Board from July.	Simon Wright & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Extended multiple roles to support completion of Stage 3. Key roles in close out organisation to be filled via internal appointments to retain knowledge.	Simon Wright

P3 Financial Summary

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ELIZABETH LINE

Crossrail



- The AFDC increased by £86.8m in the Period to £12,810m. There was a net increase in risk of £71m, predominantly for forecast cost increases at the major contracts following the P3 QRA and a review of costs to go by senior CRL management.
- In the Period, Crossrail spent £51.2m above the 2018/19 Business Plan. The Business Plan for Direct Costs was set in Period 6 2017/18, and since then there has been a significant increase to the AFDC (£0.5bn) and delays to MOHS dates for the key contracts and as such, variances to the Business Plan are to be expected.
- The overspend is predominantly: [REDACTED] due to lower than expected productivity, additional scope; access delays; and cost increases for construction and logistics as a result of delays to energisation and dynamic testing [REDACTED] due to prolongation, and ongoing architectural and MEP fit-out works [REDACTED] due to prolongation, delayed MEP and external works [REDACTED]; and other net overspends (£26.6m) offset by unspent Programme risk due to cost being reported in the Sectors (£16.2m).

Current actions:

- Review of remaining scope to be delivered by CRL and consideration of cost scenarios.
- Following SACR 19, implementation of further revisions to delegated authorities.
- Currently confirming additional format of financial and cost reporting requirements with JST.

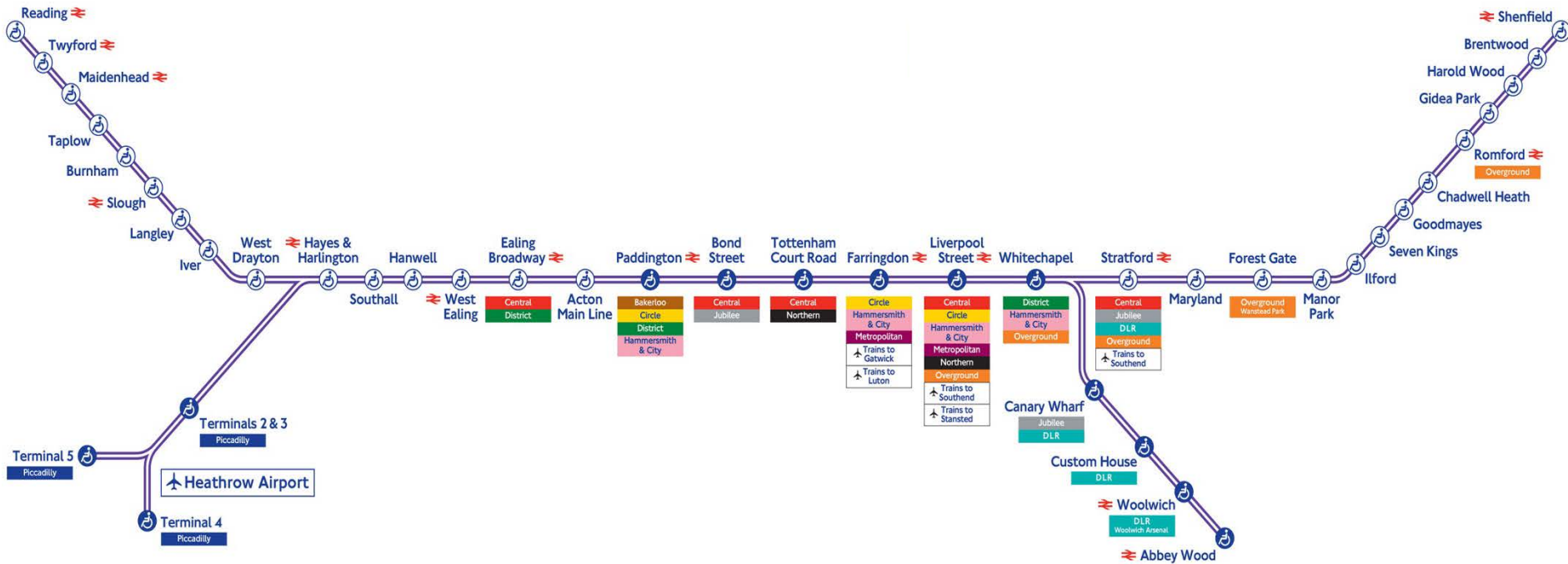
On Network Works

- The Forecast Final Outturn Cost (FFOC) remains at £2,376m (net of funding contributions).
- The ONW are 96% complete.



Elizabeth Line Readiness Board

3RD SEPTEMBER 2018





2

Agenda



Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Wright

David Hughes/Simon Adams

Lucy Findlay

Martin Stuckey (secretariat)

Vernon Everitt

Simon Kilonback

No	Item	Suggested time
1.	Actions from last meeting	5 minutes
2.	Safety	5 minutes
3.	Schedule Review – Checkpoint 2 (separate slide deck will be issued at the meeting)	30 minutes
4.	Stage 2 Readiness	5 minutes
5.	Stage 3 Readiness	5 minutes
6.	Stages 4 & 5 Readiness	5 minutes
7.	Sponsor & Integration Issues & Financial Summary	5 minutes

Elizabeth Line Readiness Board

Actions from meeting of 27 July 2018



No.	Meeting date	Issue	Owner	Target date	Status
17.043	27/7/18	Ensure best practice is being applied/shared between LU and TfL Rail in relation staff assaults	Howard Smith	3/9/18	Complete. Verbal update
17.044	27/7/18	Ensure BT are fully aware of their obligations for the Stage 2 phase ii programme	Howard Smith	3/9/18	Ongoing. Verbal update
17.045	27/7/18	Raise a number of critical issues/requirements at a meeting with NR new CEO /Chairman.	Simon Wright & Andy Brown	3/9/18	Meeting 13 Aug 18
17.046	27/7/18	Critically review responses /priorities for all degraded mode testing at the transitions.	Simon Wright	3/9/18	Ongoing. Verbal update
17.047	27/7/18	Escalate as necessary following very recent Schneider product recall.	Simon Wright	3/8/18	Complete
17.048	27/7/18	Provide short briefing note on NR power upgrade to MB	Simon Wright	3/8/18	Complete
17.049	27/7/18	Review opportunity for reducing reliance on contractors by utilising RfLI staff in COS testing activities	Simon Wright & Howard Smith	3/9/18	Continues to be considered in light of programme review.
17/050	27/7/18	Identify how further assurance of the programme can be provided	Simon Wright	3/9/18	Schedule assurance review agreed with Sponsors and underway



4

Safety



Construction

In Period 4 the HSPI fell to 2.60 (P3 = 2.61_{revised}). All 11 key contracts achieved an HSPI score of 2.20 or above and 9 of 11 scored 2.45 or above. The RIDDOR rate remained at 0.09 (P3 = 0.09) and the lost time case AFR remained at 0.16 (P3 = 0.16).

