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Crossrail Joint Sponsor Team

Sponsor Summary

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 Author: [REDACTED]
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Jacobs U.K. Limited
 2nd Floor Cottons Centre
 Cottons Lane
 London SE1 2QG
 England
 Phone: +44 (0)203 980 2000
www.jacobs.com

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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	24 April 2020	PSR 136 Period 13 FY 2019-20 Sponsor Summary v1.2 ~ Draft			
2	28 April 2020	PSR 136 Period 13 FY 2019-20 Sponsor Summary v1.3 ~ Draft	[REDACTED]	[REDACTED]	[REDACTED]
3	29 April 2020	PSR 136 Period 13 FY 2019-20 Sponsor Summary v1.4 ~ Draft	[REDACTED]	[REDACTED]	[REDACTED]
4	1 May 2020	PSR 136 Period 13 FY 2019-20 Sponsor Summary v1.5 ~ Final	[REDACTED]	[REDACTED]	[REDACTED]

Sponsor Summary

Coronavirus (Covid-19)

As the Covid-19 virus took hold in the UK from mid-March 2020, CRL started to implement social distancing measures with less office working. From 23 March 2020 the UK Government implemented a widespread stop on non-essential travel - in effect a lockdown on public life. CRL issued a Safe Stop notice¹ to all work sites on 24 March 2020, in accordance with the guidelines from Government and Public Health England, to protect those working on the Crossrail Programme from the virus. The Safe Stop instruction will keep the sites and construction works effectively paused until a managed safe re-start becomes possible. Approximately 3,500 staff, including those from the supply chain, have been requested to work from home, with approximately 250 staff retained on site to deliver security, safety critical maintenance and inspections²; the balance of the Crossrail workforce has been requested to work from home. Covid-19 has triggered a rapid move into a virtual workspace, with teams establishing on-line communications and a remote meeting schedules, in order to progress the long-outstanding paper railway from remote locations.

CRL established through its Gold Command team, a process and metrics to fully quantify within its own organisation, the level of resources engaged in working from home, task engagement and productivity; this also covered those resources that could be available for redeployment to support ongoing efforts on site during the Safe Stop period. A reporting dashboard is expected in the next period, which we understand might be extended to specialist resources that are critical to restarting Dynamic Testing and a safe start.

Health & Safety Performance

In Period 13, there were no Lost Time Cases (LTC) or RIDDOR incidents. There was only 1 High Potential Near Miss (HPNM) Incident in the period. The safety KPIs reported in Period 13 all reflect the reduced level of activity on sites across the programme.

The HPNM AFR has fallen and there has been a decrease in health and safety performance as measured by the Health & Safety Performance Index (HSPI). The HSPI score has decreased to 2.66. The RIDDOR AFR rate has decreased this period, as has the number of Lost Time Cases (LTC). The HPNM rate has again fallen, though there was 1 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	Period 13
HSPI	2.59	2.63	2.59	2.76	2.78	2.66
RIDDOR AFR	0.09	0.09	0.09	0.07	0.10	0.09
HPNM	0.32	0.34	0.37	0.32	0.32	0.27
LTI	0.17	0.17	0.17	0.14	0.17	0.15

Figure 1 - 1 ~ Health and Safety Performance COS

The rapid spread of Covid-19 has become the most important Health & Safety issue for every person working on this project. CRL has mobilised³ its Gold Command Team to consider how best to help protect both its own and its contractor's staff from the potential impacts of the Covid-

¹ CRL1-CEC-00709 (24 March 2020) sets out requirements for the Safe Stop for Crossrail Worksites.

² This work will be undertaken by Tier 1/2/3 workers given an "Essential Construction Worker" designation.

³ CRL established its Gold Command Team on 12 March 2020, together with 4 subsidiary Silver Command Teams.
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19 virus, over the coming months, through its meetings. The Gold Command Team continues to meet daily, focussing on the longer-term, strategic impact of the virus on the Crossrail Programme. The four Silver Response Teams are addressing the day-to-day efforts of CRL's Covid-19 response.

Supply Chain, Scenario Planning and Recovery Plan

It is currently unclear how long the Government will apply restrictions on public life. CRL is evaluating scenarios that consider 3-, 6- and 9-month stoppages to the works. The PRep view is that given the sudden stop to the works, there is a risk that some resources will not return to the Programme, despite Government support to furloughed staff for the first three months. This is particularly the case with key critical resources needed to finish-off assurance works for systems such as Fire, Electrical and Signalling, which are needed for Dynamic Testing. We are aware that CRL is actively engaging with the supply chain to implement mechanisms by mid- to the end of April 2020 for the retention of key critical resources.

