



Crossrail Project Representative

Crossrail Joint Sponsor Team

Sponsor Summary

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Note: This report relies on the information set out in CRL's Period 12 reports augmented by more current information received by PRep during the course of our routine discussions with CRL since the Period close on 1 March 2020. Note that information emerging after the close of Period 12 is subject to formal confirmation by CRL in its Period 12 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	25 March 2020	PSR 135 Period 12 FY 2019-20 Sponsor Summary v1.1 ~ Draft	[REDACTED]		
2	31 March 2020	PSR 135 Period 12 FY 2019-20 Sponsor Summary v1.4 ~ Final	[REDACTED]	[REDACTED]	[REDACTED]

Sponsor Summary

Coronavirus (Covid-19)

The coronavirus (Covid-19) outbreak has continued to spread globally during early 2020. The Government has imposed nationwide measures to tackle the virus in the UK, and to address the threat to public health and safety. In response, CRL has moved quickly to implement initial precautions in line with Government and Public Health England advice. This is a rapidly-developing situation and we expect these initial precautions will be modified to suit the changing circumstances.

Strategically, the CRL Senior Leadership Team has already taken steps to establish a Gold Command structure to address the threat; at project level, CRL's Teams have applied themselves to modelling of scenarios, to estimate the possible impact of, for example, loss of productivity, key resources or major sites; and at a site/office level, the overriding objective of promoting and ensuring 'distancing' between people has caused CRL to prioritise 'home-working' and the use of voice and video calls, to replace face-to-face meetings. These are commendable first responses, but there has not yet been enough time for the impact upon the Crossrail Programme of Covid-19 to be fully understood.

We will report further next period on how the Crossrail Programme is adapting to new ways of working, and the effects upon productivity that the precautions are having. However, it is important to recognise that the progression of the virus is unpredictable and the period over which the precautions will be required is unknown. Acknowledging that major challenges already existed across the Crossrail Programme at Period 12, it is extremely likely that the additional impact of Covid-19 will be significant.

The escalation of Government measures to tackle the virus in the UK and CRL's adoption of initial precautions in response, effectively took place after the Period 12 deadline. It is therefore important that this and associated period reports are used to set the pre-Covid-19 benchmark position for Crossrail, against which the future inevitable consequential disruptive impacts can be measured.

Health & Safety Performance

In Period 12, there were 3 Lost Time Cases (LTC) including 1 RIDDOR (a broken arm) and 4 High Potential Near Miss (HPNM) Incidents. The HPNM AFR has fallen however, due to Period 12 2018/19 having had 5 near misses in that period. There has been a marginal increase in health and safety performance as measured by the Health & Safety Performance Index (HSPI). The HSPI score has increased marginally to 2.78, which is the highest score since the current HSPI was implemented. The RIDDOR AFR rate has, however, increased this period, as has the number of Lost Time Cases (LTC). The HPNM rate has fallen even though there were 4 near misses in the period. Overall, safety performance across the project has fallen in the period.

H&S KPI	Period 8	Period 9	Period 10	Period 11	Period 12
HSPI	2.59	2.63	2.59	2.76	2.78
RIDDOR AFR	0.09	0.09	0.09	0.07	0.10
HPNM	0.32	0.34	0.37	0.32	0.32
LTI	0.17	0.17	0.17	0.14	0.17

Figure 1 - 1 ~ Health and Safety Performance COS

Transition to ROGS

CRL has implemented several interventions to safeguard a Trial Running [REDACTED]. However, further slippage in the period has meant that the interventions alone are not sufficient to provide the full recovery now being sought.

Integrated Delivery Teams (IDT)

The implementation of IDTs¹ has lost momentum in the period, principally because CRL expected that the Teams would be able to perform effectively with relatively little guidance and direction. We are aware of examples of Teams not yet being fully formed (i.e. lacking representation across all disciplines) or not functioning in a consistent way. CRL has taken several actions to address the situation, ranging from Programme-wide launch events² to management briefings to individual Teams. However, except for a few examples (e.g. The Plateau Team, which has effectively performed as an IDT for several months) the inability to make the IDTs effective sooner, continues to erode the opportunity for schedule recovery.

Element Outstanding Works List (EOWL) Production

CRL continues to produce a consolidated list of works to complete for each Element of the project, allowing the non-essential works [REDACTED], for allocation to the Alternative Delivery Model (ADM). It was intended that 'triaging' of the EOWs would be driven by the IDTs, but despite instructional briefings on the principles to be applied, CRL has struggled to produce lists that have a consistent basis across the Programme.

