# LEARNING LEGACY PLAN

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| 1.0 | 26/06/15 | [redacted] | [redacted] | [redacted] | First issue |
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| | | | | | |

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# 1 Introduction

The objective of the Crossrail Learning Legacy is to collate and share lessons learned, best practice and innovation from the Crossrail project for the benefit of future projects and programmes, aimed at raising the bar in industry and show casing UK PLC.

A Learning Legacy team will work with champions from within Crossrail, across the supply chain, from academia and with industry partners to produce and share lessons learned material for use by future projects and programmes. This will include a combination of Insight documents (such as research papers, case studies and micro-reports) and Datasets (such as best practice documents, management systems and statistical data) as well as a focus on the people producing the learning legacy (including people profiles and creation of a Learning Legacy Ambassador programme which connects the people who have contributed to the learning legacy with industry partners hosting knowledge sharing events and fora).

The Crossrail Learning Legacy will build on the learning legacy created by the Olympic Delivery Authority showing how the lessons have been taken forward.

The Learning Legacy team will engage with industry and legacy projects such as HS2, TfL, and Thames Tideway to market test the learning legacy proposals and ensure that the right learning legacy is being produced and prioritised to meet market demands and provide best value. The Learning Legacy is also intended to mitigate the high number of adhoc requests for lessons learned from the industry by providing a strategic framework for sharing lessons learned.

The Crossrail learning legacy will be a pathfinder project for a wider Major Projects Knowledge Hub which is being developed with the Major Projects Association to collate knowledge from projects across the industry and provide a tool for interacting with the knowledge and the authors.

The purpose of this document is to set out the plan for delivering the Crossrail Learning Legacy through to end of construction in 2018 and operations to 2020. This is a live document that will be updated throughout the life of the project.

# 2 Scope

Crossrail will, working with its delivery partners and research partners, seek to collate lessons learned, best practice and innovation from the Crossrail project.

Crossrail will publish the learning legacy via the Crossrail website and other appropriate third party places of deposit.

Crossrail will develop partnerships with industry bodies to facilitate their active dissemination of the learning legacy.

Crossrail will work with the Major Projects Association for the development of an industry wide Major Projects Knowledge Hub with the Crossrail Learning Legacy being a pathfinder project.

## 2.1 Knowledge Types

The learning legacy will comprise Insight, Data and People.

### 2.1.1 Insight

Insight will include documentation of the approach taken by Crossrail in initiating and delivering the project and the lessons learned for future projects and programmes. This information will be published on the Crossrail learning legacy website from 2016 onwards and also made available to the Major Projects Knowledge Hub as required.

It will be shared in the following formats:

1) **Case studies** – 3000 word peer reviewed papers on topics authored by the project teams or with/by partners. These would typically focus at macro/strategic level and include analysis of the process with lessons learned and recommendations for future projects and programme. Peer review by independent parties would seek to validate the recommendations for future projects and programmes.
2) **Research Papers** – detailed project studies completed by academics (using interviews, document review and questionnaires)
3) **Technical Papers** – circa 3000 word papers produced by the project team, contractors, designers and project partners focused on technical innovation or documentation of the approach taken by Crossrail on a particular aspect of the project. These papers would be less focused on analysis and more about sharing what Crossrail did with some lessons learned hence these papers will not be peer reviewed by external parties.
4) **Micro-reports** - 1-2 page lessons learned, innovations and/or best practice completed by project teams including contractors, designers, engineers, etc. Micro-reports focus on particular topics, a number of micro-reports may be linked to a case study spotlighting topics in more detail.
5) **Technical Publications** – A collection of peer reviewed papers that document the planning, delivery and operational legacy of the Crossrail project and published by industry partners.
6) **Video Podcasts** - video/audio commentary by users/authors that accompanies one of the learning legacy papers.

### 2.1.2 Data

Data will comprise the sharing of raw data, tools, templates, processes and procedures for reuse by future projects and programmes. This information will generally be shared at the end of the project when information sensitivities will have reduced. Data will **not** be published on the Crossrail Learning Legacy website and will instead seek external places of deposit such as the Major Projects Knowledge Hub and/or specialist end-users or libraries.

The learning legacy team will work with partners and the MPA to identify datasets that should be shared, at the same time, seeking to set standards for future projects and programmes.

1) **Good Practice Documents** - templates, tools and documents used successfully on a project that could be usefully applied by other projects and programmes.
2) **Datasets** – A collection of that documents that together make up a data set, eg, Management System, contracts, etc
3) **Statistical Data** – raw numerical data collected by Crossrail during its life, eg, Air quality data, H&S data, P6 data, IT configuration code, etc.

