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Crossrail Project Representative

Crossrail Joint Sponsor Team

Sponsor Summary

Project Status Report 133

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Note: This report relies on the information set out in CRL's Period 10 reports augmented by more current information received by PRep during the course of our routine discussions with CRL since the Period close on 5 January 2020. Note that information emerging after the close of Period 10 is subject to formal confirmation by CRL in its Period 10 reports. This report is supplemented by our weekly reports to JST and regular meetings with JST staff.

Document history and status

Revision	Date	Description	By	Review	Approved
1	29 January 2020	PSR 133 Period 10 FY 2019-20 Sponsor Summary v1.1 ~ Draft	[REDACTED]		
2	3 February 2020	PSR 133 Period 10 FY 2019-20 Sponsor Summary v1.3 ~ Final	[REDACTED]	[REDACTED]	[REDACTED]

Sponsor Summary

Health & Safety Performance

Due to Christmas occurring during this period, the amount of construction work was significantly reduced (31% reduction). Performance in the period was generally in line with CRL’s current averages, with 3 HPNMs, zero RIDDORs and 1 LTI.

CRL continued to engage its Tier 1 suppliers and challenge them to raise their own performance levels, rather than rely on CRL. We support this approach and would suggest CRL considers highlighting which suppliers are delivering against this challenge.

H&S KPI	Period 8	Period 9	Period 10
HSPI	2.59	2.63	2.59
RIDDOR AFR	0.09	0.09	0.09
HPNM	0.32	0.34	0.37
LTI	0.17	0.17	0.17

Figure 1 - 1 ~ Health and Safety Performance COS

Programme Delivery

Transition to ROGS

During this Period, CRL has confirmed its plan to start Trial Running on [REDACTED]. CRL has started to pivot its efforts towards this date, highlighting what is needed pre-ROGS and what can be deferred until after. This visualisation process is currently being transformed to align with the items needed for ROGS.

CRL has set itself a target to define the work to complete by the end of January 2020, using the Element Outstanding Works List (EOWL) process. While 14 out of the 30 elements that make up Crossrail have been assessed, it is evident that not all scope has been included; for example not all snags are included on this list. Only 7792 EOWs (which are meant also to include, for example, NCRs, as-built records etc., have been identified by CRL, but based upon our experience we would have expected this number to be in the region of 50 - 75,000. The definition of the scope to complete is improving, but it is not where it needs to be and is one of the core reasons why the delivery schedule continues to slip, period on period.

In addition to the scope to complete exercise, CRL has also started to define whether the EOWL items are needed pre-ROGS or Post-ROGS. From the 7,792 EOWs, CRL has identified that 7720 are needed before Trial Running, which is extremely high and not necessary. CRL may need to provide greater clarity to the teams, to allow the remaining scope to be correctly allocated.

High Level Schedule Summary

Following the CRL Board Meeting held on 9 January 2020, CRL announced that the Trial Running start date was [REDACTED] and that Stage 3 Opening would take place in Summer 2021. Two significant interventions are necessary to achieve the Trial Running date: the implementation of an integrated approach to the remaining works to be delivered, and the creation of an Integrated Delivery Team to close-out the outstanding works.

CRL is continuing to revise the dates in the DCS to incorporate a move away from 'planning to targets', to milestones based on current productivity rates. The incorporation of the Alternative Delivery Model (ADM) and the incorporation of the End-to-End Plan also have significant impact on the schedule and would warrant a re-baseline to align with the [REDACTED] Trial Running. CRL is targeting the end of February 2020 for this exercise to be completed, however this is a huge undertaking and we would suggest the end of March 2020 to be a more realistic target.

The timeline for completing the full stand-up of the ADM is scheduled for completion by the end of April 2020. A more detailed schedule will be developed by end of January 2020 to be used for monitoring and reporting progress.

The slippage of the Trial Running start date from the Period 9 date of [REDACTED] is due to the assurance process associated with the signalling software, and the achievement of SC1 at Bond Street Station.