The position remains that until the scope is defined, a robust schedule cannot be produced, and the [REDACTED] will continue with works which are not essential for Trial Running, or for bringing the railway into passenger service early. Conclusion of this activity is vital for clarity of scope that must be completed before and after Trial Running, and for the underpinning of the schedule.

Alternative Delivery Model (ADM)

The ADM was developed [REDACTED], but it appears that some confusion remains as to the principles, ownership and timescales associated with implementation. However, there has been some good progress, with the completion of an assessment of delivery routes and framework options; the platform extension at Custom House Station has also been nominated as a 'path-finder', to allow the functioning of ADM on a substantial piece of [REDACTED] work to be demonstrated.

Delays to the close-out of the EOWL 'triaging' continue to prevent the mobilisation of the ADMs.

High Level Schedule Summary

The CRL Period 12 DCS progress update shows a forecast [REDACTED] for the start of Trial Running of [REDACTED]; this is called the 'Period 12 Locked' [REDACTED] by CRL and represents an approximate slippage of 8 weeks to the DCS target of [REDACTED], identified in Period 10. It should be noted that this new forecast [REDACTED] reflects activities completed up to the Period 12 Week 2 Tier 1 contractor reporting cut-off of mid-February 2020, and not to the period end date of 29 February 2020. The key driver to this delay is the completion of Earthing and Bonding testing and the RAB(C) approval of the Safety Justification (SJ); the delay to the approval is due to the slippage to the Canary Wharf electrical test certification. The lag between contractor cut-

¹ Each IDT comprises a CRL PM, a CRL Technical Lead, a CRL T&C Lead, a CRL Handover Lead, a Tier 1 PD, a Tier 1 Design Lead (designer) and an IM representative.

² Launch event held at Westferry Circus on 4 March 2020.

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off and period end has the effect of distorting the forecast; the use of actual progress data to the end of Period 12 would result in a revised target [REDACTED] for the start of Trial Running of [REDACTED].

The adoption of the Period 13 Week 2 Tier 1 contractor reporting cut-off of mid-March 2020 results in a forecast [REDACTED] for the start of Trial Running of [REDACTED]; this is identified by CRL as the 'Period 12 post-Lock' [REDACTED].

While CRL has indicated³ that some schedule recovery might be possible through agreed changes to the deliverables necessary for safety assurance, we are unsure which target [REDACTED] CRL will finally adopt across the whole Programme, or what specific actions it will take to recover slippage. It is also unclear which target [REDACTED] CRL will use as the basis for its QSRA, and to ultimately underpin the DCS v1.1 refresh, anticipated in Period 13.

CRL 3 Lines of Defence

The assurance for risk mitigation, while in progress, is not fully transparent. Although CRL continues to 'triage' the EOWs, the scope and risk mitigation necessary to deliver the programme into a viable Trial Running state is not clear. Consequently, the residual scope and mitigation to be transferred to the ADM is equally unclear, alongside those elements that may not necessarily be required for either Trial Running or for completion under the ADM. Until such clarity is available, we consider it difficult for CRL to assure schedule and cost.

1st Line of Defence

CRL has made significant progress during Period 12 to close out the updates of its procedures. The remaining outstanding procedures tabulated below are expected to be resolved by CRL before the close of the next Period.

Function	Outstanding Procedures (Period 11)	Outstanding Procedures (Period 12)
Chief of Staff	1	0
Project Controls	0	0
Operations	2	1
Programme Delivery	1	0
Technical	6	4

Figure 1 - 2 ~ Outstanding CRL Procedures

2nd Line of Defence

Targeted Assurance Reviews

CRL has reported its forward view of planned assurance reviews for the next 3 periods. CRL has indicated that one assurance review is currently in progress in respect of CRAF2 (Completion Readiness Assurance Framework) Assessments for C360, C520, C435 and C336, which is due for completion in Period 13. Two further TARs are planned for Romford RCC (Deep Dive) and Schedule Productivity.

CRL has decided to curtail the TAR for MEP Certification Discrepancies at Victoria Dock Portal at this stage as it has high confidence that the quality is acceptable for conclusion. Its findings are due to be presented on 2 April 2020 to CRL and RfL to agree the way forward.

