



**Crossrail Project Representative**

**Crossrail Joint Sponsor Team**

**Sponsor Summary**

**Project Status Report 153**

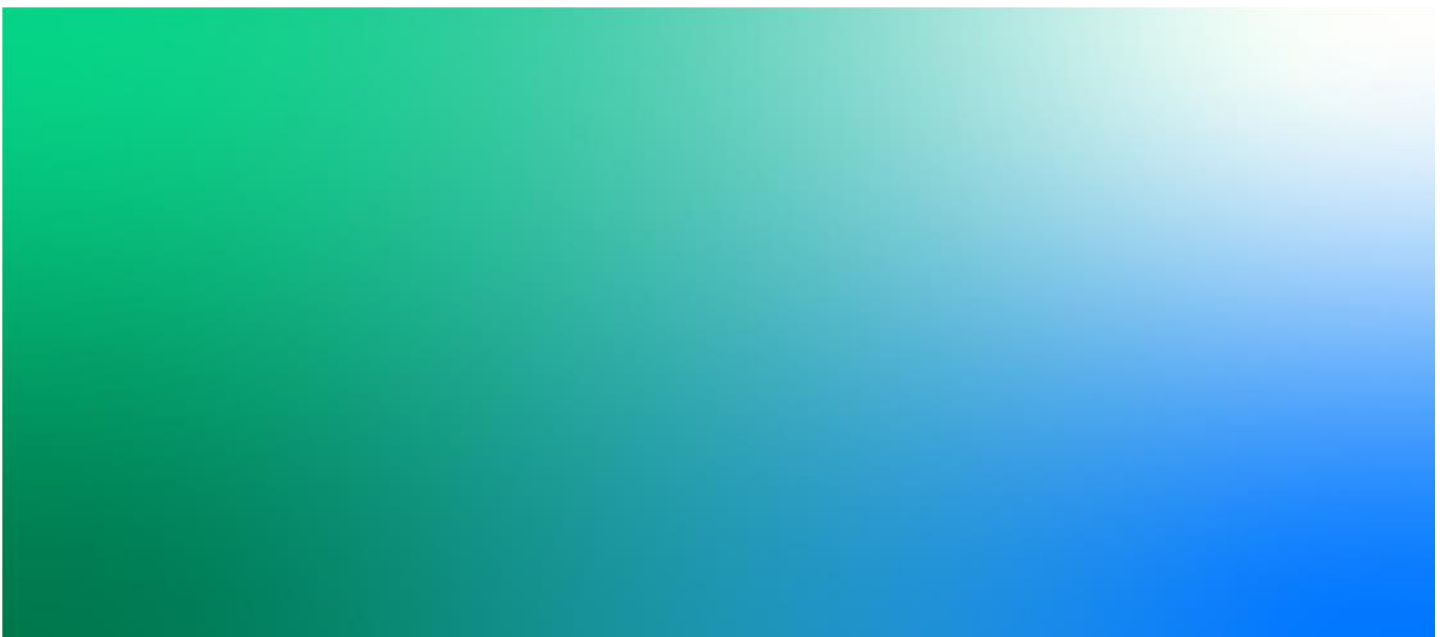
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## Sponsor Summary PSR 153

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Note: This report relies on the information set out in CRL's Period 4 reports augmented by more current information received by PRep during the course of our routine discussions with CRL since the Period close on 23 July 2021. Note that information emerging after the close of Period 4 is subject to formal confirmation by CRL in its Period 4 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   |
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| 1.       | 16/8/2021 | PSR 153 Period 4 FY 2021-22 Sponsor Summary v1.9 ~ Draft  | [REDACTED] | [REDACTED] | [REDACTED] | [REDACTED] |
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## Sponsor Summary

### 1. Observations

CRL has continued the development of DCS v1.2 in the period, and with a series of supporting cost, risk and scope reduction workshops; it expects to formally issue the completed plan with updated costs in September 2021. While there is clear commitment from CRL, key milestones in DCS v1.1 J6 are already under threat, and the compounding effect of 12 TPH trials failures and further delays in stations delivery has significantly increased schedule pressure.

