



Crossrail Project Representative

Crossrail Joint Sponsor Team

Sponsor Summary

Project Status Report 150

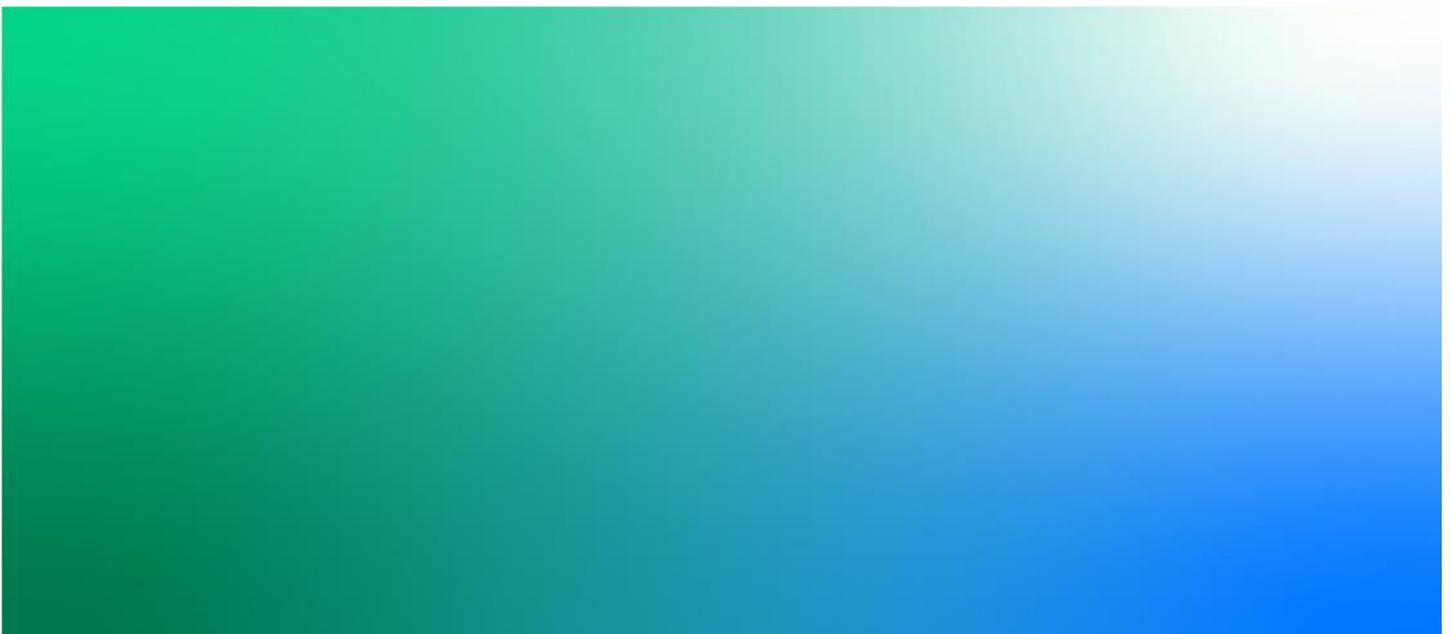
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Sponsor Summary PSR 150

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Note: This report relies on the information set out in CRL's Period 1 reports augmented by more current information received by PRep during the course of our routine discussions with CRL since the Period close on 1 May 2021. Note that information emerging after the close of Period 1 is subject to formal confirmation by CRL in its Period 1 reports. This report is supplemented by our weekly reports to JST and regular meetings with JST staff.

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
1.	24/5/2021	PSR 150 Period 1 FY 2021-22 Sponsor Summary v1.9 ~ Draft	[REDACTED]			
2	28/5/2021	PSR 150 Period 1 FY 2021-22 Sponsor Summary v1.13 ~ Final	[REDACTED]			

Sponsor Summary

1. Observations

Tottenham Court Road Station became the second London Underground station to achieve its BIU, and the third on the Central Section so far. With the Great Eastern Main Line interface commissioned as planned in the period, the Elizabeth Line can now be operated effectively as an end-to-end railway, from a signalling perspective. Software configuration TR2 Point Release 7 was commissioned prior to the start of Timetable Running on 10 May 2021, and contained fixes which have allowed the removal of many operational restrictions.