³ CRL Period 12 Board Report.
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Period Assurance Reviews

The CRL Period 12 PAR has stated that there is progress establishing the necessary scope to enable Trial Running. This has resulted in a plan for completion of the EOWL list and baselining of Handover dates from Delivery to RfL during the Period, implementation of changes to the Chief Programme Officer and Chief Projects Officer organisations and the impending final agreement of the configuration of the Trial Running railway.

The schedule has continued to exhibit significant movement during Period 12, with low productivity levels (physical works and documentation), combined with a failure to secure key planned mitigations; this has resulted in the Period 10 commitment to [REDACTED] Trial Running [REDACTED] and Summer 2021 Stage 3 Opening being put at significant risk.

3rd Line of Defence

The TfL internal audit presented its 3rd Line of Defence 2020/21 plan to the Audit and Assurance Committee on 16 March 2020. This audit plan initially concentrates on Readiness for Trial Running and Operations and the effectiveness of the proposed ADM, which we believe is timely. Further audits are planned for AFCDC Reviews, Schedule slippage and performance of the supply chain.

Cost, Commercial & Risk

The commercial position reported by CRL at Period 12 does not take into consideration the effects and influence of the Covid-19 outbreak. The P50 AFCDC has increased in Period 12 to £15,398m. This is £435m above Sponsors Funding of £14,963m. This AFCDC is based on project AFCs forecast to the mitigated deterministic Trial Running [REDACTED] and a Schedule Risk allowance of a [REDACTED] delay to the start of Trial Running. However, the Period 12 AFCDC P50 prolongation risk is not aligned to the Period 12 QSRA; consequently the Period 12 AFCDC unmitigated risk allowance is potentially understated, in the range of [REDACTED].

The AFCDC still remains dependent on the achievement of key schedule dates, which continue to slip and are not fully underpinned by the current productivity rates.

Acknowledging that the impacts of Covid-19 continue to emerge, we believe that there is opportunity for Sponsors to seek proposals from CRL to mitigate potential construction delays and Tier 1 costs. [REDACTED]

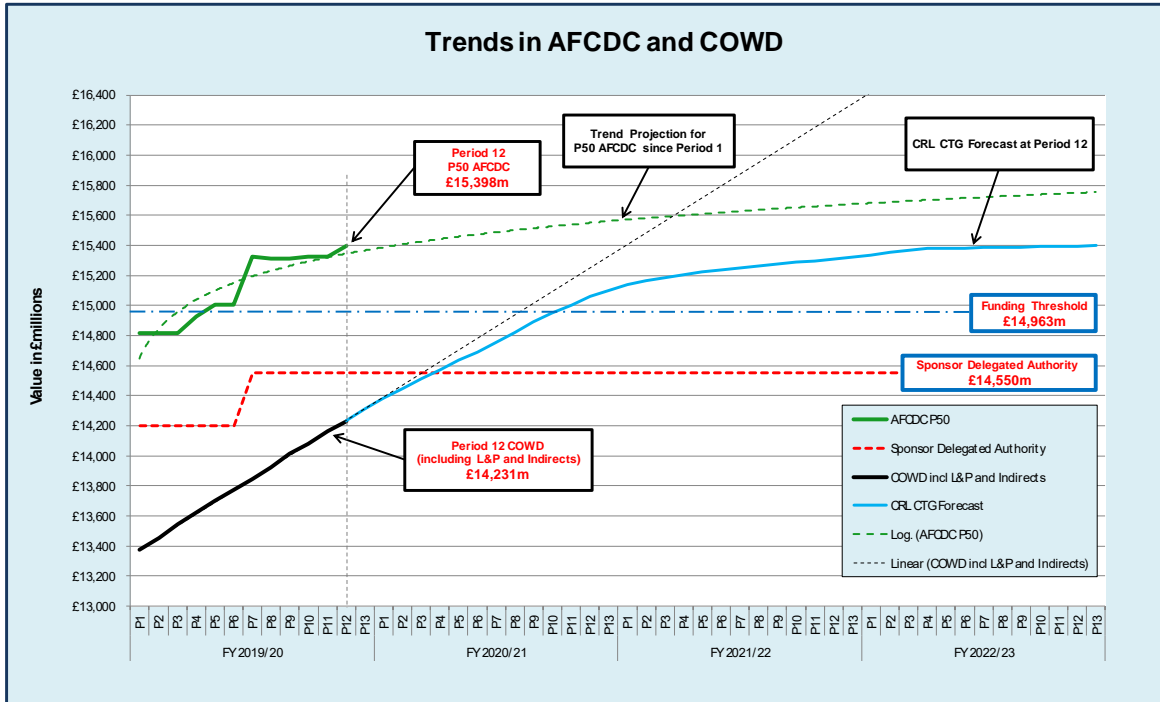


Figure 1 – 3 ~ AFDCDC Headroom to Sponsor Delegated Authority

We refer to CTG inclusive of risk, mainly due to risk being predominantly CTG in principle. Over the past 6 periods (since Period 6), COWD has increased by █████ compared to a reduction in CTG plus Risk of █████. It appears to us that the current rate of COWD spend over the past 6 periods is again more than the corresponding rate of reduction for CTG plus Risk.