RIDDOR 7+ Days

11 July – [Redacted]

Lost Time Case

26 June – [Redacted]
10 July – [Redacted]

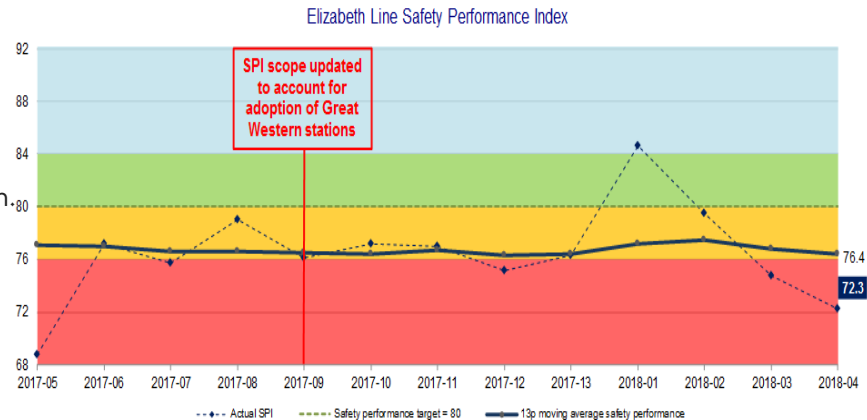
High Potential Near Misses

10 July – [Redacted]

Operations

TfL Rail: Period 4 SPI = 72.3 (P3 = 74.7) fell due to an increase in assaults on MTR staff. MTR's iSafety reporting app launched and 24 staff assaults reported (eleven verbal and thirteen physical). None of the physical assaults caused injury. MTR are working closely with the BTP and a dedicated working group has been setup with various stakeholders to target reducing staff assaults. There were twelve passenger accidents - all minor injuries. One on the Western section and eleven on the Eastern. There were two MTR workforce minor injuries in the period. There were nine operational incidents during the period, the most significant being two Train Protection Warning System (TPWS) interventions. SPI index weightings being reviewed.

Crossrail Operations team: No injuries or incidents.



⁵ Schedule Review – Checkpoint 2



Separate slide deck to be provided at meeting

6 Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018 - Achieved

Phase 2 – 24 Feb 2019 (target)



Elizabeth Line Readiness Key Milestones		MOHS 2018 Baseline Date	Actual / Forecast (P04+)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 2 Phase 2 - Paddington to Heathrow						
2.3	ETCS Ready for Formal Heathrow Testing	24-Aug-18	02-Nov-18	-70	Yellow	↓
2.4	[REDACTED]	12-Oct-18	TBC		Red	↓
2.5	ORR Authorisation for On-board Signalling	19-Nov-18	22-Feb-19	-95	Red	↓
2.6	Commence Stage 2 Phase 2 with ETCS functionality.	28-Oct-18	TBC		Red	↓

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU					
Infrastructure & Trains	Red	Timely completion of ETCS testing and BT on board signalling approval	BT's programme to be published and reviewed, and BT held to deliver to the agreed dates.	Howard Smith	
MTR, NR & RfL Readiness	Yellow	[REDACTED]	[REDACTED]	Howard Smith	

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Dynamic Testing					
3.6 Signalling infrastructure ready for DT in Zones 3 & 4 (incl.WBP)	07-Jun-18	03-Aug-18	-57		
3.1 Start Dynamic Testing (Zones 1,2,3 & 4)	30-Jun-18	27-Jul-18	-27		
Pre-trial Running					
3.13 Commence Transition Testing @ GEML	30-Jun-18	12-Aug-18	-43		
3.14 All 22 kV S,S&P locations energized	30-Jun-18	19-Sep-18	-81		↓
3.17 Commence Transition Testing @ GWML	14-Jul-18	08-Sep-18	-56		↔
3.18 Deliver Yellow Plant (RPM, ET01, ET02)	27-Jul-18	24-Nov-18	-120		↓
3.22 Train CBTC Authorised for FLU for Trial Running	26-Jun-18	10-Aug-18	-45		
3.24 22no. CI.345 FLUs Available for Trial Running	13-Aug-18	30-Sep-18	-48		↓

Stage 3

9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Combined Elizabeth line Trials					
3.16 Training completed for RFL in support of Handover of Routeway	05-Jul-18	TBC		Yellow	↓
3.26 Final COS safety case updated and submitted to RABC	31-Aug-18	TBC		Green	↔
3.21 Handover of Routeway under ROGS to RFLI as IM	05-Aug-18	TBC		Red	↓
3.27 Commence Combined Elizabeth Line Trials	01-Oct-18	TBC		Red	↓
Passenger Service					
3.28 Submit Technical File to ORR	17-Sep-18	TBC		Yellow	↔
3.29 Train CBTC Authorised for Passenger Service	10-Oct-18	TBC		Yellow	↓
3.30 PML ATS Re-energised including NR feed	15-Oct-18	TBC		Green	↓
3.31 Temporary services recovery complete	09-Nov-18	27-Oct-18	13	Yellow	↔
3.32 Opening of Stage 3 - Central Section Paddington L/L to Abbey Wood	09-Dec-18	09-Dec-18		Red	↔
Central section - other					
3.33 Plumstead Maintenance Facility Completion (Initial IM access)	21-Nov-18	21-Nov-18	0	Green	↔
3.35 Plumstead Stabling Sidings Completion	29-Mar-19	29-Mar-19	0	Green	↔

Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period	Handover to IM
LU Stations 'Staged Completion' - for LU Familiarisation and Trial Ops.						
3.251 Whitechapel Station	16-Aug-18*	TBC			↓	TBC
3.252 Bond Street Station	31-Oct-18*	TBC			↓	TBC
3.253 Liverpool Street Station	02-Sep-18*	TBC			↓	TBC
3.254 Tottenham Court Road Station	10-Aug-18	TBC			↓	TBC
3.255 Farringdon Station	17-Aug-18	TBC			↓	TBC
RFLI Stations 'Staged Completion' - for RFLI/MTR Familiarisation and Trial Ops.						
3.256 Paddington Station	29-Jul-18*	TBC			↓	TBC
3.257 Custom House Station	N/A	TBC			↓	TBC
3.258 Woolwich Station	09-Sep-18*	TBC			↓	TBC
3.259 Canary Wharf Station	05-Jul-18*	TBC			↓	TBC

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Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
 Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing		Programme 94.4% complete against plan 96.3%	Ongoing schedule reviews to deliver Stage 3.	Simon Wright	
		Timely completion of infrastructure & communication systems	Prioritisation of critical systems installation including fire integration, GSM-R/Connect Radio and Public Address /Voice Alarm systems.	Simon Wright	
		Timely completion of testing & commissioning activities (stations & systemwide)	Complete and agree schedule review. Senior management focus with weekly and in some aspects daily monitoring in place.	Simon Wright	
		Timely provision of design assurance information, asset data, key operations/ maintenance information	Maintain focus on design assurance close out rate and build on improvements in provision of asset data.	Simon Wright	
		Risk of delays to the Bombardier schedule for installation of the Class 345 on-board TCMS / CBTC. Required number of FLUs available for pre-trial running, combined trials and revenue service	TCMS R7.2.2.3 (revenue service release) and CBTC 3.1.X testing and completion. Focus on supporting testing upcoming test windows.	Howard Smith	
		Risk of delays to commissioning of NR transitions impacting trial running, including Pudding Mill Lane (Eastbound) neutral section transition	Maintain blockades Aug/Sep 18 and secure additional windows.	Simon Wright	

11 Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness	Yellow	Risk that there is insufficient time to procure spares and maintenance services and plan maintenance activity due to delayed provision of asset data and O&M manuals	Improvement in provision of asset data while CRL continues to work with contractors on resourcing and prioritisation of key information. Mitigate via Schedule Review	Howard Smith & Simon Wright	
	Yellow	RFLI readiness – risk maintenance & operations staff not being fully trained. Provision of training materials, simulators and delivery of training courses remains behind plan	TUCA available. CRL supporting contractors with information sharing. Train the trainer replaced by end user training and provision of contractor support post handover including care & custody for non-routeway assets.	Simon Wright & Howard Smith	
	Red	Risk of insufficient time to undertake trials activity	Provide minimum of 2 months full Trial Operations period after completion of Trial Running (requires Handover of trace assets).	Simon Wright & Howard Smith	
	Yellow	Risk of LU Readiness being impacted by ongoing construction at stations, delayed commissioning of critical systems, spares availability and completion of staff training	Mitigate via Schedule Review. Update and agree Handover Execution plans.	Simon Wright	