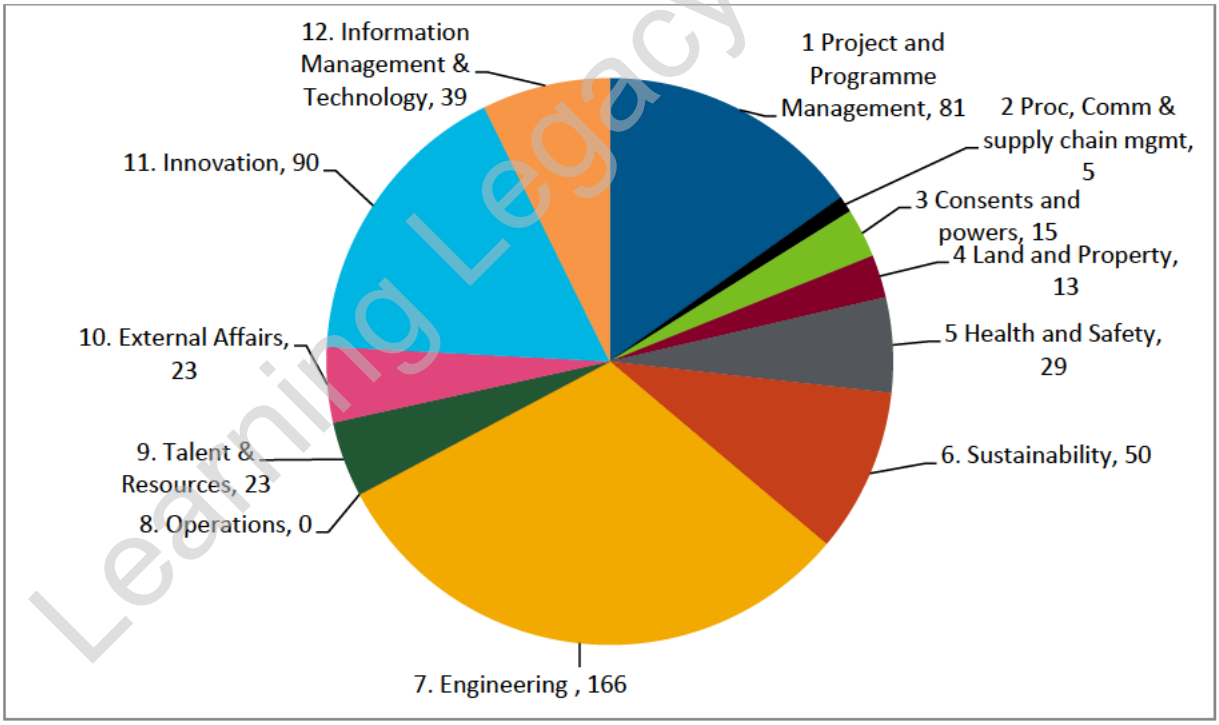
2.1.3 People

The learning legacy will seek to promote the People side of knowledge sharing as much as the documentation side. This will be done through the following methods:

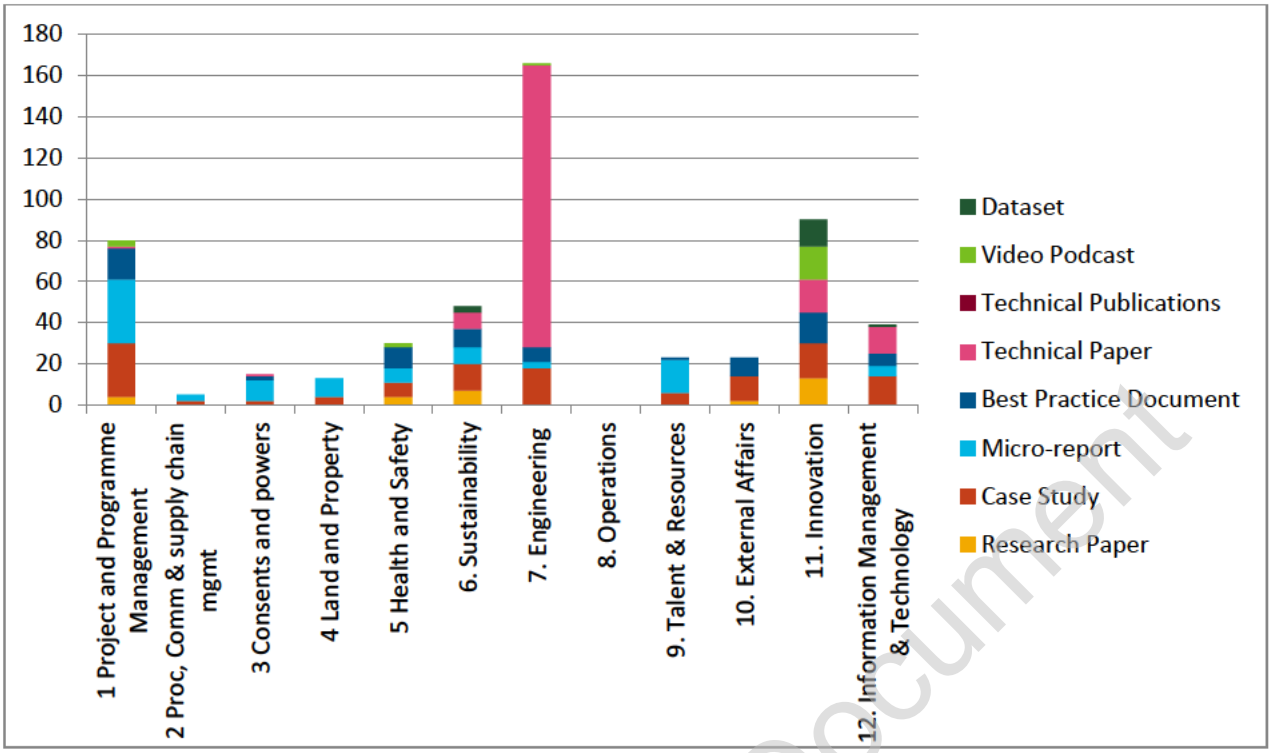
1) **Author Biogs** – The website will include author biogs alongside the document abstract.
2) **Learning Legacy Ambassadors** – Authors will be invited to join the learning legacy ambassador community which will be set up on a LinkedIn group. This is then available to the industry partners to invite the authors to speak at events hosted by them on the learning legacy. In this way even if authors move on from the Crossrail project they can still be invited to speak at events.
3) **Social Media** – the Major Projects Knowledge Hub will provide an interactive tool that will promote commentary and discussion on the learning legacy.