1.1 Headline Concerns

Completion of Maintenance Bridging Works within the Controlled Introduction Period has proved more problematic than was anticipated by CRL and RfLI. Low productivity was among several issues which led to a [REDACTED] delay to the deterministic start date for 4 TPH Timetable Running, achieved on 10 May 2021; this was slightly earlier than the P50 date. Difficulties with access to track and station equipment rooms have been a common feature this period, and continue to pose a significant threat to completing the works; while being addressed, long term improvements will be slow to emerge. The delay to the start of 4 TPH trials has implications for the ramp-up to 8 TPH and 12 TPH, which are being evaluated through the finalisation of the Trial Running Staging Plan. It is unlikely that 12 TPH trials will start before mid-July 2021, and this will have a significant impact on achieving the mileage accumulation and reliability growth pre-requisites for Trial Operations. CRL continues to focus its planning activities on a target date for the start of Trial Operations of [REDACTED]. The DCS v1.1 P50 date of [REDACTED] April 2022 for the start of Passenger Service suggests that CRL is on track for Elizabeth Line opening before Summer 2022. However, this must be validated by QSRA once DCS v1.2 (now known as PBU v1.2) development has been completed.

CRL's schedule development for PBU v1.2 is based upon a multiple blockade strategy up to the start of Trial Operations. It is unlikely that the competing demands of train testing, reliability growth, operations and maintenance and the ramp-up to train running, will all be satisfied. Constraining project delivery teams to deliver to target dates will most likely necessitate compromises from key stakeholders (i.e. CRL, RfLI and MTREL). This will add further risk to the schedule, with high potential for activities to be undertaken out-of-sequence, and this will likely impact future rail performance and operations.

PBU v1.2 is the core plan for delivering the Elizabeth Line to a safe, realistically achievable and fully costed completion; it must be fully supported by all stakeholders to ensure successful transition from Trial Running to Trial Operations. PBU v1.2 development is constrained by the drive to achieve target dates, and this approach is distorting the schedule. When completed at the end of [REDACTED], it is possible that PBU v1.2 will be outdated and impractical, because of the cumulative effects of continuing delay and loss of productivity since transition into ROGS.

Very low productivity since transition into ROGS means that there is a lack of comparable baseline metrics against which to measure future performance. There seems to be a high level of optimism and potential over-reliance on right-first-time execution and proposed mitigations. The prevailing challenges being encountered present significant schedule risks to target dates for entry into Trial Operations and Passenger Service. These include access to routeway and stations, isolations and possessions, and residual maintenance works, combined with emerging schedule delays for signalling software development and deployment, and completion of all assurance in demanding timeframes.

Stations delivery has also been impacted by the access difficulties, with particular delays affecting Paddington, Bond Street, Canary Wharf, Liverpool Street and Woolwich Stations. These delays are compounding schedule slippage that has already occurred, and also have the potential to impact the start of Trial Operations.

Appropriate performance metrics are fundamental underpinnings to any schedule, and their absence is a significant concern. The pursuit of target dates will most likely impact delivered scope, cost and quality, and Sponsors are advised to seek assurances from CRL as to the anticipated robustness and credibility of PBU v1.2.

Our concerns are summarised below:

- CRL's pursuit of target dates that are unlikely to be achieved, will drive out-of-sequence working, ultimately leading to deferral of works;
- Currently there are no appropriate metrics to monitor future schedule performance;
- Development of PBU v1.2 is constrained to meet target dates, and will be superseded before implementation;
- There has been no change to CRL's reported Deterministic and Probabilistic dates, or to the AFDCD.
- The Trial Operations target date of [REDACTED] is unrealistic.
- PBU v1.2 must be robust, underpinned, fully assured and risk-assessed, to validate key delivery and P50 milestone dates.