As CRL develops its scenario plans to overcome the impact of Covid-19, its main focus is to protect Trial Running [REDACTED] as much as possible and to ensure that the Trial Operations window is maintained in 2021. The emerging candidate appears to be a 3-month shut-down to June 2020, with a slow ramp-up over 2 to 3 months, to full productivity. Additional assumptions, such as further constraints on social distance working and extended controlled lockdown to public life in the future, may also need to be incorporated into the scenario plans before finalising. The optimal scenario will feed into a recovery plan which is under development, from which forecast [REDACTED] for Trial Running, Trial Operations and Revenue service will be determined. The final approved recovery plan is expected to be finalised in the coming periods.

Assurance Mountain

The production, review and sign-off of the large amount of outstanding critical assurance and safety documentation, required for Trial Running and Handover, has now become the focus for completion. While this is an opportunity during the Safe Stop period to catch-up on the assurance mountain paperwork and documentation, this cannot be expected to be the panacea to recover schedule slippage.

While the sites have remained closed, CRL has acknowledged that requests to undertake certain non-intrusive works (e.g. photos, videos, inspections, surveys) and light intrusive works (e.g. MEP testing) may be considered⁴ as exemptions to the Safe Stop instructions. These Niche Works⁵ will enable a limited number of programme-critical activities that can be safely carried out during the Safe Stop, to be progressed at SSP sites and along the Routeway to support assurance works. The exemption process for Niche working has been presented to TfL and DfT for consideration and had no objection⁶ and the first such works made a scheduled start on site on 20 April 2020.

It will be critical to ensure the Niche works are aligned to the assurance document priorities and requirements and that the resources working in the virtual world are focused on the relevant documentation if CRL is to make the biggest impact during the Safe Stop period.

⁴ Gold Command Call on 6 April 2020.

⁵ Niche working is defined as a limited number of programme activities that can be safely carried out during the Safe Stop, with enhanced measures in place to ensure the risk associated with Covid-19 transmission can be suitably controlled.

⁶ CRL met with the Mayor and the Director General [REDACTED] to inform them on CRL's intent to commence Niche Works to support the ongoing Assurance process.

Transition to ROGS

Readiness Capability

In the period, the Elizabeth Line Readiness Group (ELRG)⁷ has been established to review, approve and track progress against an agreed integrated completion plan, which clearly identifies scope, accountabilities, delivery mechanism, schedule and funding, with a particular focus on handover of assets and activities from CRL to TfL and its subsidiaries. This includes:

- Crossrail End-to-End Programme, which defines the full extent of the works required by CRL to enable staged opening and achieve Final Completion (as defined in the Project Development Agreement) - to be owned by the Crossrail Executive;
- Operator's Readiness Programme, which defines the work required to enable the train service to be operated, including the delivery of the organisational capability, reliable rolling-stock and the necessary timetable changes to the national network - owned by RfLI;
- Maintenance Readiness Programme, that delivers the necessary maintenance capability to enable staged opening - owned by RfLI, LU and NR;
- Residual Works Programme, which defines those works to be [REDACTED] and how they will be completed - to be owned by the Elizabeth Line Programme Delivery Lead.

It will be key to have a process established that is efficient and transparent that provides visibility on decision-making across a number of active boards, this includes ELRG, TRMB and CRL.

A 'hybrid' CRL and RfLI enterprise is being proposed to enable safe and responsible transition of key roles and accountabilities through Trial Running and Trial Operations. Such an approach will require good collaboration between both parties and all organisations to make this as effective and successful as possible.

A draft RfLI operational readiness capability model has been developed by CRL. This model is to be finalised over the course of the next 2 - 3 months. Detailed planning will be required to ensure CRL resources are not demobilised inhibiting the use of these to supplement the RfLI competence gaps at point of Trial Running. A capability framework is to be developed in conjunction with the RfLI Handover Team, so it can assure operations and maintenance readiness and support relevant assurance process. A risk associated with a prolonged period of shutdown and delay in Trial Running, is that key resources for operation, training and maintenance may struggle to maintain their competency profile.

Overall, an integrated programme plan is required to demonstrate and measure the readiness and completeness for transition to ROGS, which is the objective of ERLG.