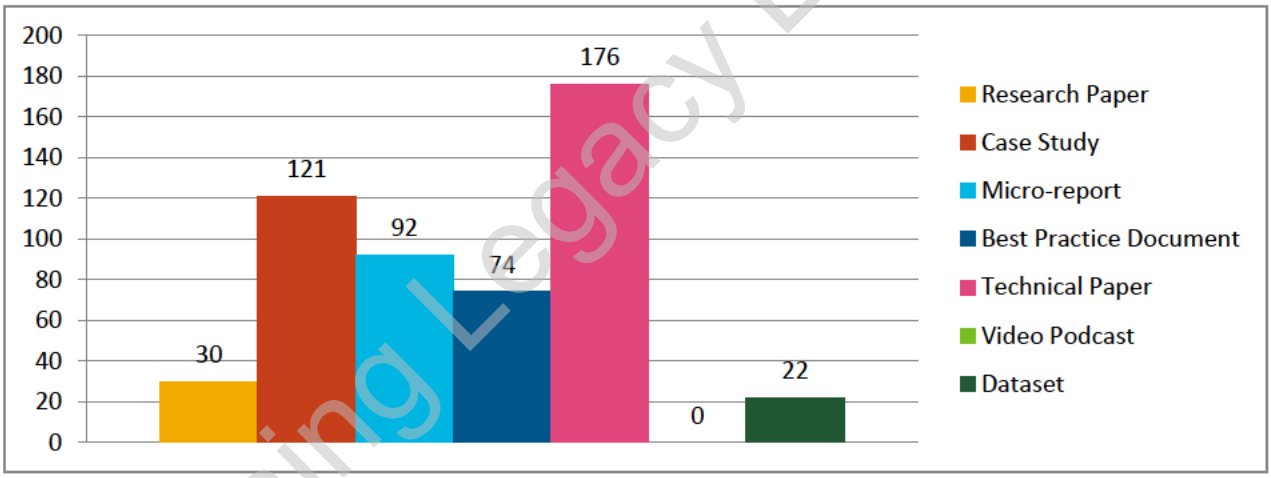
## 2.2 Proposed Content

12 themes comprising 62 sub themes and champions (see Appendix 1 for details).




534 learning legacy documents proposed to date. This will evolve over time. In particular it is not expected that the Operations learning legacy theme will develop until 2017/18 when Operations is approaching.






## 2.3 Publication

The existing Crossrail website will used to publish the learning legacy insight documents and author biogs.

Crossrail will also work with industry partners for publication through links to/from their websites and published journals.

Additionally Crossrail is working with the Major Projects Association to integrate the Crossrail Learning Legacy into the Major Projects Knowledge Hub as part of a wider project to link together learning legacies from many different projects.

## 2.4 Working with Partners

### 2.4.1 Research Partners

Research partners will:

1. Undertake peer review of learning legacy papers in their expert area
2. Undertake self-funded research on the Crossrail project and produce a Research Summary for the Crossrail learning legacy
3. Provide guidance on production of learning legacy material for use as teaching material
4. Contribute to the Learning Legacy Steering Group (LLSG) providing oversight of the learning legacy theme

Crossrail will:

1. Make available appropriate people and data as required by research partners to produce their agreed research
2. Invite research partners to participate in the LLSG to provide oversight and direct the learning legacy theme
3. Allow use of the Crossrail learning legacy logo by research partners.
4. Include on the Crossrail website and other learning legacy collateral the name of the Crossrail Research Partner

### 2.4.2 Delivery Partners

Delivery partners will:

1. Contribute to production of learning legacy material aimed at raising the bar in industry through the open sharing of lessons learned and recommendations for future projects
2. Support dissemination of learning legacy material by industry partners, eg, through learning legacy ambassadors speaking at events, social media, knowledge sharing
3. Provide funding or resource support

Crossrail will:

1. Publish and promote the learning legacy material
2. Make Crossrail facilities available with support from Crossrail executives at events
3. Include on the Crossrail website and other learning legacy collateral the name of the Crossrail Partners

### 2.4.3 Industry Partners

Industry partners will:

1. Commit to actively disseminating the learning legacy programme through means such as hosting of events, social media, publications, etc-
2. Measure the impact of the learning legacy on the industry in relation to their strategic objectives
3. Coordinate peer review of learning legacy documents eg, through special interest groups
4. Provide funding or resource support

Crossrail will:

1. Encourage participants to become learning legacy ambassadors
2. Invite industry partners to participate in the LLSG to provide oversight and direct the learning legacy theme
3. Allow use of the Crossrail learning legacy logo by industry partners.
4. Include on the Crossrail website and other learning legacy collateral the name of the Crossrail Industry Partners

### 2.4.4 Advisory Partners

Advisory partners will:

1. Provide strategic advice and guidance on the link between academic learning legacy and practical application to the industry

2. May contribute learning legacy content through analysis of data and value add on top of the learning legacy produced by Crossrail.