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Stage 3

9 December 2018 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Red	Failed procurement for on-train wifi for Stage 3. PCN procurement delayed.	On-train wifi being progressed for surface sections in late 2018 in conjunction with Overground. Working with PCN team to assess likely impact / options.	Shashi Verma	
	Green	Marketing launch and customer information activities	Launch plan prepared and managed by EL Comms Board.	Vernon Everitt	

Stages 4 & 5

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



ELIZABETH LINE

Elizabeth Line Readiness Key Milestones	MOHS 2018 Baseline Date	Actual / Forecast (P04)	Variance [BL - Forecast]	Critical Path Risk	Change from Last Period
Stage 4 - Paddington to Abbey Wood & Shenfield					
4.1 Required no. units available for Stage 4 (55 FLU & 5 RLU)	17-May-19	10-May-19	7		↔
4.2 Opening of Stage 4 - Paddington L/L to Abbey Wood and Shenfield	19-May-19	19-May-19	0		↓
Stage 5 - Full Crossrail Service					
5.1 70 Trains Delivered for Stage 5. (Including RLU to FLU Reconfiguration)	13-Dec-19	16-Oct-19	58		↔
5.2 Opening of Stage 5 - Reading & Heathrow to Abbey Wood and Shenfield	15-Dec-19	15-Dec-19	0		↔

Stage 4

19 May 2019 – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains		Timely completion of Stage 4 power upgrade works (KD22)	NR remodelling complete showing upgrade requirement to Gidea Park. Project schedule to confirm feasibility, or otherwise, of delivery for Stage 4 opening expected imminently.	Simon Wright	
		DOO CCTV installed and operational at Stratford and Shenfield	Solutions confirmed. Complete award of works at Shenfield. Programme with agreed access at Stratford required.	Simon Wright	
		Station Information and Security System (SISS)	Confirmation of design and programme for final solution with connections to RCC required.	Simon Wright	
		Ilford Depot wire heights to be completed to support Stage 4&5 timetable (& Stage 3 stabling)	Confirm not required.	Simon Wright	
MTR, NR & RfL Readiness					
Customer					

15 Stage 5

15 December 2019 – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Red	[REDACTED]	[REDACTED]	Simon Wright	Y
	Yellow	Timely completion of western outer platform extensions & DOO CCTV	Contractor instructed, forecast start on site Oct 18.	Simon Wright	
	Yellow	Stage 5 power upgrade works (KD30). ATS sites at Slough & West Ealing still to be brought online	Conversion to AT power now forecast Feb 19, remains at risk due to contractual issues, design delays, access requirements.	Simon Wright	
	Yellow	Timely completion of Liverpool St M/L platform (16/17) extensions	Full platform extension option confirmed. Early contractor involvement of MTR. Complete GRIP4 design for full funding approval.	Howard Smith	
MTR, NR & RfL Readiness	Green				
Customer	Red	Deferred contract award and track access concerns to deliver western inner station upgrades	Meetings held 13/8 & 20/8 and no significant value management opportunities remaining. NR procurement to be concluded.	Simon Wright	

16 Integration and Sponsor Issues



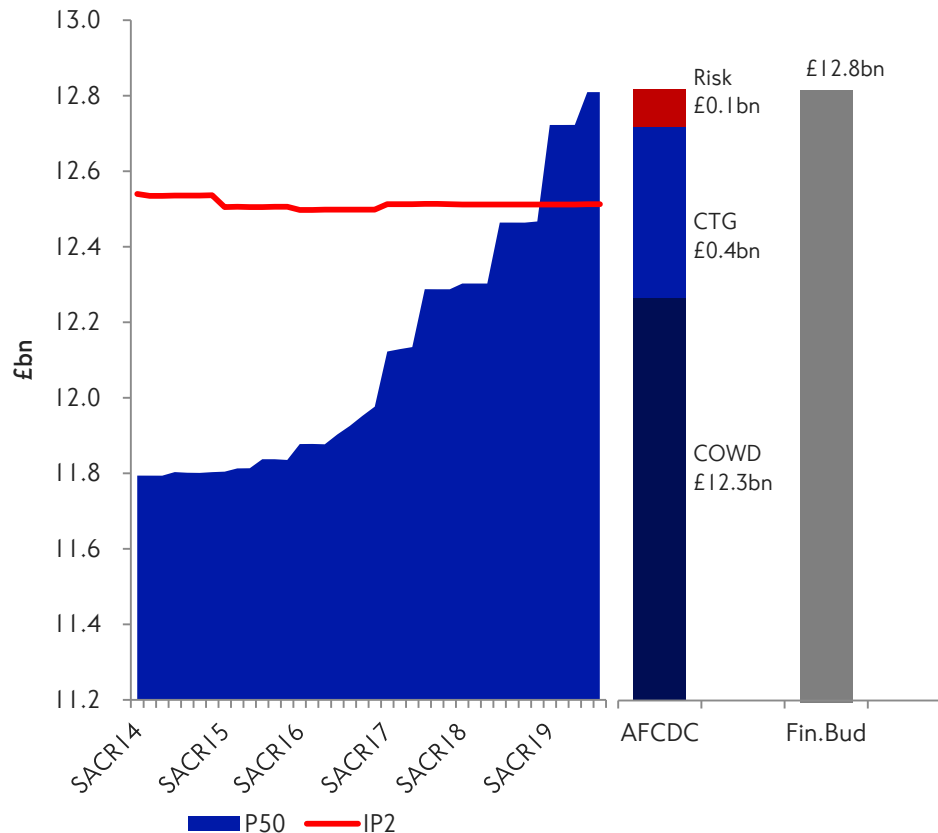
No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Appointment of 2xTfL Board members and 1x DfT nominee onto CRL Board from July.	Simon Wright & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Extended multiple roles to support completion of Stage 3. Key roles in close out organisation to be filled via internal appointments to retain knowledge.	Simon Wright

P4 Financial Summary

CONFIDENTIAL
Not for onward circulation

ELIZABETH LINE

Crossrail



The AFDCD remained unchanged in the Period, at £12,810m. To fund Delivery level cost increases, £154m of risk was utilised.

In the Period, Crossrail spent £0.1m below the 2018/19 Business Plan. This was due to an underspend in Indirect Costs following the earlier than forecast receipt of OSD income (£73.2m), offset by an overspend on Direct Costs (£73.1m).

The overspend on Direct costs is predominantly: [REDACTED] due to lower than expected productivity, access delays, cost increases for construction and logistics, and incentive payments which were approved after the Business Plan was set [REDACTED]; [REDACTED] due to prolongation, and ongoing architectural and MEP fit-out works [REDACTED]; [REDACTED] due to prolongation, delayed MEP and external works [REDACTED]; [REDACTED] due to the impact of delayed design, cost increases, scope delayed from prior periods and associated prolongation [REDACTED]; and other net overspends (£27.7m) offset by unspent Programme risk due to cost being reported in the Sectors (£7.0m).

Current actions:

- Review of remaining scope to be delivered by CRL and consideration of cost scenarios.
- Currently confirming additional format of financial and cost reporting requirements with JST.
- Detailed cost to go and cost reduction meetings for key sectors.