The recent rise in Covid-19 cases might have a critical impact upon the Programme in the lead-up to Trial Operations. However, we are encouraged by the resilience planning and contingency working initiatives which CRL has implemented to protect the schedule.

12 TPH trials re-started as planned following completion of the June/July 2021 Blockade. CRL and RfLI management now have access to dashboards that indicate the status of maintenance works, although inclusion of the forecast plan of works would further benefit monitoring approaching Trial Operations. The PSSG forum is providing appropriate focus and a route for escalation of issues for executive management attention.

#### 1.1 Headline Concerns

CRL resumed 12 TPH trials following completion of the June/July 2021 Blockade, but it has proved difficult to sustain a period of consistent service, because of a range of known and emerging technical faults. Many of the known faults are planned to be fixed with the deployment of ELR100 in [REDACTED]. However, the new software may also impact the ability to exit Trial Running if it introduces unwanted behaviours. In the meantime, CRL is having to avoid some of the disruption by careful management of train headways during Trial Running. While this necessitates running trains at lower frequencies than 12 TPH, it allows some meaningful testing to continue, albeit there will be reduced returns from 8 TPH running. Achievement of a stable service will require the removal of the more than 50 Operational Restrictions currently in place and there is a risk that more might be introduced, for example to address residual faults with ELR100 and ELR110 (formerly known as ELR11X). ITAP safety acceptance of Auto-Reverse functionality has also not yet been secured. Cumulatively, these issues mean that opportunities for mileage accumulation and reliability growth are reduced and the step-up to 24 TPH trials has been delayed.

DCS v1.1 J6 was established as an interim schedule for performance measurement in Period 3; while it was a significant improvement on DCS v1.1, it has quickly become outdated. Demand for trace access for completion has increased, for example because of extra pre-commissioning tests for ELR100, additional Tunnel Ventilation System (TVS) mode change works, and the re-planning of Bismarck Tests; this, in turn, is reducing the time available for System Testing with a Train (STT) and mileage accumulation. A revised Trial Running Staging Plan will require sign-off by all stakeholders, and we anticipate that agreed compromises will use any schedule contingency previously provided; the revised Plan is expected to be included in DCS v1.2.

The Trial Operations Configuration continues to be developed for finalisation and agreement with all key stakeholders. The Configuration State Description, a key component of the Trial Operations Configuration, has yet to be completed, but is important because it sets the criteria for entry into Trial Operations and supports the completion of the assurance process. An opportunity for an early start to the Trial Operations readiness countdown has been missed and a future start date has yet to be declared by CRL.

While stations are generally achieving their deterministic dates for handover, with agreed deferral of certain scope elements up to Trial Operations, costs continue to increase. Control of these costs is the subject of recently completed cost reduction workshops which are considering [REDACTED] and the identification of non-critical scope that can be deferred until after Passenger Service has started. We are concerned that the scope to complete at Canary Wharf Station continues to 'evolve' as CRL tries to bring the station up to full compliance with LU/RfLI standards. Rapid conclusion of these issues is necessary to ensure that the re-scheduled deterministic date of [REDACTED] for completion is achieved. A detailed review of Bond Street Station scope, schedule and costs, and options for earlier delivery, is being supported by the cost reduction workshops. Delivery delays are moving both Canary Wharf and Bond Street Stations closer to the critical path.

While CRL and RfLI engage in workshops on scope and cost reduction and [REDACTED], it is unlikely the associated AFDCD for Programme completion will be finalised within Period 5. Commercial arrangements for [REDACTED] and [REDACTED] for scope beyond Stage 3 opening also need to be concluded to fully inform the AFDCD. Outcomes from the cost reduction workshops will be reported next period. However, we believe it is improbable that CRL will outturn under the £825m funding threshold. Following this reporting period cut-off, CRL has held its AFDCD to £15,939m<sup>1</sup> for the third consecutive period, despite emerging cost pressures. The movement adjustments observed in the period require further clarification from CRL.