While the concept of Handover Lite, applied to Routeway and shafts, allows CRL to get to Trial Running as soon as possible without compromising safety, given the uncertainty of when Dynamic Testing will resume, the implications of committing to a Lite approach, needs further consideration; this applies particularly where the Full approach proves achievable by the time Trial Running actually takes place. An additional challenge is seen to be the need for collaboration and agreement between CRL and RfLI on which documents fall within the Lite category, and what the document contents comprise. Historically, reaching any sort of agreement between CRL and RfLI when the underlying consequences are taking over an asset (or not) has been difficult.

⁷ Elizabeth Line Readiness Group Meeting No. 1 held on 6 March 2020.
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Integrated Delivery Teams (IDT), Element Outstanding Works List (EOWL) Production and ADM

In Period 12, we noted that the implementation of Integrated Delivery Teams (IDTs) had lost momentum, principally because the Teams were expected to perform effectively with relatively little guidance and direction. The Station IDTs have started to consolidate with daily conference calls and video meetings to coordinate inputs for document production and monitor outputs. The introduction of Niche Works will be supported by these efforts. It is still important CRL provides the IDTs with clear instructions on how they are to function and the necessary delegated authority to act quickly and pragmatically. A cultural change will still be required within the senior management of CRL and the IMs, to change the focus from control, to providing support to the IDTs.

The ECHR triage process and the EOWLs has undergone its second iteration to further challenge the requirements for Trial Running and, as a result, is running slightly behind planned completion by mid-March 2020. The final EOWLs have now been signed by their respective IDTs, although the ADM team is undertaking a further triage and this will form the basis for change control going forward.

The Alternative Delivery Model (ADM), developed to [REDACTED] continues with the ADM team being finalised and stood-up, financing of the works, procurement frameworks and funding mechanisms are being developed. Best value from the ADM implementation will likely be obtained from the development of a detailed schedule and associated cost breakdown at each site. This may expose and enable elements of work to be undertaken by the IM's works and maintenance organisations, [REDACTED].

High Level Schedule Summary

The Period 13 DCS progress update shows a forecast [REDACTED] for [REDACTED] Trial Running of [REDACTED], which is based upon the Tier 1 Contractor forecast up to the end of Period 13. In comparison with [REDACTED] identified by CRL in the past, this represents an approximate slippage of 14 weeks to the Period 10 DCS target of [REDACTED]; it also shows a 5-week delay compared with the 'equivalent' Period 12 unmitigated forecast [REDACTED]. This latter 5-week delay comprises one week attributable to Covid-19, and 4 weeks in the assurance process, due to poor productivity; there was no delay contribution from Dynamic Testing, which does not sit on the Critical Path.

As with Period 12, the driver to the assurance delay is the delivery of Earthing and Bonding EMC certification⁸, followed by the preparation of the Routeway Chapter 4 Energy Safety Justification, and the subsequent RAB(C) approval. The forecast completion date for the Safety Justification is [REDACTED].

CRL recovery planning is in its early stages. However, assuming the incorporation of a Covid-19 Safe Stop period of [REDACTED] (the current Scenario Planning candidate) and a managed re-start to site activity, the indicative revised Trial Running [REDACTED].

CRL 3 Lines of Defence

CRLs Assurance Team has observed⁹ that CRL has a culture of optimistic target date-based reporting, in which the development of 'politically-acceptable' forecasts appears to pervade all project-level planning and reporting processes; this aligns with our own concerns about CRL 'planning to targets', which we have expressed in previous PRep reports. Resolution of EOWLs

⁸ CRL Schedule Integration Review Slide Deck.

⁹ Periodic Assurance Review Report, Draft – P13, dated 8th April 2020
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still continues and, consequently, the scope and risk mitigation necessary to deliver the programme into a viable Trial Running state remains a concern.

To address these issues, CRLs Assurance Team is recommending:

- that the Project and Programme Assurance (PPA) Team is permitted access to the pertinent strategy and planning workstreams to facilitate timely engagement and influence for effective assurance oversight and future monitoring and reporting;
- [REDACTED]; and
- that the scope definition initiatives of EOWL and ECHR Triage are urgently completed and, most importantly, work is undertaken to align the decision-making criteria and expectations of the approving stakeholder bodies involved.

While CRL management will review observations on mismatch in expectations, acceptance criteria and specification, in general, the observations made by the PPA Team are broadly aligned with PReps observations over previous periods. We await either CRL acceptance and implementation of these recommendations or its alternative strategy going forward. Until such clarity on the observations and recommendations from CRL on the, we consider it difficult for CRL to assure schedule and cost.

1st Line of Defence

CRL has closed all outstanding procedures during Period 13.