2.4.5 Legacy Projects

Stakeholders from Legacy projects such as HS2, Thames Tideway and HS2 will be invited to participate in the themed Learning Legacy Steering Groups to provide strategic advice and guidance on the learning legacy that is being produced and be the link back into their organisations on promotion of the learning legacy as a tool. They will also be the single points of contact for any requests for lessons learned.

These partners may also contribute to the learning legacy if they have specific requirements perhaps through the running of workshops and producing lessons learned reports from the outputs.

2.4.6 Partnerships by theme.

Below are the industry and academic organisations that have been* or plan to be approached to partner with Crossrail on each learning legacy theme.

| | Industry | | Academic | |
|---|---|---|---|---|
| | **Tier 1** | **Tier 2** | **Tier 1** | **Tier 2** |
| 1 Project and Programme Management | APM* | CQI | UCL | Manchester Business School? |
| 2 Procurement, Commercial & supply chain management | RICS | | | |
| 3 Consents and powers | RTPI | | | |
| 4 Land and Property | RICS | CPA<br>NLA | | |
| 5 Health and Safety | IOSH*<br>BSC* | BOHS* | | |
| 6. Sustainability | IEMA*<br>CIRIA* | | | Kings (KCL)<br>UCL<br>Staffordshire |
| 7. Engineering | ICE*<br>IET*/IMechE | | | |
| 8. Operations | REF<br>CILT | | | |
| 9. Talent & Resources | CIPD* | CITB<br>RAE | | UoW (people)<br>Cambridge (IR) |
| 10. External Affairs | CIPR | Inst of Govt | | |
| 11. Innovation | Innovate UK | APM<br>MPA<br>KTN | Imperial College | |
| 12. Information Management and Technology | | APM<br>ICE | | |

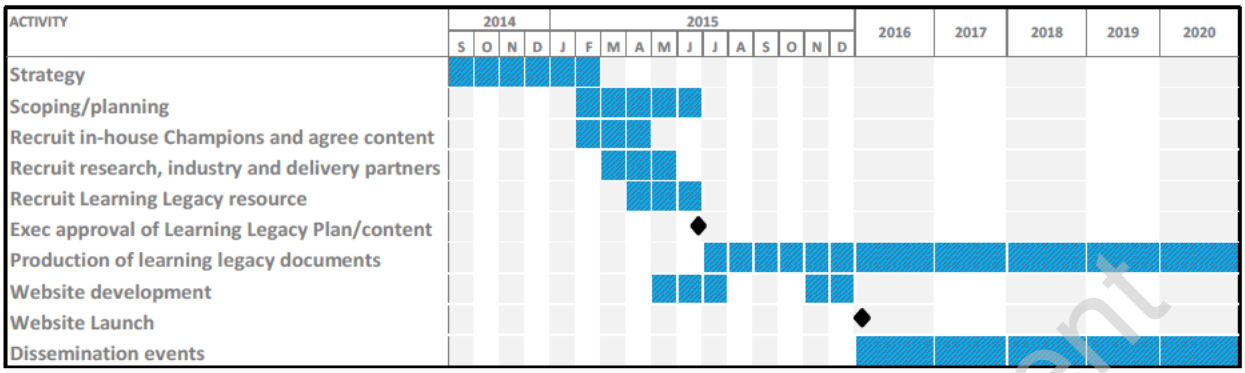
*Agreed Partners

## 2.5 Working with the Projects

The learning legacy explained above is functionally based using the 12 themes. It is important however that learning legacy is also sought through the Projects. It is proposed to do this through accessing the lessons learned database and also tapping into the lessons learned workshops that are held at key points in the Projects, possibly through the creation of learning legacy champions on the projects in the same way as innovations champions and lessons learned champions currently work. This would enable more effective engagement of the supply chain with the learning legacy.

# 3 Implementation

## 3.1 Programme




The learning legacy team will work with the theme leads to develop a programme over the next few months for publication of the learning legacy and dissemination events.

The key date is the launch of the learning legacy website in early 2016.

## 3.2 Budget

The table below shows the costs included in the Business Plan for Learning Legacy from 2015/16 to 2020/21.

| Description | Budget |
|---|---|
| IT | £120k |
| Remaining resource budget | £185k |
| **Total** | **£305k** |

The table below shows the estimated costs for delivering the learning legacy:

| Description | Budget |
|---|---|
| Website | £20k |
| Branding and artworking | £25k* |
| Collateral (eg, badges) | £5k |
| Specialist resources (9*£25k each) | £225k |
| **Sub-total** | **£275k** |
| Contingency 10% | £30k |
| **Total** | **£305k** |

*on the assumption that artworking of content will mostly be completed in-house.