CTG and Risk combined has increased by █████ in the Period. CTG has gone up by █████ and Risk down by █████, yet █████ has been spent which we expect to be drawn-down or deducted from the Period 11 CTG. However, at Period 12 CTG has gone up █████, with █████ contribution from Trial Running delays and █████ from █████. Consequently, the █████ reduction from Risk has been fully converted to CTG, which supports our reasoning that CRL risk is predominantly committed spend.

Stage 2B

Achievement of the APIS by 27 March 2020 remains viable, but RfL is not sighted on what the scale and complexity of the ORR’s comments are likely to be. As described in previous reports, the ORR is reviewing a complex submission, so we believe there is an increasing risk that the APIS will take longer than the allocated 4 weeks. This raises the risk of operating a 4TPH service to Heathrow with FLUs for the May 2020 timetable change. However, we are aware that RfL is now in the process of retaining the Class 360 fleet for a limited period beyond the timetable change. This would ensure continuity of services.

The FLU fleet has begun passenger service operations between Paddington and Hayes & Harlington⁴, and the intention is to begin operating services to Reading in late March 2020. This will be dependent upon acceptable levels of growth in reliability and operator confidence. The benefits of this GWML service will be: the provision of mileage for reliability growth purposes; identifying faults before the Heathrow service starts; and starting the process of RLU to FLU conversion.

⁴ Started on 9 March 2020.
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Configuration.	Expected completion		Comment
	Period 1	Period 12	
Y 1.3 ⁵	16 Sep 19	27 Mar 20	This is the configuration that will be authorised by the ORR for APIS.
Z 1.x	26 Sep 19	10 Apr 20	Passenger Service approved software.

Figure 1 – 4 ~ BT Software Configuration

Stage 3

We are concerned at the continued slippages that have occurred in the forecast SC3 dates for the Stations and the Handover dates for the remaining Portals and Shafts. There has been a further drift to the SSP programme with, in some cases, an almost period-on-period slip to forecast SC3 and Handover dates. The DCS, in its current form, does not provide an adequate basis for managing or forecasting the remaining programme of works for the SSPs. There remains a continued divergence between planned and actual progress, productivity, technical assurance and documentation submission dates. The continued slippages in forecast dates does not yet appear to have been arrested by the recent DCS refresh. The DCS refresh reviewed schedules to ensure that they realistically reflected achievable rates of documentation production and delivery. Confidence in the DCS forecasts will only improve once the schedule can be aligned to consistently achievable levels of productivity. Until then, we believe that the forecast dates remain at risk of further delays.

A change in CRL’s approach to achieving Handover to the IMs is required, as the current strategy and processes employed are consistently taking CRL and its contractors longer than planned to deliver. The implementation of the IDTs, with clear delegated authority to sign-off on behalf of CEG and the IMs (which in some instances has still not been confirmed) and the implementation of a more radical ADM, will help CRL achieve the necessary changes.

Approvals, Assurance and Agreements

All the RAB(C), RAB(C) Sub-Group and DTSRP safety review panels have been active in the period, supporting assurance workstreams for Handover and for progressing Dynamic Testing.

We reiterate that the risks in delay to the assurance programme are primarily concerned with the delivery of the ESJs, and, as can be seen from the top diagram in Figure 1 - 5, the current submission rate continues to fall below the recently re-baselined target. This current course needs significant correction, which we doubt can be achieved to allow a Trial Running [REDACTED]. Key issues in completing the documents are the slow delivery of physical evidence and completing other documents that the ESJ refers to as supporting evidence (‘dependencies’). CRL Delivery, Tier 1 contractors, CRL Assurance and RfL must find a route through the current situation to avoid further delays to [REDACTED] Trial Running.