On Network Works

- The Forecast Final Outturn Cost (FFOC) increased to £2,430m (net of funding contributions).
- The ONW are 91%* complete.

*Percent complete this period has reduced due to increased FFOC which now includes +£54m funding covered by the Portfolio Board plus a CRL assessment for cost pressures and tender price risk associated with the Enhanced Stations.

◀ Checkpoint 2 – Stage 3, 4 and 5 Schedule Implications

Elizabeth Line Readiness Board

3rd September

Schedule priorities for Stage 3



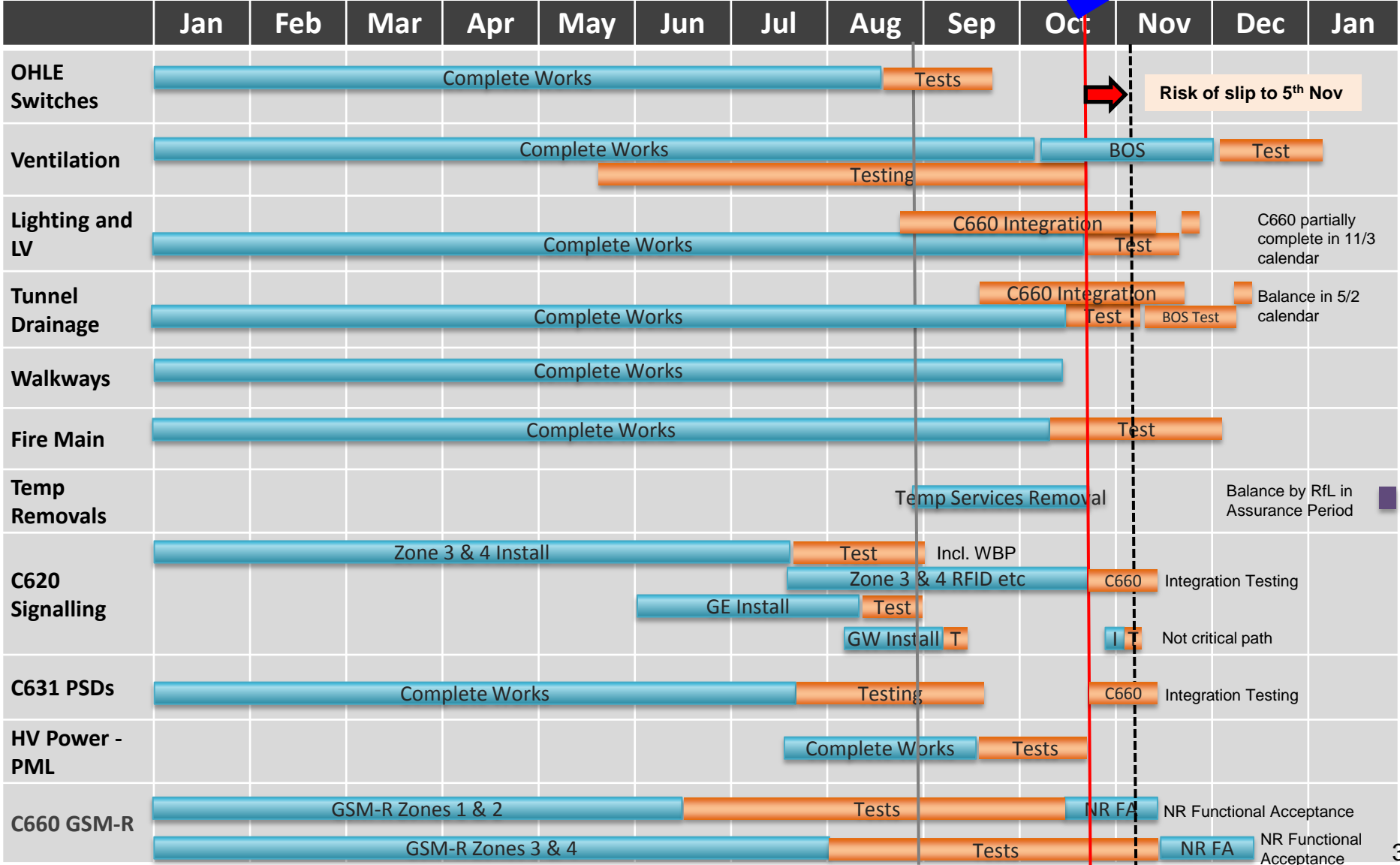
1. Finish routeway construction
2. Satisfy entry criteria for 5/2 Dynamic Testing including planned software updates (train and signalling)
3. Start 5/2 Dynamic Testing, optimising test cycles (Siemens and BT) and bug-fix train/signalling software
4. Finish and handover stations in the most efficient way
5. Re-establish separate Trial Running and Trial Operations – building fleet and system reliability

Finish the routeway to enable 5/2 Dynamic Testing



Target Completion Date
22nd October

2018



Entry criteria for 5/2 dynamic testing



The following agreed activities need to have been completed to enter the 5/2 dynamic testing regime:

- ▶ **Software** – Planned releases of BT and Siemens software on-board products installed
- ▶ **Rolling Stock** – train must pass all 29 x CBTC tests at Melton; 4 x units in the COS then need to be successfully tested to latest configuration with stabling available. (note: current train being used for testing has passed 12/29 tests)
- ▶ **Railway Systems:**
 - ◆ All installation requiring use of rail mounted vehicles complete
 - ◆ C620 – all critical equipment installed & tested
 - ◆ C610 – ventilation control system operational
 - ◆ C631 – all platform screen doors operational with signalling interfaces
 - ◆ C660 – critical interfaces to PSDs, C620 and external NR systems operational
- ▶ **Stations** – permanent LV supplies in place for PSDs, comms & signalling rooms
- ▶ **Assurance** – approval to support multi-train operation

- ▶ CRL will commission a detailed independent review of the readiness of the systems to start the 5/2 Dynamic testing period
- ▶ Focus especially on Siemens and Bombardier software readiness:
 - ◆ Essential functionality
 - ◆ “Delta functions” (i.e. the differences between previous versions of CBTC used elsewhere e.g Copenhagen)
 - ◆ Reliability / performance

Main Dynamic Testing Regime



- ▶ Railway energised 5 days per week 24 hours a day for dynamic testing, and isolated 2 days per week for maintenance and completion of outstanding works

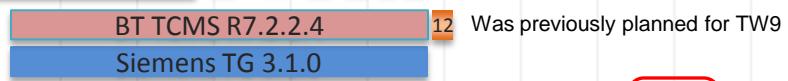
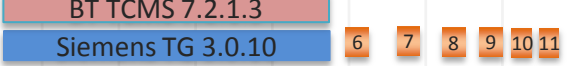
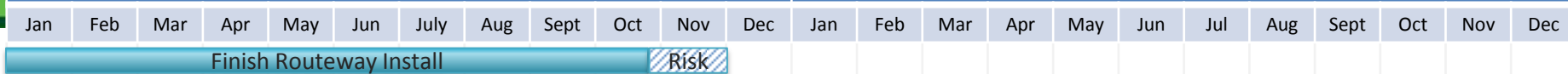
- ▶ During the 5 days:
 - ◆ 16 hours per day allocated to dynamic testing, with signalling tests prioritised initially
 - ◆ 8 hour night-shift allocated to remaining static testing

- ▶ Key Contractors and stakeholders have confirmed support to this regime and discussions are ongoing