Function	Outstanding Procedures (Period 12)	Outstanding Procedures (Period 13)
Operations	1	0
Technical	4	0

Figure 1 - 2 ~ Outstanding CRL Procedures

2nd Line of Defence

Targeted Assurance Reviews

At Period 13, CRL is reporting six assurance reviews that are presently in various states of progress. CRAF2 assessments are complete for C610, C695, C340 and C620, while C360, C520, C435 and C336 which were due for Period 13, are now expected to be complete early in Period 1. Three TARs are currently in progress as planned: Approvals and Authorisation Top Down, Elizabeth Line RCC and Back-Up Control Facility and Infrastructure Manager Interfaces. Two further TARs are planned for Romford RCC (Deep Dive) and Schedule Productivity in the next three periods.

CRL is reporting a pre-Covid-19 status of no delays to the assurance reviews. However, we believe it is likely that progress of the assurance reviews will be affected from the impacts of national emergency restrictions as a result of Covid-19.

Period Assurance Reviews

The CRL Period 13 PAR analysis of underlying pre-Covid-19 data indicates that a likely commencement of Trial Running will not be before [REDACTED] and hence, Stage 3 revenue service will not be before [REDACTED]. A key issue for CRL is the significant disparity of planned work vs actual achieved progress data across the project; CRL is reporting that overall progress across the project has remained consistently around the 34% of that planned.

3rd Line of Defence

Due to the effect of Covid-19 lockdown, the TfL internal audit has suspended its activities and reports that there is no material movement in Period 13 from last Period. The 3rd Line of Defence 2020/21 audit plan to the Audit and Assurance Committee on 16 March 2020 was to concentrate on CRL Readiness for Trial Running and Operations and the effectiveness of the proposed ADM. TfL is reporting at Period 13 the audit on Operational Readiness for Trial Running has been deferred to 2021. This would place the audit after the CRL [REDACTED] Trial Running commencement and the assurance from such a late deferred audit may be rendered immaterial. Further audits were planned for AFCDC Reviews, Schedule slippage and performance of the supply chain. Although the procedures are in place, we firmly believe that all these audits are entirely appropriate to ensure that CRL is maintaining compliant delivery and handover. Consequently, we await the TfL revised audit schedule.