There are considerable challenges in almost every delivery area of the Programme. It is evident that there is insufficient time for target dates to be met and that pressure is increasing on the achievement of the start of Trial Operations on the deterministic date of [REDACTED] November 2021; we do not believe it will be possible for CRL to deliver full Trial Operations on that date. The forecast P50 date for the start of Trial Operations has slipped from [REDACTED] February 2022 to [REDACTED]. Stage 3 Passenger Service has moved to [REDACTED] May 2022<sup>2</sup>, but remains within the latter part of the declared opening window of the first half of 2022.

Our concerns are summarised as follows:

- The Elizabeth Line completion plan has yet to be finalised in DCS v1.2 and risk assessment is still necessary to provide certainty to key milestone dates and final costs;
- Milestones dates in interim schedule DCS v1.1 J6 are under threat, and significant challenges in systems testing, stations and assurance will prevent the start of full Trial Operations on [REDACTED] November 2021;
- Canary Wharf and Bond Street Stations are close to being back on the critical path and Abbey Wood Station requires completion by NR, putting at risk the start of Trial Operations and Passenger Service;
- Poor Trial Running and railway systems testing performance, and limited schedule opportunity to build reliability growth, is threatening earliest Passenger Service.
- Cost and scope reduction workshops are revealing few significant achievable cost savings opportunities and point towards a future priority focus on cost containment.

<sup>1</sup> Elizabeth Line Delivery Group Meeting papers, 19 August 2021.

<sup>2</sup> Executive Programme Performance Review, Part B, 11 August 2021.

## 1.2 Health and Safety

RfLI reported one significant incident with a voltage transformer in Period 4; this is under investigation. The overall indicators remain within those set by the Programme. CRL continues to focus on the communication of change and implementation of new procedures for safe access, resulting from updates to RfLI Green Book. Covid-19 cases increased significantly in Period 4, and these are mainly linked to transmission from outside the Programme. Covid-19 continues to be a threat to the Programme.

## 2. Programme Overview

### 2.1 Schedule

DCS v1.1 J6 was adopted in Period 3 for the monitoring of performance towards Trial Operations and Passenger Service. However, several challenges have since emerged that are putting pressure on this schedule. For example, the rise in Covid-19 cases has impacted resource availability and resulted in some re-scheduling of works. Preparatory works ahead of TVS mode changes require access before the ██████████ Blockade that has not been allowed for in DCS v1.1 J6. The unplanned rescheduling of Bismarck Tests also requires further access time. Collectively, these issues are having an impact on Trial Running, and in particular on System Testing with the Train (STT), with the majority of the shifts lost to accommodate other project works.

It is increasingly apparent that the DCS v1.1 J6 contingency is likely to be used to accommodate competing outstanding works into an already tight schedule, ahead of the start of Trial Operations.

The critical path to the deterministic date for the start of Stage 3 Passenger Service on ██████████ February 2022 is through the implementation of signalling software ELR110. This is planned to be commissioned at ██████████, with delivery closely linked to signalling works on the GWML being carried out by NR at the same time. These works require close attention from both CRL and NR, to ensure that they are properly co-ordinated, and to ensure that there is no impact upon the start of Stage 3 Passenger Service.

ELDG's approval<sup>3</sup> of the delivery strategy for signalling software ELR200 and ELR21X in 2022 allows CRL to finalise access planning for Stage 5B, for incorporation into DCS v1.2. This will allow CRL to develop the Stage 5 delivery element to the same level of detail as the rest of the schedule, including identified access windows, a full suite of milestones and P50 and P80 schedule forecast dates. It is expected that this will inform the updated AFCDC position for Programme completion.

### 2.2 Commercial and Risk

In Period 4, CRL reported<sup>4</sup> a draft AFCDC of ██████████; an increase of ██████████ from Period 3. This increase was attributed to an additional ██████████ AFC and Risk and ██████████ offsets. At the Period 4 EPPR, CRL reported<sup>5</sup> an updated draft AFCDC of ██████████. The increase of ██████████ was attributed to an additional ██████████ AFC and Risk, and ██████████ offsets, which includes ██████████ AFC reduction agreed within the cost reduction workshops. These variances are most likely due to cost reporting for the period progressively evolving as a result of CRL's endeavour to contain costs within its funding limit. The final Period 4 AFCDC is subject to CRL's executive review and update for ELDG endorsement.