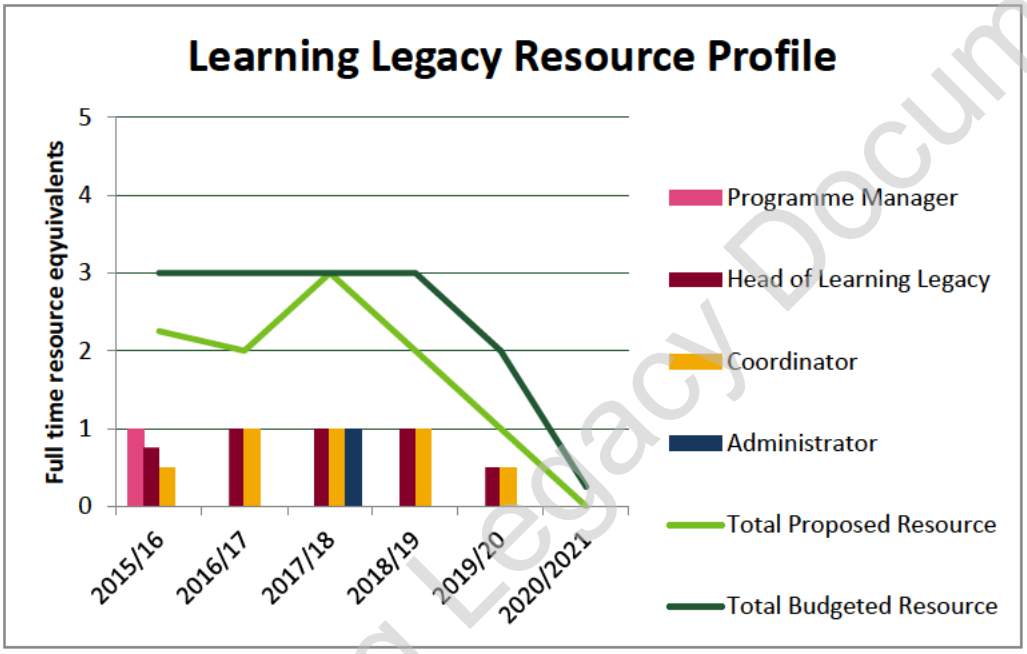
## 3.3 Resourcing

It is proposed to have a core learning legacy team of 2 made up of:

- Head of Learning Legacy
- Learning Legacy Coordinator

This will be supplemented by a specialist Learning Legacy Programme Manager in the first year to set up and launch the learning legacy and then at the back end of the programme by administrative support to collate and prepare the management system documents for publication.

Additionally there will be specialist resources brought in to support the teams in the production of the learning legacy material. Ideally these resources will be identified by the teams and will have worked in or with the team previously. These will be short term assignments funded by the learning legacy.