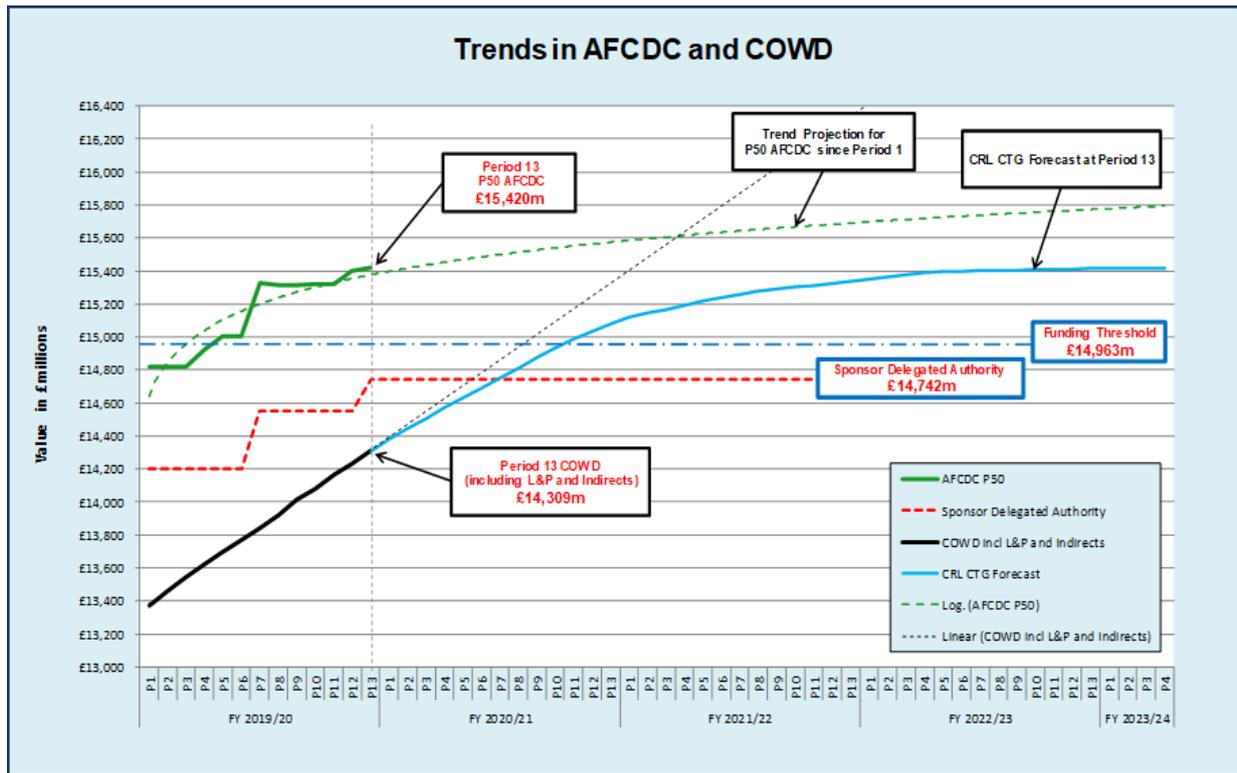
Cost, Commercial & Risk

The commercial position reported by CRL at Period 13 does not take into consideration the effects and impact of the Covid-19 outbreak. However, the Period 13 AFCDC may be regarded the baseline from which the effects of the Covid-19 virus on the Programme can be measured and assessed.

In Period 13, the P50 AFCDC has increased by £22m to £15,420m. This is £457m above Sponsors Funding of £14,963m. This AFCDC is based on project AFCs forecast to CRL's [REDACTED] Trial Running [REDACTED] and a Schedule Risk allowance of a [REDACTED] delay to [REDACTED] Trial Running. However, the Period 13 AFCDC P50 prolongation risk is not aligned to the Period 13 QSRA which is based on an unmitigated Trial Running start [REDACTED]; consequently, it is our opinion that the Period 13 AFCDC unmitigated risk allowance remains understated.

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

During Period 13, the Sponsor Delegated Authority has been increased by £192m to £14,742m. Up to Period 13, CRL is reporting a £109m increase in allocation up to £14,599m of the revised £14,742m Sponsor delegated authority. The waiver that has been put in place for the CRL Board to certify that the Programme is deliverable within the funding package is valid to [REDACTED], to enable CRL and Sponsors to develop the new funding arrangements.



We refer to CTG inclusive of risk, mainly due to risk being predominantly CTG in principle. Since Period 7, COWD has increased by [redacted] compared to a reduction in CTG plus Risk of [redacted]. It appears to us that the current rate of COWD spend over the past 6 periods continues to be more than the corresponding rate of reduction for CTG plus Risk, together with increasing trends of AFCDC, COWD and CTG.

CTG and Risk combined has decreased by [redacted] in the Period. CTG has gone up by [redacted] and Risk down by [redacted], yet [redacted] has been spent which we expect to be drawn-down or deducted from the Period 12 CTG.

Although CRL is reporting an up-to-date position, there is potential for confusion and misalignment between cost, schedule and risk data sets, through a disconnect in timing of snapshots and the introduction and interchangeable use of Locked, Post-Locked, Unmitigated and Mitigated points of reference. We expect that adjustments and updates are appropriately recorded and auditable.

CRL indicate throughout their Period 13 reporting that productivity loss due to Covid-19 will now start to be seen across Programme Delivery. CRL will be assessing the schedule impact of Covid-19 and providing a view in Period 1 2020/21. This will be based upon the scenario workstreams for recovery being developed by the Silver Response Teams.

Stage 2B Operational Readiness

The target for achieving APIS in our Period 12 report was 27 March 2020, and there has been an additional 4-week delay in this period. As we described in our Period 12 report, we thought some further delay was a likely risk given the complexity of the submission, and the review period has also been affected by the Covid-19 situation. The original estimate of a 4-week APIS review period is now likely to be 8 weeks in duration.

Once the APIS has been received, there is a further period in which Heathrow Airport Limited Assurance Review Panel (HALARP) and the MTR-SVP give their approval. This is programmed to take 2 weeks, but could be affected if the ORR’s approval contains conditions¹⁰ that must be addressed by BT.

Configuration	Expected Completion		Comment
	Period 1	Period 13	
Y 1.3 ¹¹	16 Sep 2019	[24 April 2020]	This is the configuration that will be authorised by the ORR for APIS.
Z 1.x	26 Sep 2019	[7 May 2020]	Passenger Service approved software.