⁵ Y1.3 and Z1.x dates from Period 12 NR PDB Board Paper and RSD Vis-Board, both 16 March 2020. PSR 135 Period 12 FY 2019-20 Sponsor Summary v1.4

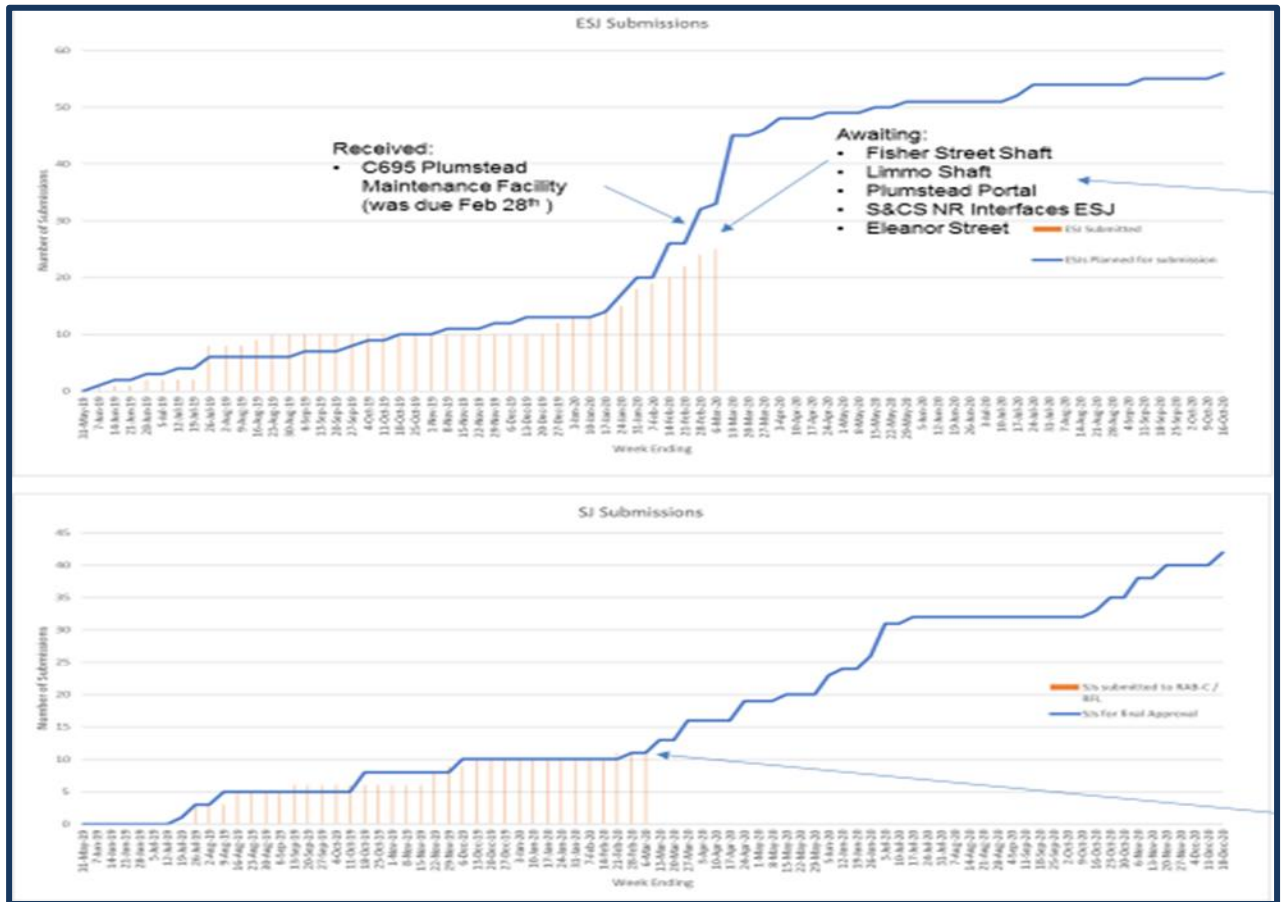


Figure 1 - 5 ~ ESJ Submissions for Trial Running (Top) & Overall SJ Submissions (Bottom)

The Handover process, of information being accepted in accordance with the T-Minus process for each Element, is not working. The process is not able to support a [REDACTED] Trial Running [REDACTED] and is likely to delay it by months.