<sup>3</sup> Elizabeth Line Delivery Group meeting, 22 July 2021.

<sup>4</sup> Project Development Review, 29 and 30 July 2021.

<sup>5</sup> Executive Programme Performance Review, 11 August 2021.

Cost reduction workshops are reviewing the scope to completion to achieve a safe reliable 24 TPH railway to Stage 5C, while minimising expenditure in order to remain as close as possible to the £825m funding level. The workshops<sup>6</sup> include a review of the cost reduction/opportunity on the costs-to-go for Stations, Routeway, Operations and Indirect Resources. At the time of writing these workshops have only just been completed, and cost forecasting remains subject to review and change, in order to deliver a final position for Period 4. However, initial workshop output indicates a draft range between ██████ to ██████ of potential opportunities; these remain strategic and subject to validation by CRL. This range of proposed cost reduction is presently not fully underpinned and is unlikely to fully recover the excess of cost forecast above current funding. The ongoing cost and scope reduction workshops point towards a future priority focus on cost containment.

The widening gap between funding and limited opportunity to fully offset costs, together with increasing cost pressures, reaffirms our opinion that it is improbable that CRL will outturn under the already agreed £825m funding threshold. The cost reduction workshops will result in commitments and actions to contain costs within CRL's previously requested upper funding limit, and offer improved certainty to maintaining within the funding limits; however, the speed with which the actions are implemented through the supply chain will be vital.

We are currently reviewing the seven Supplemental Agreements completed and executed since March 2021. However, we have deferred our analysis until finalisation of the outcomes of the cost reduction workshops, as there may be consequential alignment revisions and amendments. A further seven Supplemental Agreements are in development that principally focus on various final accounts or ongoing maintenance provisions. Similarly, these Agreements may be subject to further iterations to take account of the workshop conclusions.

### **2.3 Organisation**

The cost reduction workshops include a focus on the Indirect resources required to complete the remainder of the Programme and the assumptions that underpin DCS v1.2. The outcomes from the workshops will set CRL's strategy for management restructure and for defining a reduced organisation to support RfLI in the opening of the end-to-end railway. In the meantime, a number of key resources have started to depart the Programme from early July through to the end of August 2021<sup>7</sup>. The recent departure of the Head of Engineering from the RfLI team presents an additional risk to achieving Trial Operations.

CRL will be completing an ISO9001 audit by Lloyds Registry on its CMS management systems in Period 5. A successful audit is anticipated, which will support CRL completing the remainder of the Programme.

The rise in Covid-19 cases has impacted the Programme because of the need for staff self-isolation. CRL does not intend to change its strategy for managing Covid-19 in the near future, and will maintain this beyond the next government update on restrictions in mid-August 2021.

### **2.4 Stage 3 Trial Running, Trial Operations and Passenger Service**

Trial Running re-started with a 12 TPH service on 12 July 2021. Since the restart, a number of operational challenges have been experienced, and this sub-optimal performance is likely to continue until fixes can be implemented.

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<sup>6</sup> Cost Reduction Workshops Week 2 Period 5, 2 to 6 August 2021.

<sup>7</sup> Executive Group Meeting, 27 July 2021.

The deployment of ELR100 software is scheduled in the [REDACTED] Blockade, and preliminary testing was undertaken at the end of Period 4. While this was seen to be a success, works were impacted due to Covid-19, which required additional possession time; consequently, planned mileage accumulation has been reduced.

Train reliability performance in Period 4 has generally been poor. The compounding effects of successive faults are significantly affecting daily operations. Only 2 out of 7 days of 12 TPH running were achieved, with the remaining 5 days reduced to 8 TPH<sup>8</sup>. CRL's challenge will be to manage the disruption during the remainder of the Trial Running period to allow as much meaningful testing as possible. STT is being impacted, and there is a risk that insufficient evidence will be produced to demonstrate that the railway meets the reliability criteria for entry into Trial Operations. A significant increase in train reliability, as measured by MTIN, is also necessary for entry into Passenger Service<sup>9</sup>.