Figure 1 – 4 ~ BT Software Configuration

Assuming the dates shown in Figure 1-4 are achieved, the first FLU to Heathrow is likely to be in early May 2020. If that train performs satisfactorily then a 2 TPH service is possible by mid-May 2020, but further slippage could be expected if it does not. The full 4 TPH service does not appear to have a clear introduction date, due to the impact of Covid-19 on airline operations at Heathrow Airport.

Stage 3

The Niche Works will require enhanced measures to ensure that the risk associated with Covid-19 transmission can be suitably controlled but will, nevertheless, permit small numbers of staff to provide important information to support those working remotely on assurance documents. All exemption requests for Niche Works are being considered on a case-by-case basis by CRL and will need to propose a safe plan of action to maintain social distancing with the necessary PPE. The justification for each work proposal requires sign-off by CRL’s Executive and the contractor’s senior management, before work can start.

Custom House Station achieved what has been termed by CRL as a ‘virtual’ Handover on 8 April 2020. In addition to Covid-19 restrictions, the Handover was delayed by outstanding Cyber Security (CS) documentation requirements. It is clear that Cyber Security has not been given the attention it requires and that the contractors do not have the expertise, or access to appropriate resource, together with CRL, necessary to undertake the work to demonstrate Cyber Security compliance. We believe there remains a programme wide risk that Cyber Security issues has the potential to further delay Handover of the remaining SSPs. We also understand that there are similar emerging issues with some of the Rail Systems, in particular the upgrade and adoption of the latest Windows operating system and compatibility; we will report further next period.

We have previously expressed our concern at the continued slippages that had occurred in the forecast SC3 dates for the Stations and the Handover dates for the remaining Shafts and Portals; these slippages have continued. The inevitable consequential disruptive impacts that Covid-19 will have had on the SSP programme will have to be measured, and revised forecast completion dates established. However, CRL must confirm what measures it will take to increase the level of confidence that its new forecast dates will be achieved, once the DCS is re-set and the programme re-started.

¹⁰ For example, a possible condition is that an Operational Procedure be put in place to mitigate a deviation from a Technical Standard.

¹¹ Y1.3 and Z1.x dates are from the Stage 2B Vis Board on 22 April 2020.
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Contributing factors to the ongoing difficulties include technical issues, such as Electromagnetic Compatibility, 25kV disconnectors and fire alarm sounders; apparent RfLI resource bottleneck, with the contractors' rate of submission and subsequent RfLI sign-off, for assurance certification and some project-wide issues arising from the concurrent review of O&M Manuals and assurance documentation. CRL continue to resolve assurance requirements for D25 testing and commissioning. These continued slippages have presented a gradually increasing longer-term risk to the start of Trial Running and Trial Operations. CRL has established Tiger Teams to address concerns surrounding the delayed Handover of the remaining Shafts and Portals. These teams will work alongside the IDTs and the IM (RfLI) to agree pragmatic, joint plans to speed up the handover of the remaining assets .

CRL is working on a proposal with RfLI to simplify the process¹² for Handover of assets to RfLI. The proposal, referred to as Handover Lite, refines the Element Completion Handover Report (ECHR) triage categories into two stage completion categories, comprising:

- Phase 1: Handover Lite – A reduced list of essential requirements for Trial Running, where CRL provides RfLI with essential documentation. RfLI becomes responsible for the care, maintenance, management and safety accountability of the asset.
- Phase 2: Full Handover – Required for Trial Operations and Revenue Service.

Handover Lite, endorsed by CRLs and RfLIs Executive, is anticipated to allow CRL and RfLI to better prioritise the delivery of limited candidates identified in the Shafts and Routeway Chapter required for Trial Running. This will effectively defer full Handover (Phase 2) and push Tier 1 document production during Trial Running and up to Trial Operations.

The proposal appears to adopt a similar approach to that being taken by LU, with its Early Station Transfer process; although except for Bond Street, all the LU stations have already achieved CRL's SC1 as their benchmark requirement for the start of Trial Running. As with Early Station Transfer, the benefit to CRL comes from a considerable reduction in what is regarded as essential documentation required for entering Trial Running.

Unfortunately, there does not appear, under the Handover Lite proposals, to be any reduction in the overall level of documentation finally required for full (Phase 2) Handover. CRL has noted that Handover Lite is to be used as a fall-back position, to be used only when the achievement of full Handover for Trial Running is proven to be unachievable. Past performance would suggest that Handover Lite may become the norm for Handover of the remaining RfLI assets.