Dynamic Testing Critical Path

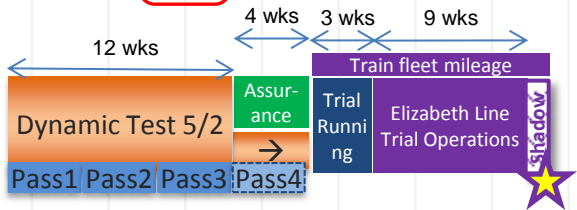


2018												2019											
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

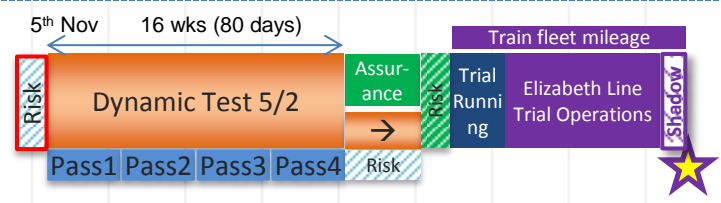


Further GE/GW transition T&C windows required but not yet secured

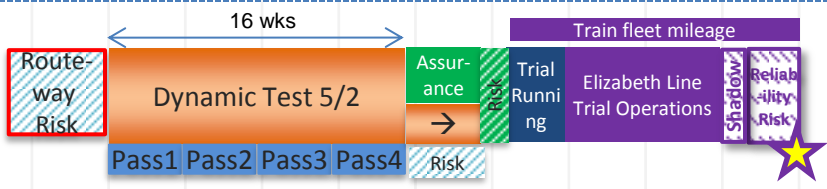
SCENARIO 1



SCENARIO 2



SCENARIO 3



Independent Schedule Peer Review

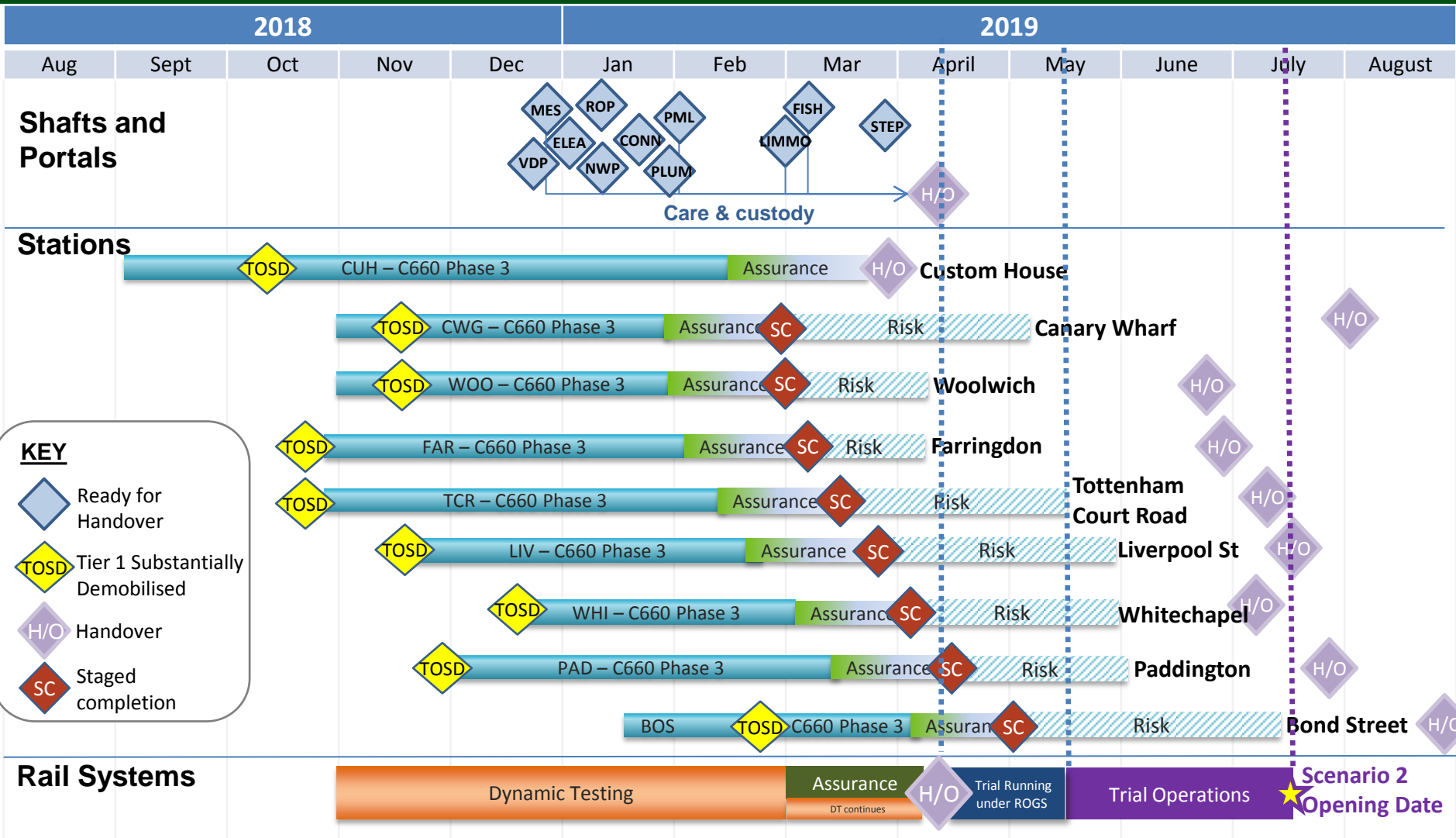


COS Stations Completion and Handover



- ▶ Objective is to substantially demobilise Tier 1 contractors as soon as works are complete
- ▶ Some integration tests (C660/SSP) are to be conducted after the Tier 1 contractor is substantially demobilised
- ▶ Transfer to IMs to be implemented once end state functionality and assurance is complete
- ▶ Care & custody and Staged Completion opportunities to be optimised with Infrastructure Managers (IM) pre-Handover
- ▶ Final Handovers can take place after opening

Handover Schedule - Overview



KEY

- Ready for Handover
- Tier 1 Substantially Demobilised
- Handover
- Staged completion

NB: Station 'Staged Completion' dates dependent on C660 SCADA and Radio resource analysis TBC

Mid April
Enact IM
Responsibility

Revised Stage 3 Opening Plan – recommendation (and key messages)

2018							2019											
Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

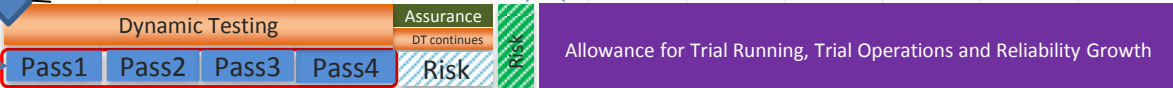
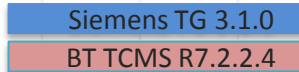
1. Hold Systemwide contractors to 22nd Oct completion (acknowledging risk around this) and complete test windows



5. CP2A - Go/No-Go for T-14 weeks for Trial Running

3. Start 5/2 Dynamic Testing on 5th Nov (acknowledging risk on "entry criteria")

Set internal CRL target programme to start Trial Running (under ROGS) April 2019



2. Release of final on-board software products by 22nd October

4. Assumes no major issues, for instance to a SIL 4 (safety critical) component, are uncovered during Passes

Passenger Service



6. Substantially demobilise stations contractors – drive to PPE-free completion in main areas & "ready for integration testing"