Given the difficulties with 12 TPH trials, the planned preparatory exercises and demonstration of a 24 TPH service in August 2021 have been delayed. Auto-Reverse functionality is required for 24 TPH operation, but the preparation of safety assurance acceptable to ITAP is proving difficult. As a consequence, schedule risk is building in the approach to Trial Operations.

A substantial number of Operational Restrictions (68)<sup>10</sup> are currently in place which have an impact on performance; ELR100 deployment is expected to reduce this to 13. In the meantime, RfLI works closely with CRL and MTREL to reduce the dependency of the Programme on Operational Restrictions.

CRL and RfLI management teams now have visibility of access and maintenance performance through weekly dashboards. While improvements being delivered by the Access Improvement Initiative and Engineering Hours Improvement Plan are evident, they need to be effective to support the reduction in engineering hours for the start of Trial Operations. RfLI continues to review and refine the maintenance work bank, which is indicating that 34% of the asset is non-compliant, but with an improving trend. Performance will need to be monitored regularly to ensure that outstanding maintenance does not become a barrier to entry into Trial Operations.

The Trial Operations Configuration State Description will set the criteria for entry into Trial Operations. It will define the system configuration and functionality (or, if not achievable, the required mitigation measures) that will be in place at the start of Trial Operations, and identify the associated assurance evidence. Completion of this document has continued to slip and it is now not expected to achieve cross-organisational sign-off until towards the end of August 2021. Experience gained since the start of Trial Running is planned to be reviewed in "Day in the Life of" workshops, in order to de-risk entry into Trial Operations. These types of workshops have been used to good effect by CRL in the past.

## 2.5 Stations Commissioning and Handover

Stations transfer progress has been maintained, with Liverpool Street Station achieving BIU on the deterministic date of 3 July 2021. While Paddington Station did not meet the planned BIU date of 23 July 2021, it achieved the re-forecast BIU transfer on 6 August 2021. This delay was necessary to allow time to complete test assurance activities related to Acceptance Certificates (ACs). Whitechapel Station is forecast for handover on 23 August 2021.

<sup>8</sup> Weekly Performance Report, Trial Running, 11-22 July 2021.

<sup>9</sup> CRL Weekly Dashboard, Week 4 Period 4.

<sup>10</sup> CRL Weekly Dashboard, Week 3 Period 4.

While SC3 ROGS and BIU has been achieved at 6 of the 10 Central Section Stations, each still has varying amounts of physical works, assurance documentation and Asset Data still to be completed. CRL has agreed with the IMs that works can be completed after BIU transfer, but before Trial Operations. Agreements include the later submission of assurance documentation and the meeting of reduced requirements for upload of Asset Data into RfLI's database system (known as Maximo).

[REDACTED]  
[REDACTED] This will drive additional cost pressures by increasing prolongation costs.

Both Canary Wharf and Bond Street Stations have much physical work to complete but have experienced constrained access since ROGS transition in March 2021. The lack of underpinned and fully integrated schedules for completion at both stations, suggests further delays are possible. The start dates for the readiness countdowns to BIU have yet to be confirmed.

Canary Wharf Station continues to generate more challenges for resolution before the start of Trial Operations. Progress towards the SC3 ROGS milestone has been hampered by continued discoveries of [REDACTED] and non-compliant material/installation, and additional scope items have been identified that must be completed for SC3 ROGS. Issues have been found with fire systems, and concern remains that further works requiring long-lead items may be necessary, adding to the schedule pressure. An accelerated assurance process bespoke to Canary Wharf Station has not yet been agreed or implemented. CRL's mitigation is to mobilise resources from other parts of the Programme to support the preparation of assurance documentation. CRL's latest schedule date for BIU has slipped from [REDACTED] to [REDACTED], with approval of the ACs driving the forecast; a revised date of [REDACTED] has been presented to EPPR<sup>12</sup>. We are concerned that this date will slip further and that Canary Wharf Station delivery is moving towards the critical path for entry into Trial Operations.