Approvals, Assurance and Agreements

RAB(C), RAB(C) Sub-Group, Dynamic Testing Safety Review Panel (DTSRP) and the Test & Commissioning Configuration Review Panel (TCCRP) have convened using remote conferencing technology imposed by home-working restrictions due to Covid-19. These groups remain the primary formal review bodies to assess systems safety submissions by CRL and RfLI, covering Crossrail end and intermediate-states.

The period has seen an increase in the number of handover related submissions and Routeway Engineering Justifications (ESJs) appearing for consideration by RAB(C) after delays in their development by the contractors. It should be noted that the completion of submission of all Routeway ESJ Chapters was achieved in the period.

¹² Noted at the ECHR Triage and Assurance Review Update held on 7 April 2020.

RAB(C) considered, on behalf of RfLI, the Element Acceptance Case (EAC) for Custom House Station¹³. Endorsement was secured¹⁴ ahead of the then-planned handover date of 7 April 2020.

RAB(C) considered on behalf of CRL and endorsed the SC1 Ready submissions for Paddington and Canary Wharf Stations¹⁵. Further endorsements were made for the SC1 Ready submissions for Whitechapel Station, Liverpool Street Station and Woolwich Station. Collectively, these are significant achievements given the time and effort expended by the interfacing teams. The quality of these submissions was commended by the Board and it is hoped that they will be used as a benchmark for future submissions; given the Covid-19 restrictions, an opportunity exists for doing so.

The RAB(C) Sub-Group has endorsed, subject to minor post-meeting review, the OHLE and Traction Earthing & Bonding ESJ¹⁶. A number of dependencies remain, but these were shown to not have an impact upon the safe operation of the system; these will be resolved prior to formal handover.

A review of the Handover process is being undertaken by the Trial Running Mobilisation Board (TRMB), which has so far identified the scale of the issue by looking at two test cases¹⁷. Our understanding is that the focus for TRMB going forward would be the quality of the contractor documentation, speed of review process and removal of blockers.

The initiative to produce a more limited set of Handover materials to enable the IMs to enter ROGS is being proposed through CRL's Handover Lite programme. This will apply to some outstanding Shafts and Portals, and Routeway Chapters¹⁸. Stations will be approved to SC1 as currently planned. This is a sensible course of action, given the circumstances, however the key documentation (As-Built Drawing, Data Drops, O&M Manuals, H&S Files) that is proving difficult to produce remains a component of Trial Running. CRL and RfLI must also come to an agreement as to what works will be deferred as part of the EOWL triage process, and this will affect the level of assurance evidence to be reviewed prior to Trial Running. Handover Lite also means that a substantial body of work has been deferred, to be completed during Trial Running.

Rail Systems & Dynamic Testing

Up to the time of Safe Stop, the CRL Mega Plan 2 provided the basis for planning and tracking progress of the completion of SSP and Routeway delivery, Dynamic Testing, and the concurrent Maintenance and Reliability workstreams. Given that the Plan is largely built around the Signalling / Rolling Stock software development process, it is likely that the basic schedule structure for completion up to Trial Running will remain largely unchanged. However, a revised schedule to the same level of detail as Mega Plan 2 is anticipated, to support the re-start of Routeway works; it is also likely that the Plan will incorporate new proposals for software delivery.

Notwithstanding the uncertainty around any future relaxation of national Covid-19 restrictions, CRL Teams have already turned their attention to options and opportunities for the resumption of works. The initial focus has been on key site works which, were they completed, would have the effect of 'releasing' and enabling significant off-site workstreams. Attractive early examples included the development of one-off dynamic testing opportunities, in order to prove the success of specific critical signalling software fixes. A further candidate is the completion of the Traction Power Supply switchgear modifications at Stepney Green Shaft, which were still in progress when

¹³ RAB(C) meeting held on 12 March 2020.

¹⁴ RAB(C) Extraordinary meeting held 30 March 2020.

¹⁵ RAB(C) meeting held on 25 March 2020.

¹⁶ Document C610-ATC-Z7-RGN-CRG03-50055 endorsed at RAB(C) meeting held on 2 April 2020.

¹⁷ Meeting on 08 April. Test cases were Track and Tunnel Safety Services.

¹⁸ With the exception of signalling and comms
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Safe Stop was imposed. However, at the time of issue of this report, robust mechanisms for the identification, prioritisation, planning and approval of such relatively intrusive works had not yet been established within CRL

With the timing on resumption of Dynamic Testing on the Central Section under determination, some off-site facilities still remain operational (e.g. the CIF is being configured for 24-hour off-site testing, supported by minimal tester access and under remote control), to allow at least some progression in the meantime. However, the opportunity has now opened-up for CRL to consider more ambitious plans for software delivery, for example TR2, within revised and emerging Trial Running timescales.