7. Staged Completion once C660 testing and assurance case complete



8. Final Stations Handovers once all paperwork completed (not critical path for opening)

Stage 4 & 5 Opening



- ▶ If the COS doesn't open for passenger service till July 2019 the existing Staged opening plan (Stage 3 Dec 2018, Stage 4 May 2019, Stage 5 Dec 2019) needs revising
- ▶ Any revised plan needs to be operable, offer adequate capacity at each stage, and fit with train and traincrew availability
- ▶ A revised staged opening plan needs to protect Stage 5 (extension of through running to/from Great Western) because (i) this is where much of the additional revenue to TfL arises (ii) it involves changes to other operators services, which the COS (Stage 3) and GE generally don't
- ▶ Three options have been assessed by a joint CRL/RfL/MTR team:
 1. **'Base'** - Current stages but compressed July/Sept/Dec
 2. **'Variant'** - Open in July with 12tph through running to/from GE, add Abbey Wood in Sept to provide 24tph in the COS and Stage 5 as planned in Dec. This option protects the blockade in August 2019 for platform lengthening at Liverpool St
 3. **'Contingency'** - Open Stage 3 in July and then through run to/from GW in Dec before adding Stage 4 in Q1 2020. However without through running to the GE the core is restricted to 12-15tph as that is the maximum number of trains that can be turned at Abbey Wood

Initial Conclusions and Next Steps



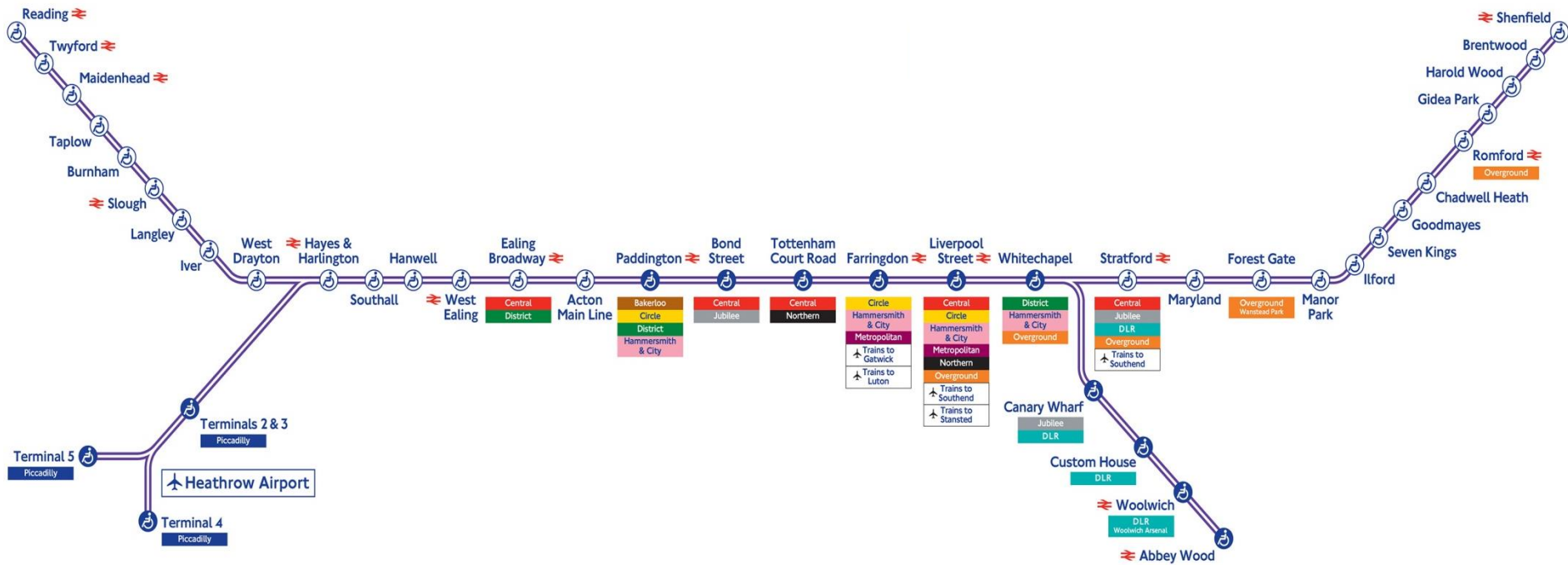
- ▶ Initial conclusions are that 'Base' and 'Variant' are feasible.
- ▶ Each has pros and cons but both are at risk if there is further slippage - neither is robust against further slippage in COS (Stage 3) opening beyond July 2019
- ▶ 'Contingency' offers greater protection against further slippage but doesn't offer sufficient capacity in the core, so has to be discounted
- ▶ All options, including 'Base' require NR to flex normal planning rules which requires urgent discussion and support from Sponsors.
- ▶ It is important to get across that changes to the COS and GE are largely self contained and have minimal effect on other operators
- ▶ Limited hours/extent 'Preview' service can be associated with any solution and will be based on the success of TR/TO but is not possible in December
 - ◆ Any preview service requires authorisation for passenger service. This requires submission of a Technical File. This is not possible because neither station comms nor SCADA will have been tested and commissioned, and the signalling system will be several iterations away from a reliable state. The train software would also need to be frozen imminently to gain public service authorisation.
- ▶ Next step on Stage 4 and 5 is to commence discussions with NR about 'off pattern' changes to timetables, and develop 'Base' and 'Variant' options

▶ End



Elizabeth Line Readiness Board

21ST SEPTEMBER 2018



² Agenda



Invitees

Mike Brown (chair)

Mark Wild

Howard Smith

Simon Wright/ Chris Sexton

David Hughes/Simon Adams

Lucy Findlay

Martin Stuckey (secretariat)

Vernon Everitt

Simon Kilonback

No	Item	Suggested time
1.	No actions from last meeting	
2.	Safety	5 minutes
3.	Stage 2 Readiness	10 minutes
4.	Stage 3 Readiness	30 minutes
5.	Stages 4 & 5 Readiness	10 minutes
6.	Sponsor & Integration Issues & Financial Summary	5 minutes

3

Elizabeth Line Readiness Board

Actions from meeting of 3rd September 2018



No.	Meeting date	Issue	Owner	Target date	Status
No actions from 3 rd September 2018					

4 Safety



Construction

In Period 5 the HSPI fell to 2.55 (P4 = 2.60). This is the third lowest HSPI score in a year but is above 2.20 target. 10 of 11 key contracts (91%) achieved an HSPI score of 2.20 or above and 7 of 11 (64%) scored 2.50 or above. The RIDDOR rate remained at 0.09 (P4 = 0.09) and the lost time case AFR remained at 0.16 (P4 = 0.16). The rollout of the 'Finish Safe' campaign will start next period.

RIDDOR 7+ Days

18 August – [REDACTED]

High Potential Near Misses

14 August – [REDACTED]

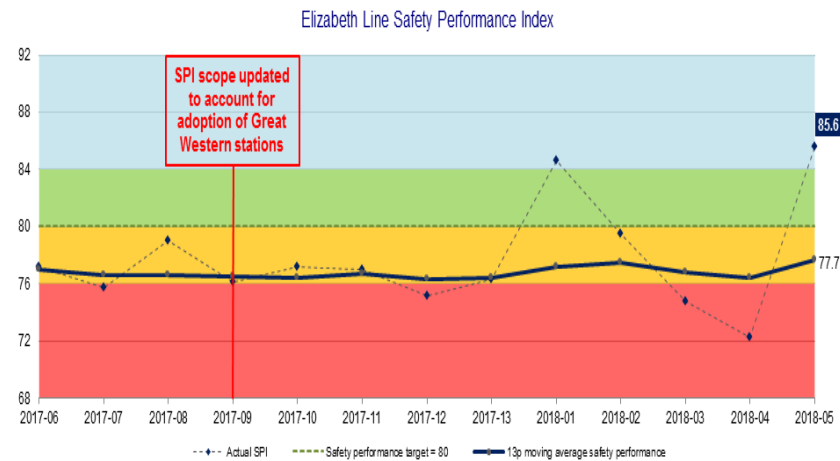
Operations

TfL Rail: Period 5 SPI = 85.6 (P4 = 72.3). The recovery in safety performance is the result of significant decreases in passenger accidents (12 to 5), workforce assaults (24 to 8) and operational incidents (9 to 6). This may be partly due to the 'settling down' of the new incident reporting app introduced by MTR last period.