1.2 Health and Safety

Four High Potential Near Misses occurred in Period 1; two were related to access control. The Safety Performance Indicator decreased slightly, although the overall indicators remain within those set by the Programme. Since transition into ROGS, unauthorised access has accounted for over a third of all reported incidents across the Programme. Few new Covid-19 cases are being realised across the CRL sites.

2. Programme Overview

2.1 Schedule

In Period 1, CRL has held the DCS v1.1 forecast Deterministic dates for the start of Trial Operations on [REDACTED] and Passenger Service on [REDACTED]. The Probabilistic dates have also not changed since Period 12, while CRL updates its current DCS v1.1 baseline to PBU v1.2, to include all scope and activities to achieve Trial Operations and Passenger Service.

To date, it is evident that schedule planning and delivery is heavily influenced by senior management aspirations for the earliest opening of the Elizabeth Line. PBU v1.2 development is constrained by these influences through workshops addressing the four main areas of the schedule, through to Trial Operations and Passenger Service, namely: scope, access, assurance and Trial Running Staging Plan. With key strategic risks now materialising, realistic productivity measures to underpin the schedule will be difficult to derive. Continued planning to target dates will drive out-of-sequence working and deferral of works that will require operational restrictions and import risk into the schedule.

To support finalisation of PBU v1.2, 15 scope items that have a high operational impact have been identified. Additionally, a further approximately 300 other items are also being evaluated and categorised, although this number is increasing. Key items have been selected for performance monitoring because of the significance of their impact upon operations and maintenance, if not

completed. The Programme Change Panel is due to process the scope changes; the Panel is planned to be established by the end of Period 2.

Finalisation of the Trial Running Staging Plan is challenging, as CRL works to accommodate all stakeholders; an example of this is the change in planning strategy from three to two blockades. CRL is attempting to accommodate the competing needs of the stakeholders, while also achieving early completion of works to expedite the assurance process. There are also implications to consider for train mileage accumulation and reliability growth, MTREL resource rostering and maintenance shifts. Given the resolution of ongoing access difficulties and emerging challenges associated with signalling software ELR100, it is likely that a complete and fully-underpinned PBU v1.2 will slip beyond its forecast completion date of [REDACTED].

2.2 Commercial and Risk

Our Period 1 analysis is based principally on direct discussions with CRL finance representatives and the subsequent Period 1 EPPR report. The Period 1 Programme performance meetings (PDR and IPR) were cancelled, with CRL concentrating its efforts on developing PBU v1.2. Consequently, CRL is holding its Period 1 AFCDC at [REDACTED], as it did in Period 13, while a review of scope, schedule, risk and resource is being undertaken to underpin PBU v1.2. Neither a QCRA nor QSRA has been undertaken during this period. However, CRL expects to present an updated AFCDC in Period 2, ahead of the finalisation of PBU v1.2.

While we support the CRL strategy to hold its forecast for a period as it progresses schedule development, we are concerned that CRL is proposing to present its cost forecasts before this work is complete. We believe that there will be uncertainty in the forecast while schedule development continues. Until the drivers of cost are fully identified, the AFCDC cannot be reliably underpinned or be given any view of assurance.

In Period 13, CRL proposed an AFCDC of [REDACTED], with [REDACTED] of AFC increases reported by projects, partially offset by [REDACTED] of approved offsets. CRL reports that these were approved via drawdown papers through change control. However, the change papers appear to be retrospective rather than providing guidance, direction and control; they also suggest that delivery decisions focussed on target dates are driving priority.

The impact of CRL's cost review and challenge last period reduced the cost pressures to [REDACTED], but this continues to be excluded from the reported AFCDC. We expect the cost challenge exercise to continue in parallel with the development of PBU v1.2, such that all cost elements will be included in future reported period AFCDC figures. However, a significant number of additional and, as yet, un-costed scope items has been identified, which may exert further cost pressure.