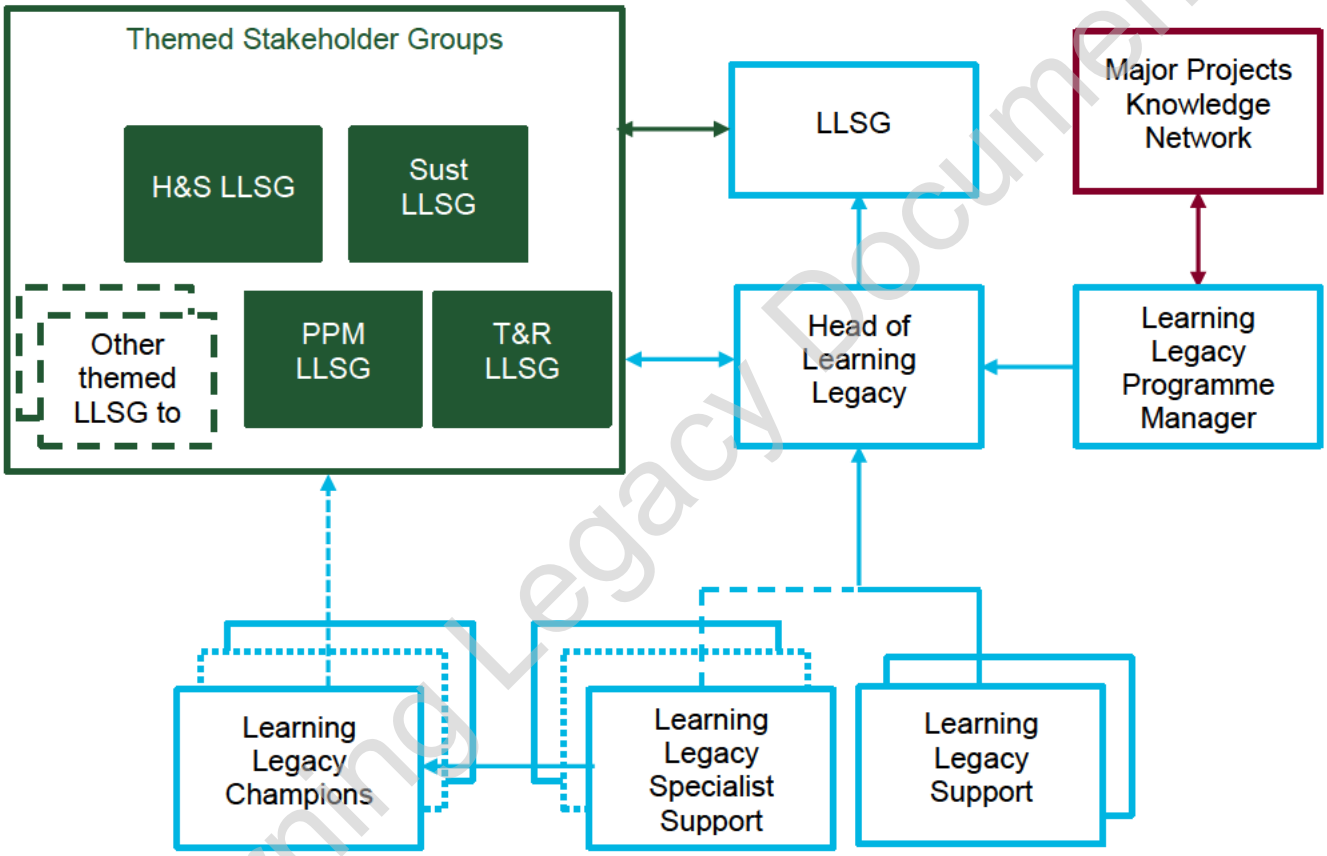


### 3.4 Governance and Delivery Framework

An exec level Learning  Legacy Steering Group will meet quarterly and provide oversight and direction of the learning legacy.  This however will not be a sub-Committee of ExCom and will be limited to the delegated authority of its members.

The Major Projects Knowledge Network will provide the external review and validation of the approach taken including a leadership campaign to promote both the learning legacy and the Knowledge Hub.

Stakeholder groups will be managed by themed steering groups chaired by the Crossrail Exec lead for the theme.  These will be supported by working groups as necessary such as for coordination of communications and events with partners.



# 4 Communications

## 4.1 Learning Legacy Brand

A Crossrail learning legacy sub brand will be developed with the Marketing team that can be used by Crossrail and partners to create a presence that is easily recognised across the industry.

Cover sheets and templates for learning legacy material will be created in the brand and aim to minimise the need for extensive artworking.

## 4.2 Website

The learning legacy website will be part of the Crossrail.co.uk website learninglegacy.crossrail.co.uk

It will be use the standard website structure and search functions so to minimise cost.

It will be designed so that it can be archived as a separate site to be hosted by a legacy owner such as the Major Projects Authority or Major Projects Association.

## 4.3 Video Team

A key part of the learning legacy will be to ensure that the material is suitable for use as educational material by universities. Videos will play a key role in achieving this as guided and directed by the academic partners.

## 4.4 Review of material

As the learning legacy content will be published on the learning legacy website it is expected that the External Affairs team will want to review the content prior to publication. Resource will need to be allocated accordingly.

# 5 Appendices

## 5.1 Appendix 1 – Learning Legacy Themes

| Themes | Exec Lead | Champion |
|---|---|---|
| **1 Project and Programme Management** | **Richard Pacenzki Martin Buck** | **Richard Wood** |
| a. Requirements definition | | Lucy Findlay (Sarah Johnson) |
| b. Business case | Martin Buck | Simon Adams |
| c. Funding | David Allen | Simon Adams |
| d. Structuring and governance | Martin Buck | Simon Adams |
| e. Delivery/execution strategy | Bill Tucker | Will Sharp |
| f. Cost Control | Richard Palczynski | Julian Bartlett |
| g. Planning | Richard Palczynski | Rob Little |
| h. Risk management | Richard Palczynski | Rob Halstead |
| i. Change management | Richard Palczynski | Walter Macharg |
| j. Reporting | Richard Palczynski | Mike Laws |
| k. Performance Assurance | Richard Palczynski | James Corrigan |
| i. Quality | Chris Sexton | Chris Titterton |
| j. Audit | Chris Sexton | Robert Kemp |
| k. Financial Operations | Robert Flanagan | |
| l. Handover | Chris Sexton | Jeremy Bates |
| m. Transition | Martin Buck | David Yass |
| o. Smart clienting with industry partners | Matt White | |
| **2 Procurement, Commercial and supply chain management** | **Martin Buck?** | |
| a. Procurement | Kevin Lloyd Davies | ICG Routemap |
| b. Supply chain management | Martin Buck | Simon Pain |
| c. Commercial | Paul Grammer | David Morris |
| d. Legal agreements | Mark Fell | |
| e. Insurance | Mark Fell | |
| **3 Consents and powers** | **Rob Paris** | |
| a. Town Planning | Rob Paris | Julie Davis |
| b. Traffic and Highways Consents | Rob Paris | Gary Moreira |
| c. Undertakings and Assurances | Rob Paris | Iftikhar Abutin |
| d. Constitutional Arrangements | Mark Fell | |
| e. Engagement with statutory regulators and other third parties | | |
| **4 Land and Property** | **Ian Lindsay** | |
| a. Land Management and Estates | Ian Lindsay | Harry Younger ; Paul Bolton |
| b. Over site development (incl. route protection) | Ian Lindsay | Niall Lindsay; David Taylor |
| c. Urban Integration | Ian Lindsay | Sam Richards |
| d. Regeneration | Ian Lindsay | Neil Roberts? |
| **5 Health and Safety** | **Steve Hails** | |
| a. Occupational Health and Wellbeing | Steve Hails | Christina Butterworth |
| b. Health and Safety improvement | Steve Hails | Steve Crofts |
| c. Health and Safety Assurance | Steve Hails | Darren Sellman |
| d. Diversity and Inclusion in H&S | Steve Hails | Pamela McEnroy |