One of the physical assaults caused injury when a brick was thrown at the back of a member of MTR staff whilst on duty at Maryland station. The member of staff returned to work after six days off. BTP have good CCTV images but have not yet identified the assailant, the investigation is ongoing.

The SPI index weightings are being reviewed.

Crossrail Operations team: One minor injury - a maintenance apprentice supporting the Crossrail project works sustained a cut injury to their hand.



5 Stage 2

Paddington to Heathrow, Shenfield to Liverpool Street mainline

Phase 1 - 20 May 2018 - Achieved

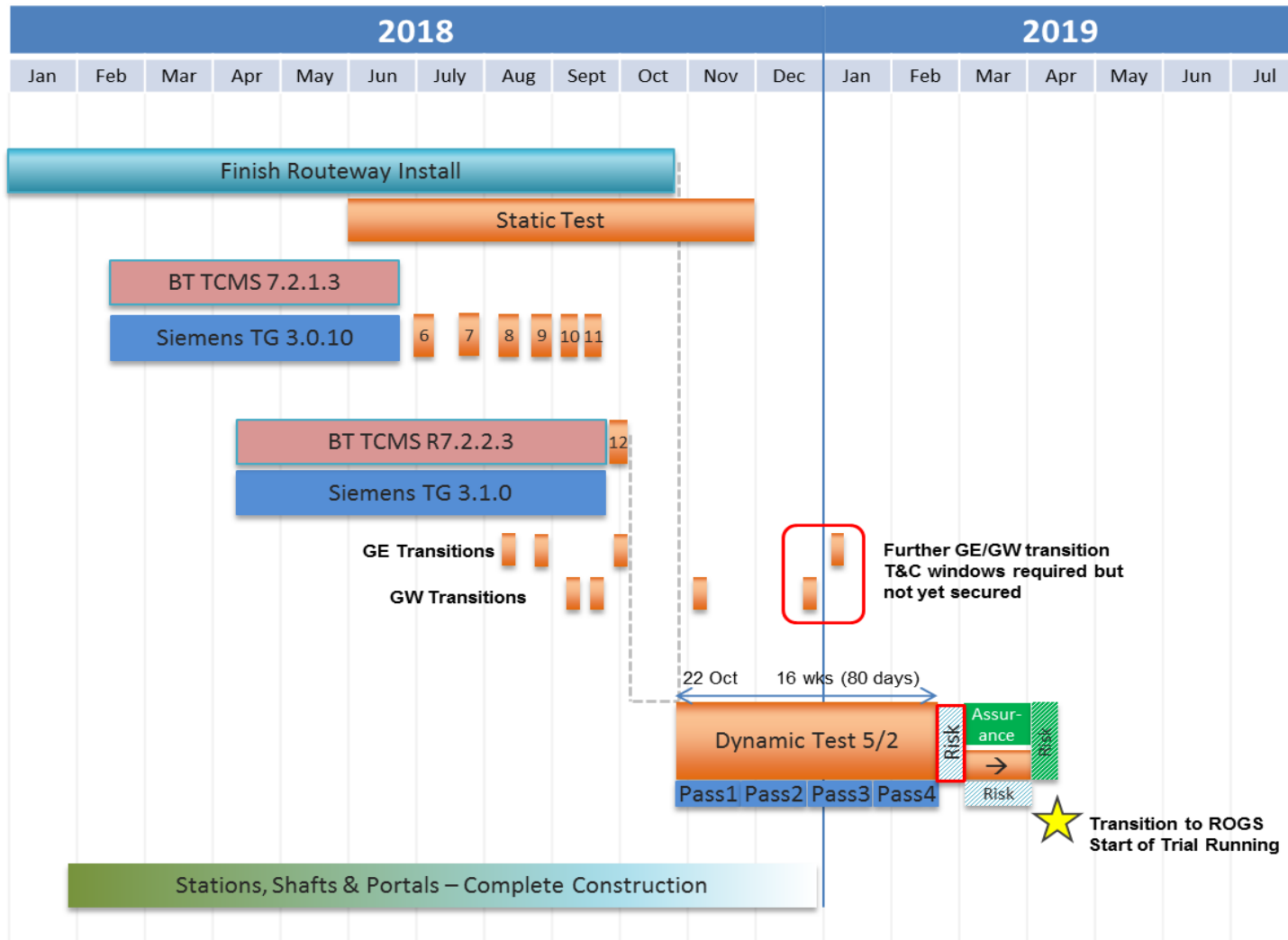
Phase 2 – 24 Feb 2019 (target date under review)



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Phase 2 – 4 tph Paddington to Heathrow T4 CI345 FLU					
Infrastructure & Trains		[REDACTED]	[REDACTED]	Howard Smith	
MTR, NR & RfL Readiness		[REDACTED]	[REDACTED]	Howard Smith	

6 Stage 3

Autumn 2019 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline



7 Stage 3

Autumn 2019 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure, Trains & testing	Yellow	Completion of Routeway (Rail Systems) to enable start of 5/2 Dynamic Testing 22Oct18	Completion of full MOHS update and dynamic test plans in Period 6 to confirm programme and establishment of T-minus reviews to confirm readiness and delivery of entry criteria for 5/2 Dynamic testing.	Simon Wright	
	Yellow	████████████████████ ████████████████████ ████████████████████ ████████████████████ ██████	████████████████████ ████████████████████ ████████████████████	Howard Smith	
	Yellow	Completion of Dynamic Testing 5Apr19	Include Siemens & BT software releases & testing plans for each of the passes in MOHS	Simon Wright	
	Red	NR Transitions commissioning for commencement of trial running under ROGS 5Apr19	Some testing undertaken TW9 & 11. Additional windows 28-30Dec & 5-Jan. Further testing opportunities are required and being explored 23-28Dec and early Jan 19.	Simon Wright	
	Yellow	Handover of Routeway for commencement of trial running under ROGS 5Apr19	Continue to accelerate production of safety justification, asset data and documentation required by RFLI.	Simon Wright	
	Yellow	Stations progress of physical works & production of Installation Release Notes (IRN) (as well as other key documents) to support handover	Close monitoring and drive for improved rates of phase 2 certification. Complete I/O schedules, update T&C plans noting additional resources and reprioritisation of systems and stations required to achieve phase 3 tests.	Simon Wright	

Stage 3

Autumn 2019 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



ELIZABETH LINE

	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
MTR, NR, LU & RFLI Readiness		RFLI readiness required to commence T Running 15Apr19. Opportunity to support CRL scope when ready.	Update and agree Staged Completion and Handover Execution Plans. CRL training team extended to complete technical training delivery and manage provision of Code 1 materials. Programme to complete competency being updated – risk of loss of staff & competency due to delayed Handover arising from Schedule Review.	Howard Smith & Simon Wright	
		Risk of insufficient time to undertake trials activity	Mitigated by re-establishment of periods of trial running and trial operations ahead of passenger service.	Simon Wright & Howard Smith	
		LU readiness	Update and agree Staged Completion and Handover Execution Plans.	Simon Wright & Howard Smith	