A total of 41 out of 120 Cardinal Milestones have now been completed to date, against an approved plan of 53. Of the 79 remaining milestones, 73 are now forecast beyond the [REDACTED] with 6 forecast to be within the approved date. The number of Cardinal Milestones with more than 50 days negative float has increased in the period to 47

CRL 3 Lines of Defence

As reported in Period 9, we considered June 2020 to be the earliest point at which the DCS schedule could be assured by an external body. This was due to the volatility of the schedule, the requirement for a subsequent period of stability in the schedule and the time taken to complete the assurance exercise.

Based on this period's performance (dates have slipped 3 months in last 2 periods), we now believe there is limited benefit in assuring the full schedule. Following the logic above, it would not be possible to assure the DCS until August 2020. By August, CRL is planning on completing the majority of the works and the disruption to the delivery teams required to assist the assurance process may outweigh the benefits of an assured schedule. The impact of this approach is the schedule (and cost) will not be as stable or controlled as would normally be expected of a programme of this size, at this stage of the project. Whilst we do not consider there is value in reviewing the full schedule, CRL may want to consider focussing their assurance work on the critical path to protect the proposed ROGS date.

1st Line of Defence

As reported previously, it is important that CRL teams all work to common standards, to ensure consistency and robustness of the product. Figure 1 - 2 shows the number of procedures still overdue:

Function	Outstanding Procedures (Period 9)	Outstanding Procedures (Period 10)
Project Controls	1	1
Support Functions	6	0
Finance	0	0
Operations	4	4
Programme Delivery	7	3
Technical	8	7

Figure 1 - 2 ~ Outstanding CRL procedures

2nd Line of Defence

Targeted Assurance Reviews

No TARs were submitted for review this period. TAR13 MEP certification and TAR14 Completion readiness assessment are ongoing and we expect these to be issued in the next two periods.

Period Assurance Reviews

The CRL Assurance Team has identified a number of key observations:

- **Real time assurance** – CRL Assurance Team has concluded that a set piece assurance review is not possible, for the reasons we identify at the beginning of this section of the PSR. However, CRL has suggested a real-time assurance approach, which, without seeing the details of the process, we remain sceptical as to the benefits.
- **Schedule adherence** – CRL Assurance Team has stated that based on current performance levels, ROGS is not achievable until [REDACTED] without key interventions. This aligns with our view in our Period 8 report.

3rd Line of Defence

No audits have been issued for review, although both cost management and workforce planning are imminent and fraud, conflicts review and H&S are ongoing.

Cost, Commercial & Risk

The P50 AFCDC has increased by £11m in Period 10 to £15,324m. This is £361m above Sponsors Funding of £14,963m. This increase is based on a revised DCS forecast, alignment with Tier 1 Contractors and reassessment of overall risk and contingency.

The Period 10 AFCDC is based on the [REDACTED] date of [REDACTED] for Trial Running being deferred to [REDACTED]. At Period 10, costs were built up from the alignment with Tier 1 contractors achieved through adjustment of the top down overlay and risk and contingency reviews carried as a function of CRL review of project AFCs.

The AFCDC still remains dependent on the achievement of key schedule dates, which continue not to be fully underpinned by the current assurance document production rates. CRL had intended to carry out deep-dive reviews on all projects to review the respective AFC position, but these are no longer planned. However, CRL is now instigating separate detailed reviews of the prolongation risk next Period which PRep will be attending. We would expect CRL to complete its review of scope, schedule and resourcing for the ADM to be undertaken in advance.