| | | |
|---|---|---|
| c. Security | Bill Tucker | David Buck |
| **6. Sustainability** | **Chris Sexton** | **Rob Paris** |
| a. Sustainability | Rob Paris | Mike De Silva |
| b. Environmental | Rob Paris | Cathy Myatt |
| c. Social | Valerie Todd | Andrew Eldred |
| d. Economic | Martin Buck | Simon Pain |
| e. Archaeology | | Jay Carver |
| **7. Engineering** | **Chris Sexton** | |
| a. Civils | Chris Sexton | Mike King, Mike Black |
| b. MEP | Chris Sexton | Rhys Williams |
| d. Rail systems | Chris Sexton | David Lyle |
| g. Technical assurance and integration | Chris Sexton | Jeremy Bates |
| **8. Operations** | **Howard Smith** | |
| a. Planning a service | Howard Smith | |
| b. Operations and Infrastructure Management | Howard Smith | |
| c. Rolling Stock | Howard Smith | Phil Hinde |
| d. Passenger Experience | Howard Smith | |
| **9. Talent & Resources** | **Valerie Todd** | |
| a. People Strategy | Valerie Todd | Valerie Todd |
| b. Culture, Values and Engagement | Valerie Todd | Rob Jones |
| c. Talent and Development | Valerie Todd | Rob Jones |
| d. Alignment and Collaboration | Valerie Todd | Rob Jones |
| d. Resourcing and People Management | Valerie Todd | Dawn Barker |
| e. Employment and Skills | Valerie Todd | Andrew Eldred<br>Paul Butler<br>Nathan Pascutto |
| f. Youth Strategy | Valerie Todd | Sally Speed<br>(Kate Myers) |
| **10. External Affairs** | **Will Parkes** | |
| a. Community relations | Will Parkes | Ben White |
| b. Wider stakeholders/Public Affairs | Will Parkes | James Gray |
| c. Media relations | Will Parkes | Peter MacLennan |
| d. Marketing comms | Will Parkes | Sarah Allen |
| e. Art | Will Parkes | Christina Anderson |
| **11. Innovation** | **John Pelton** | **Marie Gilmour** |
| a. H&S Innovation | John Pelton | Marie Gilmour |
| b. Sustainability Innovation | John Pelton | Maggie Brown |
| c. Efficiency Innovation | John Pelton | William Reddaway |
| d. Digital Integration Innovation | John Pelton | Syinyi Phoon |
| **12. Information Management and Technology** | | |
| n. Information Management - GIS, BIM, IM | Chris Sexton | Malcolm Taylor |
| f. IT | David Allen | Andrew Turner |