Bond Street Station is lagging well behind the other stations and still has mechanical and electrical works to complete. A finalised delivery plan, assurance strategy, and integration scheme to complete the station to SC2 and BIU is required. CRL continues to maintain that Bond Street Station will achieve SC2 on the deterministic date of [REDACTED], although the project teams are forecasting [REDACTED] [REDACTED]. Achievement of SC2 is important for entry into Trial Operations. The [REDACTED] date for BIU is likely to slip and work to achieve BIU/SC3 in [REDACTED] is under detailed review by CRL.

CRL has identified a change in approach in which Abbey Wood Station will be commissioned in one stage instead of two. The new target date will be [REDACTED], although not all functionality will be in place (e.g. it will include lifts but not escalators) and to meet this date requires co-ordination and support from NR.

CRL is working to conclude the commercial close-out strategy across all the stations. We remain concerned that there continues to be a 'long tail' associated with completing all works after station handover. While CRL has a target to [REDACTED], this is proving to be difficult to enforce, and risks increasing prolongation costs. The series of workshops planned for early August 2021 is intended to close the issue of scope-to-go and identify potential scope for deferral. [REDACTED]  
[REDACTED]

<sup>11</sup> Elizabeth Line Delivery Group meeting, 22 July 2021.

<sup>12</sup> Executive Programme Performance Review meeting, 11 August 2021.

<sup>13</sup> Project Delivery Reviews, 29 July 2021.



Woolwich West Shaft was handed-over to the IM at the end of July 2021; only the handover of Bond Street Station shaft remains, which is anticipated in August 2021.

## 2.6 Assurance

Outstanding station assurance activities include the delivery of ACs, As-Built Drawings, O&M Manuals, H&S Files and Asset Data. Several review iterations of Asset Data are proving necessary to meet agreed standards, requiring resources to stay longer on the Programme. Completion of the O&M Manuals that require As-Built Drawings and ACs is proving time-consuming and frustrating and may pose a threat to start of Trial Operations.

With the June/July 2021 Blockade completed, delays are occurring in the processing of the documentary evidence to support the assurance process<sup>14</sup>. This is due to both resource constraints and timely processing of information from CRL's supply chain into its management system. This will necessitate further follow-up by CRL.

CRL continues to review the EOWs that must be cleared ahead of Trial Operations and Passenger Service. Many of these are linked to the closure of Dependencies and the completion of Safety Justifications, and to the CESAC required for the start of Trial Operations. The data suggests that the burn-down of Dependencies is slowing and this may threaten timely completion of the assurance process.

## 2.7 Future Stages

Services on the GWML will be altered in the [REDACTED] timetable changes to facilitate the implementation of Stage 5B. These are referred to as Stage 5A+ and Stage 5A++.

The opening of Stage 5B depends upon reliable performance of Stage 3 operations, the implementation of software configuration ELR200, and the completion of power upgrade work at Plumstead Depot. Software deployment is likely to require a window over the [REDACTED], followed by ELR21X in [REDACTED]; risk assessment may indicate that additional<sup>15</sup> weekend possessions on the Central Section after [REDACTED] are necessary for bug fixes. CRL and RfLI will target Stage 5B opening in [REDACTED] and this is expected to be reflected in DCS v1.2 as a deterministic date.

Software configuration ELR300 will be required to facilitate the end-to-end operation of Stage 5C services.

MTREL will distribute the Stage 5B timetable to stakeholders for discussion. This will be followed by a timetable bid in early [REDACTED]. However, should CRL achieve Stage 3 opening in May 2022 (the P50 date), there may not be sufficient time to evidence a reliable service and this may pose a threat to the approval for the opening date for Stage 5B.

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<sup>14</sup> CRL Weekly Dashboard, Week 3 Period 4.

<sup>15</sup> Additional to the two 52-hour weekend possessions per annum provided for in the RfLI Possession Plan.

<sup>16</sup> Period 4 Schedule Integration Review Meeting, 28 July 2021.