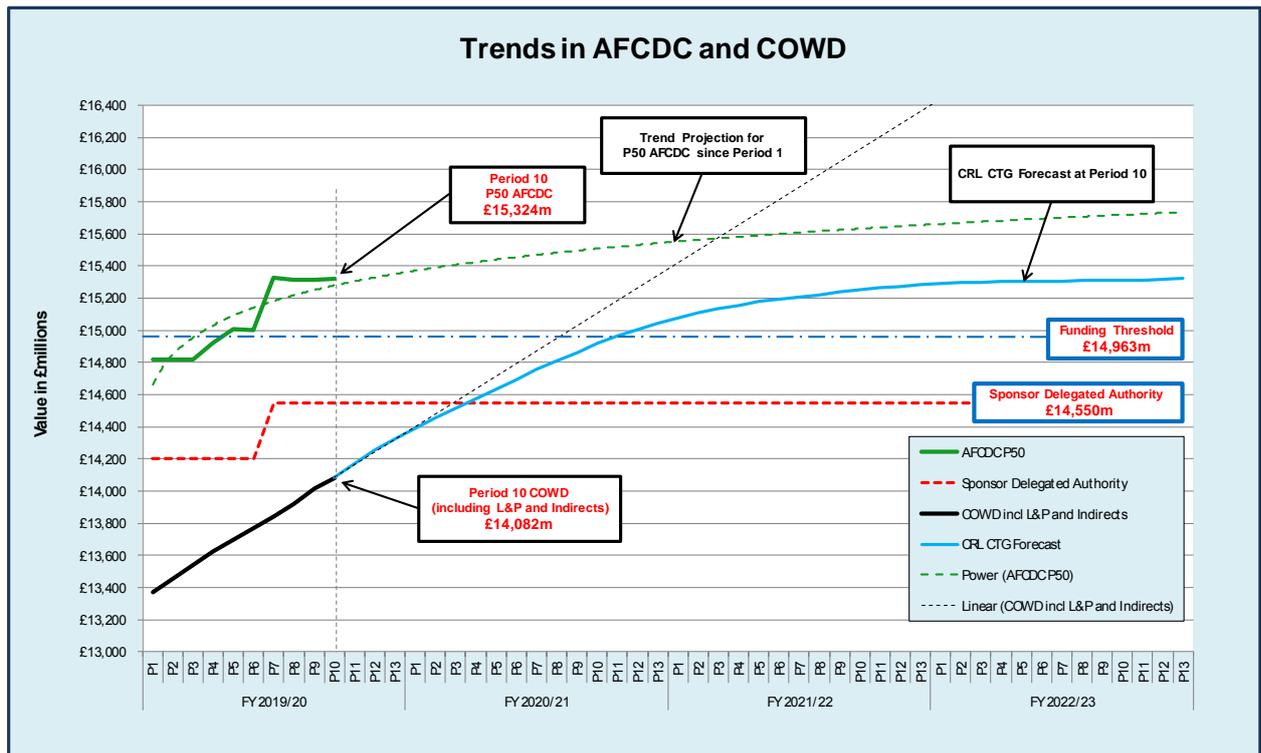


Figure 1 - 3 ~ AFDCDC Headroom to Sponsor Delegated Authority

We refer to CTG inclusive of risk, mainly due to risk being predominantly CTG in principle. Consequently, our assessment puts COWD movement over the past three periods at [REDACTED], versus a CTG+Risk sum of [REDACTED]; a net difference of [REDACTED]. Over the past 6 periods (since Period 4), COWD has increased by [REDACTED] compared to a reduction in CTG+Risk of just [REDACTED]. It appears to us that the rate of COWD spend is more than the corresponding rate of reduction for CTG+Risk. The increase of Risk versus CTG percentages, from [REDACTED] are taken directly from the Period 9 and Period 10 CRL Board reports.

Stage 2B

Assuming approvals are achieved and reliability performance is met, the first FLU in passenger service to Heathrow is likely to be in [REDACTED]

In the table below we have shown Period 1 dates to highlight the slippage to the programme over the last 10 periods. Red text denotes changes from Period 9.

The expected completion of Y1.3 software authorisation has slipped by 6 weeks in the last period¹. The primary cause of this particular delay has been the additional time taken by BT to produce documentation required to support its application to the ORR.

¹ Period 9 forecast 8 January 2020.