With the AFCDC held in Period 1 and the cost pressures excluded from this forecast, CRL will need to recover [REDACTED], in order to out-turn within the [REDACTED] funding package. To be successful, CRL will need to achieve all its risk mitigations and/or scope reductions. We are concerned that by focussing on delivery to meet target dates, CRL may consume its risk allowances in mitigation, such that the target dates may be met, but spending to [REDACTED].

2.3 Organisation

In Period 13, CRL's Workforce Planning Group processed more than 200 change requests for resources against its Workforce Plan [REDACTED]

While the impact of roles yet to be filled is under review by CRL, this may offer an opportunity for a saving of approximately [REDACTED], which could be made available to transfer to scope in PBUv1.2. However, given that the Workforce Plan is based on Deterministic dates, there are likely to be further cost pressures due to the extension of roles to align with P50 schedule dates.

The ramp-down of the site workforce, that was expected as stations and shafts are handed-over, has not significantly materialised so far. Site resources have ranged through approximately 2,500 in Period 9, 2,000 in Period 11, and 2,400 in Period 1.¹

2.4 Stage 3 Trial Running, Trial Operations and Passenger Service

Transition into ROGS was achieved on time on 27 March 2021, but only because RfLI was able to develop, at a late stage, an acceptable plan for maintenance regularisation (i.e. Maintenance Bridging Works). However, the Maintenance Bridging Works and residual Programme scope planned for completion during the initial [REDACTED] Controlled Introduction Period has beset an organisation which is sized and structured for 'the steady state', and has magnified previously-identified concerns of the RfLI Rule Book for the current phase of the railway. This has resulted in a [REDACTED] delay to the deterministic start date for 4 TPH trials, achieved on 10 May 2021. Although 4 TPH trials have started, RfLI's priority must be to bring stability to the new operating railway environment; the establishment of robust and clear processes under the control of resources fully familiar with the system must take precedence over the gathering of train performance metrics.

In the period, difficulties with control and implementation of railway access has been the main threat to Programme delivery. An independent review has been undertaken that has identified 20 improvement recommendations, including the establishment of a single integrated controlling body reporting to RfLI's COO. This is expected to provide a co-ordinated approach to access control, with consistent procedures and improved communication between parties (i.e. RfLI, CRL and the supply chain). Time will be required to implement fully the improvement plan, but it is expected some short-term wins can be realised to re-start station works.

From Period 2, PSSG will report on the performance metrics of 10 selected workstreams, split between CRL and RfLI, that are required for entry into Trial Operations. Issues that are vital to delivery are to be escalated from the PSSG forum to executive leadership for intervention, if necessary. Delivery of reliability growth and assurance, and the Trial Running Staging Plan, are important workstreams for incorporation into PBU v1.2.

The constraints imposed on the schedule for entry into Trial Operations make it impossible to satisfy all stakeholders. A change in strategy from the single August 2021 Blockade, to two smaller blockades in July and August 2021, highlight CRL's difficulties. Completion of the remaining PMSE (Project, Maintenance, Snagging and Enhancements) works for routeway and stations and completion of assurance must be balanced against achieving mileage growth, train and system testing and operations trials. RfLI's need to complete significant residual Maintenance Bridging Works, emergency maintenance and routine works, while reducing the conflict with CRL's PMSE activities, are important planning considerations. MTREL's requirement for FLU access to Old Oak Common Depot from the GEML, and its ability to provide drivers to support 24-hour work patterns, must also be considered. Consequently, the schedule up to Trial Operations is heavily congested and contains no float. The emerging schedule pressures on ELR100 delivery continue to pose a threat to the August 2021 Blockade and the overall schedule. Without contingency factored into the Trial Running Staging Plan, the target date of [REDACTED] for entry into Trial Operations is

¹ CRL Dashboard Week 1 Period 2.

unrealistic. A risk assessment against the planning dates is also required to validate the P50 date for Trial Operations and Passenger Service.