Trial Running and Reliability Growth

Trial Running ‘candidate’ software configuration of Y0.510¹⁹ will provide an assured configuration fit for entry into Trial Running and remains a key deliverable. The investigations by the Plateau Team into the development of a fully-assured configuration incorporating CBTC TR2 ahead of the start of Trial Running, was at an advanced stage at the end of Period 12; this work was indicating that, with the correct strategic checks in place, a revised ‘candidate’ can successfully deliver a more robust and reliable configuration, earlier than planned. With all on-site testing now on hold under Safe Stop, this allows more time for the consideration of alternative software delivery proposal.

CRL’s current strategy is to assure Y0.510, and enter Trial Running with Y0.525 configuration²⁰. This is not the final software configuration, but it does allow further software development through implementation on the Central Section. However, Y0.525 will have many known deficiencies together with mitigating Operational Restrictions in place, which would limit the development and learning potential.

CRL is progressing with its development of an ‘opportunity build’ known as Y0.603²¹, which provides the opportunity to enter and exit Trial Running with the same software configuration²². If it can be adopted, then Trial Running will benefit from having a more reliable software configuration from the start and avoid the disruption caused by carrying out a formal signalling software change using the RfL Rule Book.

The current plan is to review the progress of Y0.603 progress at the end of April 2020 and the end of July 2020 to see if it can replace the current candidate Y0.525. Progress is being measured against a Trial Running [REDACTED], however our view is that that [REDACTED] is not achievable (see our Period 11 report). The Covid-19 restrictions are expected to compound that risk, and we now expect the start of Trial Running to slip [REDACTED]. This enhances the case for starting Trial Running with the Y0.603 configuration.

Stage 4 Summary

Planning for [REDACTED] has progressed this period, with the Liverpool Street platform extension works proceeding to programme and with MTR well-placed to begin the timetable submission process at the end of April 2020.

The risks to that plan are further delays to completing the GEML traction power programme, the installation of Balises to enable Correct Side Door Enabling (CSDE) and completing assurance evidence.

¹⁹ Y0.510 consists of TCMS 7.3.3.2, CBTC P_D+11 and Point Release E11/0060 and ETCS 6.6.4

²⁰ Reliability Board – 24 March 2020

²¹ Y0.603 consists of TCMS 7.5.1, ETCS 2.3, CBTC TR2 – RSD dashboard NR PDB 15 April 2020.

²² Further iterations of the Y0.600 series are planned.

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The key consideration for Stage 4 Opening will be the timetable bidding process that will begin in November 2020, completing in March 2021. CRL was originally expecting to be partway through Trial Operations at that time, but the most optimistic forecasts now indicate that Trial Running will only just have commenced. We have previously described the importance of demonstrating that the railway is reliable during this process, especially across the transitions between the Central Section and NR. This is an important consideration for RfLI's Reliability Board.

Stage 5B Opening

The situation with Stage 5B Opening is unchanged from Period 11. The key consideration for Stage 5B Opening will be the timetable bidding process that will formally begin in April 2021. We have previously described the importance of demonstrating that the railway is reliable during this process, especially across the transitions between the Central Section and NR. Stage 3 operations were originally expected to have started at the time of submission, but we now expect Trial Running to be operating during this period. This is an important consideration for RfLI's Reliability Board.

Key Areas of Concern in the Period

A wide range of completion activities has continued across the Crossrail Programme, targeting the start of Trial Running [REDACTED]; however, even before the impacts of Covid 19 pandemic are considered, key performance indicators in the period confirm that this [REDACTED] is not achievable. The predicted benefits of improvement initiatives which commenced in early 2020, have yet to be realised. Now with Covid-19 becoming more widespread in the UK, a Safe Stop on all site works has been implemented on 24 March 2020.

Based on our Period 13 status report, we consider the following points require further action or explanation to Sponsors, by the CRL Leadership Team:

1. How CRL can demonstrate that resources utilised in Safe Stop, will be measured and focused on the relevant assurance documents, supported by Niche works, to positively impact handover and Trial Running?
2. CRL has previously found it difficult to implement adequate durations in its scheduling, how will CRL give assurance that a realistic Recovery Plan will be developed and underpinned by robust scenario plans, a costed QSRA, a fully defined scope of works to complete and achievable durations?
3. How CRL will mitigate emerging concerns on programme wide issue of Cyber Security?