Configuration.	Expected completion		Risk could extend to:		Comment
	Period 1	Period 10	Period 1	Period 10	
Y 1.3 ²	████████	████████	████████	████████	This is the configuration that will be authorised by the ORR for APIS.
Z 1.x ³	████████	████████	████████	████████	Passenger Service approved software.

Figure 1 - 4 ~ BT Software Configuration

Stage 3

There has been limited progress on the SSPs during the period; mainly due to the 2 weeks of Christmas holidays taken by most of the contractors. We note that some ‘critical’ works were undertaken at Paddington and Bond Street Stations, during the holiday period. Many of the Stations, Portals and Shafts have, in the period, held the forecast SC3 and Handover dates reported in Period 9. We are, however, concerned to see that the relatively low level of activity has still resulted in some of the sites reporting further delays.

The delivery teams have noted that some of the stations still appear to be working towards different key target milestones. In addition, the requirements for, and the complexity of, the staged configuration approach for SC1, SC2, SC3 and SC3R, still appear to be confusing the teams, and has led to ambiguity in the detailed scope required for each⁴; despite the recent CEG clarification of the various Staged Completions. To eliminate this apparent confusion, CEG has been asked to issue a further CEC clarification to reduce complexity, and to have the stations track against achieving the single key milestone date of SC3 ROGS. There also appears to be a need for all (within CRL) to reach a clear understanding of what is required⁵, by whom and by when, if the SC3 ROGS milestone is to be achieved. The organisational understanding of the Handover strategy needs to be made clear to all the delivery teams; not just adequately reflected in their HEPs.

Approvals, Assurance and Agreements

In our last report we suggested that CRL should consider ensuring deliverables necessary for Trial Running be prioritised, and we continue to support that view. ██████████

The scale of the task has been slightly alleviated by the period re-forecast. When considering the CARE charts in Figure 1 - 5, the 250 documents forecast to be completed in January 2020 (discussed in our Period 9 report) has been pushed back to late April 2020. This allows some time to be gained, however the window to complete the documentation is not large. The key assurance documents need to be completed 3 months (late June 2020) in advance of Trial Running to allow RfL-I time to complete its assurance activities against a known configuration.

To meet this deliverable, CRL is implementing a number of initiatives, from simplifying/rationalising O&M Manuals to the establishment of Integrated Delivery Teams. It needs to make these initiatives work, and all parties to ensure they have the right approach

² RSD dashboard dated 15 January 2020.

³ Western Service Completion Group (RfL, BT, MTREL) indicative dates.

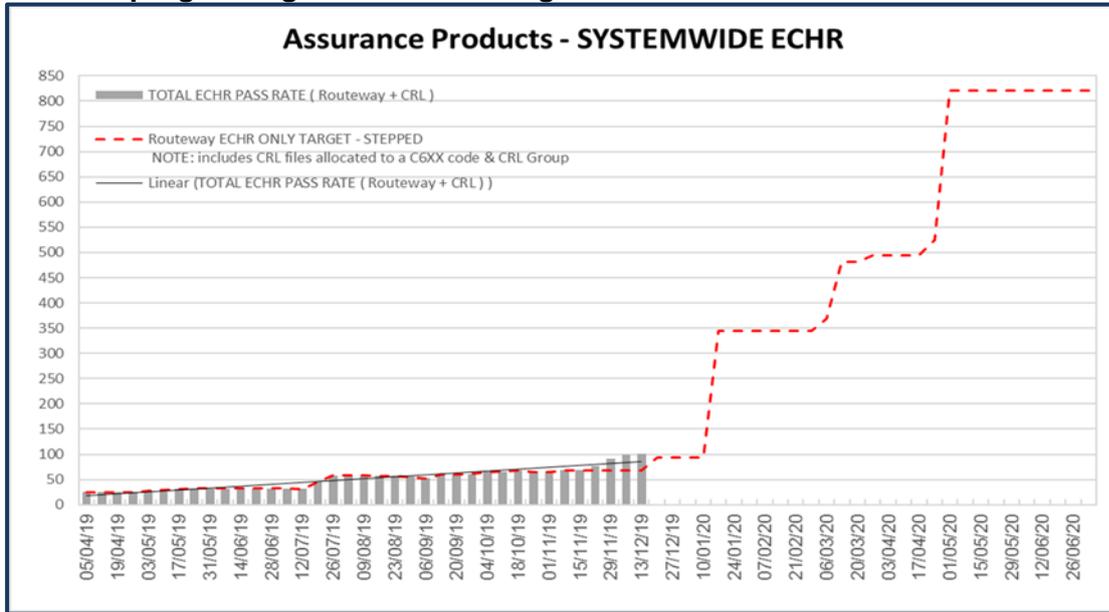
⁴ Noted at the Period 11, Week 1 SSP Vis-Board review and also previously raised in CRL’s Period 9 Periodic Assurance Report.