Stage 3

Autumn 2019 - **Abbey Wood to Paddington**, Heathrow to Paddington mainline,
Shenfield to Liverpool Street mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Customer	Yellow	Failed procurement for on-train wifi for Stage 3. PCN procurement delayed	On-train wifi being progressed for surface sections in late 2018 in conjunction with Overground. Working with PCN team to assess likely impact / options.	Shashi Verma	
	Green	Marketing launch and customer information activities	Manage impacts arising from delayed opening. Launch plan to be updated and managed by EL Comms Board.	Vernon Everitt	

10 Stage 4

TBC – Paddington to Abbey Wood / Shenfield, Heathrow to Paddington mainline



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Red	Timely completion of Stage 4 power upgrade works (KD22)	NR remodelling complete showing upgrade requirement to Gidea Park. Access TBA. Project schedule and QSRA to confirm feasibility, or otherwise, of delivery for Stage 4 opening required.	Simon Wright	
	Yellow	DOO CCTV installed and operational at Stratford and Shenfield	Solutions confirmed. Shenfield works instructed but delayed awaiting completion date for temp system from GA. Stratford priority P5&8 design complete, works planned 23Dec-1 Jan still to be instructed. P9, I0, I0a on hold, scope TBC.	Simon Wright	
	Yellow	Station Information and Security System (SISS)	Confirmation of design and integrated NR & C660 programme for final solution with connections to RCC required.	Simon Wright	
	Green	Ilford Depot wire heights to be completed to support Stage 4&5 timetable (& Stage 3 stabling)	Confirm not required. Surveys and analysis to be complete by mid-December.	Simon Wright	
MTR, NR & RfL Readiness	Green				
Customer	Green				

Stage 5

TBC – Full operation from Reading/Heathrow to Shenfield/ Abbey Wood



	RAG	Risk / Issue	Mitigation / Response	Lead	Sponsor Assistance
Infrastructure & Trains	Red	[REDACTED]	[REDACTED]	Simon Wright	Y
	Yellow	Timely completion of western outer platform extensions & DOO CCTV	Contractor instructed, forecast start on site Oct 18. NR review of programme ongoing following forecast completion Jan20.	Simon Wright	
	Yellow	Stage 5 power upgrade works (KD30). ATS sites at Slough & West Ealing still to be brought online	Conversion to AT power now forecast Feb 19, remains at risk due to contractual issues, design delays, access requirements.	Simon Wright	
	Red	Timely completion of Liverpool St M/L platform (16/17) extensions	Potential impact of Stage 3 & 4 delay on Aug 19 blockade. Major operational planning required if services terminated at Stratford.	Howard Smith	
MTR, NR & RfL Readiness	Green				
Customer	Red	Deferred contract award and track access concerns to deliver western inner station upgrades	Meetings held 13/8 & 20/8 and no significant value management opportunities remaining. NR procurement to be concluded and additional funds being sought by NR.	Simon Wright	Y

¹² Integration and Sponsor Issues



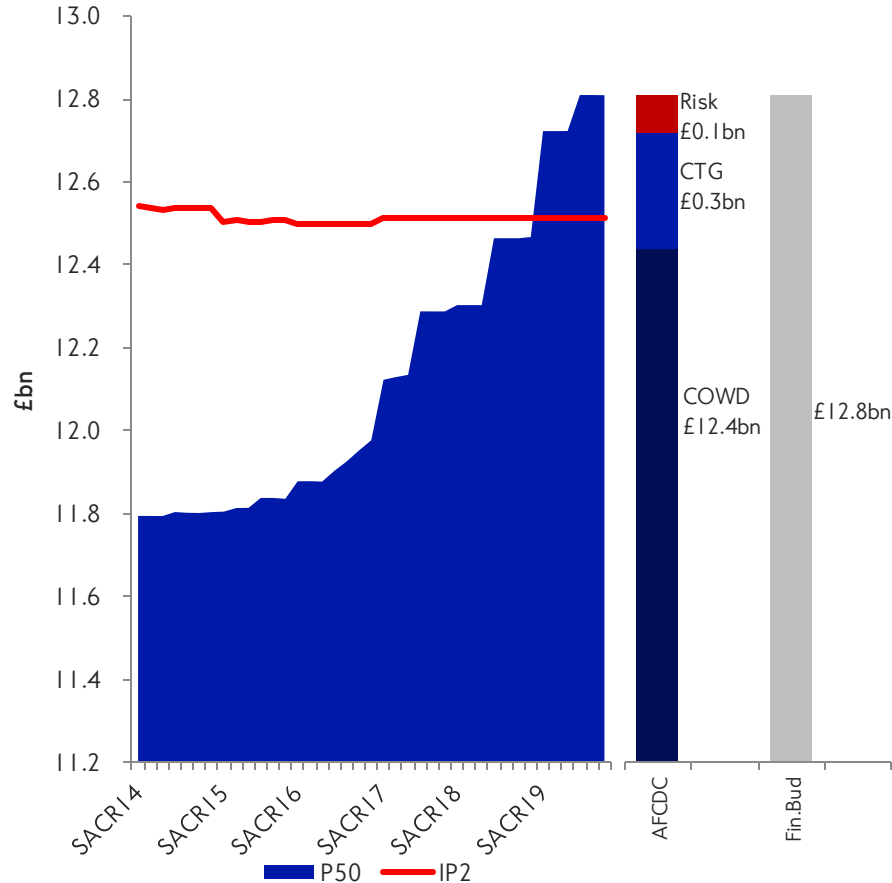
No	RAG	Key Risk / Issue	Mitigation / Response	Lead
1.		Timing of transition of governance from CRL to TfL	Appointment of 2xTfL Board members and 1x DfT nominee onto CRL Board from July.	Simon Wright & Mike Brown/Sponsors
2.		Loss of critical CRL staff at key stage of project	Extended multiple roles to support completion of Stage 3. Key roles in close out organisation to be filled via internal appointments to retain knowledge.	Simon Wright

P5 Financial Summary

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Crossrail



The AFDC remained unchanged in Period 5, at £12,810m. However given the large increase in URTs in the Period, increases to the AFDC are expected in Period 6. To fund Delivery level cost increases, £2.8m of risk was utilised.

URT increased by £127.8m in the Period to £173.5m following a series of defined cost reviews for key contracts, and are now £81.0m higher than the available risk. There were increases in URTs at [REDACTED] [REDACTED] and other net increases (£11.7m).

In the Period, Crossrail spent £66.1m above the 2018/19 Business Plan, predominantly at: [REDACTED] due to lower than expected productivity, and cost increases for construction and logistics [REDACTED]; [REDACTED] due to prolongation, and ongoing architectural and MEP fit-out works [REDACTED]; [REDACTED] due to prolongation, delayed MEP and external works [REDACTED]; delays to MEP and fit out, and prolongation at [REDACTED] [REDACTED]; and other net overspends (£21.7m) offset by unspent Programme risk due to cost being reported in the Sectors (£12.4m).

Current actions:

- Review of remaining scope to be delivered by CRL, impact on Programme and consideration of revised cost scenarios.
- Preparation for the Period 6 QRA.
- Review of the allocation of remaining Financial Budget across contracts.

On Network Works

- The Forecast Final Outturn Cost (FFOC) remains at £2,430m (net of funding contributions).
- The ONW are 91% complete.
- Cost pressures exist on a number of contracts and additional funds being sought for enhanced western stations.