We are aware that CRL has engaged a specialist company to improve the quality of the O&M Manuals, which is a positive action; however, there needs to be a fundamental review by CRL and the IMs of the current approach. We suggest it should aim to reduce the workload to that which is essential to achieve Trial Running. This is not a panacea, as significant amounts of the outstanding documentation are associated with the assurance evidence required for ROGS. Concluding Tier 1 involvement wherever possible could also provide benefits, by reducing the number of parties engaged in the process.

Any new initiatives introduced by CRL are unlikely to be effective to allow a Trial Running [REDACTED], but they may mitigate the current slippage.

The overall Handover situation, as evidenced by the CARE deliverables, has not materially changed since our Period 10 and 11 reports. The acceptance of SSP assurance products by the IMs is beginning to dip below forecast, and the rate of Routeway Assurance production is not expected to change until late April 2020.

Rail Systems & Dynamic Testing

CRL completed the 'Mega Plan 2' schedule planning initiative in early February 2020. The schedule has effectively become the control vehicle for planning and tracking progress of the completion of SSP and Routeway delivery, Dynamic Testing, and the concurrent Maintenance and Reliability workstreams. The construction and Dynamic Testing windows have been optimised to produce an 'access footprint' covering the period up to a Trial Running [REDACTED]. While the schedule continues to provide a template against which detailed delivery plans can be prepared, CRL has had to make provision for the inclusion of items previously missed (e.g. Routeway integration testing) or omitted logic (e.g. the links between completed tests, assurance production and final safety approvals). These and other possible late changes might impact a Trial Running [REDACTED], unless mitigated. Further scope uncertainty exists while EOWL 'triaging' remains incomplete.

Testing in the period has also been subject to the detailed scrutiny with the TICAR (Testing Impact Concern Action Report) review system. Initial outputs from TICAR have, to some extent, confirmed what has previously been understood empirically by the test teams: that is, the significant productivity improvement opportunities that remain unrealised lie largely outside CRL's control. Thus, despite increasing focus upon test planning and readiness (where some improvements are still able to be made), delivery performance has often been lower than planned. TICAR outputs from MDT 49 illustrate CRL's exposure, where only 43% of tests planned were completed, largely because of safety incidents and NR infrastructure failures. It should be recorded that this was an exceptionally poor test window and, for balance, the 13-week rolling average test complete performance is 78%. That is still not an encouraging statistic, but with the balance of testing with the current configuration concentrating upon the signalling interfaces with NR, it is difficult to see where meaningful performance gains will be made.

The safety incidents during MDT 49 (including a SPAD on the GWML and a train crew detrainment in the Central Section Tunnels) highlight the potential for disruption outside CRL control and, once again, reinforce our concern at the impacts of poor Dynamic Testing delivery performance upon the achievement of Trial Running.

The difficulties of influencing improvements in areas controlled by others continue to frustrate CRL, but this should not detract from the relatively good state of Signalling/Rolling Stock testing readiness overall, ahead of Trial Running. The latest position against the requirements for entry into Trial Running (as of 16 March 2020) is: 136 out of 141 tests performed, of which 100 have fully passed, and 22 are proposed to be mitigated by Operational Restrictions. The balance of 19 test are planned to be carried out or otherwise resolved by 9 May 2020.

Reliability Growth

As described in our previous report, the train control software strategy is key to reliability growth. The current approach is to enter Trial Running with configuration Y0.525⁶. It is acknowledged by all parties that a further software revision, to the Y0.6x series⁷, will contain the necessary reliability to exit Trial Running. This is currently forecast to be available at almost the same time as the Trial Running [REDACTED]; however, it is not currently nominated as the Trial Running candidate configuration because there would be little contingency if the train control software was delayed. CRL's issue is how it can expedite the testing, the resulting defect discovery and then the assurance of Y0.6xx, without impacting the testing of Y0.525 and the start of Trial Running.

⁶ Forecast to be assured 22 June 2020.

⁷ Begins with Y0.603.

While these are significant issues for CRL, plans to address them must now take account of the recent rapid advance of Covid-19 in the UK. We consider that the CRL Leadership Team should continue to be challenged by Sponsors, to explain the actions CRL is taking to address schedule recovery, while recognising the wider emerging context of this national emergency.

The escalation of Government measures to tackle the virus in the UK during March 2020, including CRL's adoption of a Safe Stop order on 23 March 2020 and demobilising its supply chain in response, has occurred after the Period 12 deadline. It is therefore important that this and associated period reports are used to set the pre-Covid-19 benchmark position for Crossrail, against which the future inevitable consequential disruptive impacts can be measured.