⁵ Discussed at the RfL Operations Vis-Board review on 15 January 2020.

(e.g. CRL delivering good quality documents in a timely manner, IMs reviewing quickly and positively) if Trial Running on [REDACTED] is to be achieved.

In our last report, we described issues with the T-Minus process, in that the IMs believed it was not being applied robustly. That issue appears to have been recognised and the process is now more robustly managed.

Period 9 progress against Period 7 target



Period 10 progress against Period 10 target

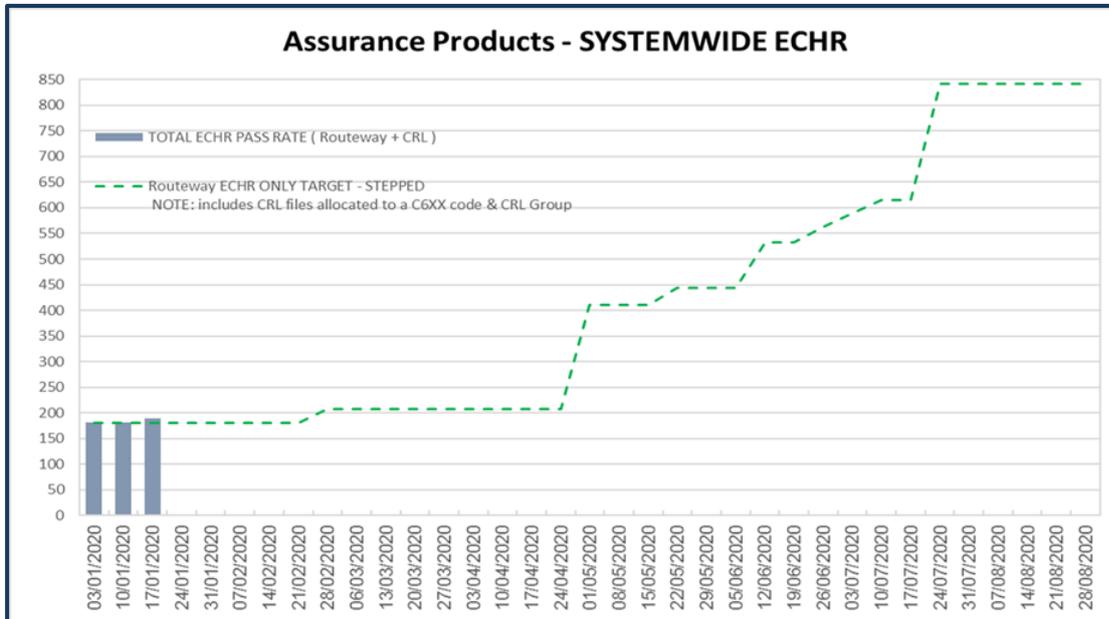


Figure 1 - 5 ~ CARE: Acceptance of Assurance Evidence - Routeway

Rail Systems & Dynamic Testing

Notwithstanding the slippage last period in the date for the start of Trial Running (to [REDACTED] the CRL Routeway, Dynamic Testing and Plateau Teams are maintaining their plans for earliest completion⁶. There is a particular logic to retaining the Trial Running target of [REDACTED] because the date is embedded in the current committed BT and Siemens plans for integrated software delivery. Ultimately, it might prove possible for CRL to drive to a later software configuration for Trial Running than P_D+11, if a software development and assurance window emerges from the Mega Plan 2 initiative; however, the approach to continue with the early target is prudent for now.