Initial indications suggest that 12 TPH trials will start in mid-July 2021, later than originally planned; its duration is currently based upon the minimum required number of days operation. FLU reliability mileage is currently down 53% against DCS v1.1²; emerging unforeseen issues during the Trial Running period are likely to further threaten mileage growth.

The deployment of signalling software PR7 in early May 2021 has brought improved reliability, and 4 TPH trials are able to proceed with many operational restrictions removed.

The [REDACTED] target date for entry into Stage 3 Passenger Service is unlikely to change, even when PBU v1.2 is fully developed and approved. With key stakeholders required to commit to the [REDACTED] date, compromises will be necessary (e.g. operational restrictions) to facilitate achievement of the target date.

2.5 Stations Commissioning and Handover

Stations progress has been hindered by difficulties with access. Changes to access management processes for RfLI secure rooms on stations have added a further 2 weeks of delay to slippage previously identified, and will be challenging to recover. Additionally, suspension of all TVS works across the Central Section has been necessary following a serious HPNM incident at Bond Street Station and, until the root cause has been identified and improvement measures put in place, additional delays are likely. A review of the Integrated Access Plan is expected to identify improvements to existing processes, but a pragmatic approach will be necessary in the meantime.

Achievement of SC2 and SC3 ROGS for Trial Operations, respectively, at Bond Street and Canary Wharf Stations, continues to be a concern. Liverpool Street and Woolwich Stations are the next due for handover, but the recent difficulties with access have reduced to zero the schedule float to BIU.

While three stations have been successfully handed-over by their forecast Deterministic dates, the compromises necessary to achieve these milestones mean there remains deferred work to complete during the T+ period, before they can become fully operational.

2.6 Assurance

Completion of the Maintenance Bridging Works plan was a pre-requisite to the start of 4 TPH trials. However, poor progress resulted in the adoption of a risk-based rather than an evidence-based approach to TRRAC acceptance by ITAP.

Workshops have been undertaken to streamline safety assurance delivery, and provide greater certainty of achieving target dates; however, existing processes are well established, and there is limited opportunity to change. Concurrency of assurance delivery in the periods leading up to Trial Operations adds further risk to successful achievement. This includes at Paddington, Canary Wharf, Bond Street and Whitechapel Stations, and in Rail Systems (e.g. Signalling, TVS, PSD and Communications and Control). The volume of activities associated with RAM demonstrations and compliance reporting prior to station handovers is also concerning. There is also a concern about the level of resources available to deliver the current plan. CRL's blockade strategy will be important to facilitate the earliest and efficient processing of information required to complete the assurance activities prior to the start of Trial Operations.

² ELC Committee Dashboard for 20 May 2021.

The StEJ process that supported transition into ROGS will not be widely available to CRL for Trial Operations readiness. A right-first-time approach will be crucial to expedite the assurance process, and the incorporation of past learning will be valuable underpinning to PBU v1.2. CRL's adherence to the delivery plan will be important to allow RfLI to meet its obligations on safety assurance leading to Trial Operations.

2.7 Future Stages

The Stage 4A timetable was implemented on 16 May 2021, and infrastructure works to support FLU operations have been completed. FLUs were not in passenger service at the start of the timetable change, as there was uncertainty whether the Central Section would be available at the date when a commitment to starting the service was needed. With FLUs planned to start passenger services on 25 May 2021, the fleet available to support the service is currently limited to between 4 and 6, with a mixture of RLUs and Class 315 trains, until the completion of the August 2021 Blockade. From that point, there will be a rapid transition to a full FLU fleet.

The proposed replacement of [REDACTED] is currently under review. Evaluation of the risks and benefits of [REDACTED] will need to validate that there is not an unacceptable risk to the delivery of Elizabeth Line and main line timetable operations, when implemented.