As with previous periods, the delivery of planned tests has been subject to disruption due to events, issues and asset failures. Among a number of recent unplanned events, the most serious was a SPAD which occurred during MDT 43, as part of Train Describer testing at the North Kent Line interface; initial indications are that this was due to a misunderstanding or a miscommunication, but the circumstances are being formally investigated. While there have been notable improvements in Dynamic Testing readiness (as evidenced in performance metrics presented at the Routeway/T&C Vis-Board review), we remain concerned that poor Dynamic Testing delivery continues to pose a significant risk to the achievement of Trial Running.

Train Describer test failures have raised concerns about the integrity of the current interface design. CRL will investigate further, but is committed to not be distracted from the main task of delivering the Central Section, rather than investing a disproportionate effort in resolving a lower priority issue. We support this approach.

Reliability Growth

CRL's approach to reliability is beginning to coalesce, and there appears to be a unity of purpose within the stakeholders. This is important, as building reliability is a key element of the Elizabeth Line, and at this point as important as construction in getting Stages 3, 4 and 5 open.

There have been some positive developments in the analysis of service-affecting faults⁷. BT and Siemens, in conjunction with CRL, now believes that the fixes incorporated into the P_D+11 and P_D+12 software releases will provide higher levels of PPM (for the 12TPH Stage 3 service) than previously modelled. Nevertheless, all parties acknowledge that it is not until reliability mileage can begin to run in earnest (currently expected in May 2020) that modelled assessments can begin to be replaced with measured observations. Access to the COS for this work will be at a premium as other workstreams compete to complete their works.

Other points to note are:

- The introduction of FLUs on the GWML will provide some reliability performance by proxy, as they incorporate some of the same software as the trains operating in the COS.
- The ORR has been reported by RfL as willing to consider a proposal to increase the number of trains in the COS up to 8, during the enhanced Dynamic Testing period. If this is the case then the additional trains would be operating from May 2020.
- The NR/COS transitions are causing concern because reliability growth is in its infancy and access is limited. Evidence of transitions operating reliably at line speed would be of particular interest to NR when it is considering the Stage 4 timetable submission.
- The speed of analysis and rectification of faults needs to be increased.

⁶ Confirmed at Vis-Board reviews held on 20 January 2020.

⁷ Reported at the Reliability Board held on 8 January 2020.

Stage 5B Opening

Nothing to report this period.

Stage 4 & Stage 5 Summary

Due to the short period between the release of our Period 9 report and this report, there have been limited developments in this area.

Key Areas of Concern in the Period

As reported previously, tangible progress has been made by CRL in several areas, but further work is still required by CRL in: i) limiting the increasing AFDCD through risk mitigation; ii) the alignment of the safety and technical assurance documentation production rates within the DCS; iii) underpinning of the DCS dates, following the exercise to change from planning to targets and the incorporation of the 'known-unknowns'.

Based on our Period 10 status report, we consider the following points require further action or explanation to Sponsors by the CRL Leadership Team:

1. What are CRL's plans to develop a robust scope to complete each element of the programme?
2. BT's software Y1.3 (authorisation by ORR for Stage 2B) has slipped from a forecast of [REDACTED] in Period 1 to its current forecast of [REDACTED] it has slipped from the [REDACTED] in the last period alone. What assurances can CRL provide to Sponsors that this slippage will not continue?
3. The delivery teams have noted that some of the stations still appear to be working towards different interpretations of key milestones. What are CRL's plans to simplify the milestone targets to support the [REDACTED] Trial Running start date?