## 5.2 Appendix 2 – Learning Legacy Content Plan

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Crossrail Management System | Case Study | Chris Titterton<br>Aram Stirzaker | CQI | Crossrail's concept of establishing and implementing a management system ensuring that all key processes are mapped. The CRL Management System (CMS) was set out to mandate the processes and procedures that were adopted for the delivery of the Crossrail Programme. In doing so it provided assurance to Sponsors (through the Project Representative) and Infrastructure Managers that the programme was being delivered coherently and correctly. | 1 Project and Programme Management | Quality | | |
| 2 | Supply Chain Quality Requirements | Case Study | Chris Titterton<br>Janak Mistry | CQI | The key requirements that were over and above the industry norm that were included in supply chain contracts to ensure that contractors were resourced correctly and established systems to deliver quality | 1 Project and Programme Management | Quality | | |
| 3 | Cost of Defects | Micro-report | Chris Titterton<br>Janak Mistry | CQI | Analysis of the cost of rework on Crossrail | 1 Project and Programme Management | Quality | | |
| 4 | Right First Time Metrics Contractor Performance Report | Micro-report | Chris Titterton<br>Janak Mistry | | A report on right first time metric perfomance of Contractors | 1 Project and Programme Management | Quality | | |
| 5 | Trend Analysis of all NCR's raised on the Crossrail Supply Chain | Micro-report | Chris Titterton<br>Janak Mistry | | A report on trend analysis of all NCR's rasied on Crossrail | 1 Project and Programme Management | Quality | | |
| 6 | Quality professional resourcing | Case Study | Chris Titterton<br>Jon Elliot | | Crossrails concept for resoucing the client and supply chain teams for quality | 1 Project and Programme Management | Quality | | |
| 7 | Inspection and Testing and Self Certification | Case Study | Chris Titterton<br>Jon Elliot | | Crossraild concept for 'getting the quality righ' by use of Inspection and Test plans and self certification | 1 Project and Programme Management | Quality | | |
| 8 | Fraud Risk Assurance Group (FRAG) | Case Study | *Robert Kemp, Robert Flanagan* | | A public sector funded major project such as Crossrail will need to provide assurance that it is providing value for money. Losing money through fraud would clearly not be demonstrating good value for money. FRAG was established to help raise awareness of the fraud risk across the Project. It has met for two years, and has been instigative in raising fraud awareness, not only within Crossrail, but also its Tier 1 contractors. Future developments will include Tier 2 and 3 initiatives. | 1 Project and Programme Management | Audit | | |
| 9 | Crossrail Integrated Assurance Group (CIAG) | Case Study | *Robert Kemp* | | A public sector funded major project such as Crossrail will need to provide assurance to many bodies in relation to governance and the effectiveness of delivery. These bodies include the National Audit Office, the Major Projects Audithority, the Department for Transport, the Office for Rail Regulation and Transport for London. CIAG meets six times a year and shares assurance information with a view to reduce overall assurance intrusion from these different bodies, whilst delivering effective assurance. | 1 Project and Programme Management | Audit | | |
| 10 | Integrated Audit | Case Study | *Robert Kemp* | *CQI*<br>*IIA* | Crossrail has recognised the need to reduce audit intrusion from within the project itself, and has developed a fully integrated Audit Planning process in which all audit activity is co-ordinted and monitored. There are further oppoertunities to refine this further with support of the IIA and the CQI. | 1 Project and Programme Management | Audit | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 11 | Risk Based Audit and Assurance | Research Paper | Robert Kemp | CQI IIA | Integrating risk, audit and assurance to optimise assurance based activities will help ensure that the good work already undertaken to reduce assurance intrusion will be realised. The purpose of this research paper is to explore the ways in which these different functions can act in unison to reduce intrusion further and allow this major project to be delivered more effectively. It will also look at the ways in which the different professional bodies can work together to provide a more integrated approach to audit. It will also compare and contrast the ways in which the parent organisation (TfL)and Crossrail operate in relation to audit provision. | 1 Project and Programme Management | Audit | | |
| 12 | Benefits Management | Case Study | TfL Sponsor team - Sarah Johnson | APM | | 1 Project and Programme Management | 1b. Business case | | |
| 13 | Business Case | Case Study | TfL Sponsor team Simon Adams Martin Buck | APM | | 1 Project and Programme Management | 1b. Business case | | |
| 14 | Funding | Case Study | TfL Corporate Finance team - Tom Buton Page; Simon Adams; Julian Waring; Martin Buck. | APM, CE | What we said we would raise through funding what we got. | 1 Project and Programme Management | 1c. Funding | | |
| 15 | Pre-construction, organisation and management | Case Study | Simon Adams Mark Jones Martin Buck | APM | Organisational set up and project initiation | 1 Project and Programme Management | 1d. Structuring and governance | | |
| 16 | Requirements | | TfL Sponsor team - Sarah Johnson | APM | | 1 Project and Programme Management | 1a. Requirements definition | | |
| 17 | Programme Controls Overview | Case Study | TBC | | Case study detailing the overall structure of the Programme Controls department & the changing requirements over time. Should include details of the tools and systems utilised to capture data, and introduce the functional case studies and micro-reports. | 1 Project and Programme Management | | 29-Jan-16 | |
| 18 | Work Breakdown Structure | Micro-report | TBC | | Defining and controlling through the Master Data system | 1 Project and Programme Management | | 04-Dec-15 | |
| 19 | Board Reporting | Case Study | Mark Warren? | | Case study detailing the design and implementation of the Board Report, including requirements definition, graphical design, data sources, interfaces, improvements over time & lessons learned. | 1 Project and Programme Management | 1j. Reporting | 29-Jan-16 | |
| 20 | Movement from areas to sectors | Micro-report | Mike Laws / Sam Blackmore? | | Short report detailing the decision to reorganise the programme away from areas to sector-based delivery, specifically the reporting requirements to support reallocated delivery responsibility | 1 Project and Programme Management | 1j. Reporting | 04-Dec-15 | |
| 21 | Reporting / Data structure | Micro-report | Mike Laws / Robert Stockwell? | | Short report detailing the reporting hierarchy, data structure and tools & system interfaces | 1 Project and Programme Management | 1j. Reporting | 04-Dec-15 | |
| 22 | Critical information requirements | Micro-report | Mike Laws | | Reporting targeting matrix - What, why, when, who for each reporting output. Ensuring value in reporting. | 1 Project and Programme Management | 1j. Reporting | 04-Dec-15 | |
| 23 | Reporting roles, responsibilities & timescales | Best Practice Document | Mike Laws | | Process document, detailing who provides what information, when during the periodic reporting cycle. | 1 Project and Programme Management | 1j. Reporting | 02-Oct-15 | |
| 24 | Crossrail Board Report | Best Practice Document | Mike Laws | | Consider publishing full Board Report | 1 Project and Programme Management | 1j. Reporting | 02-Oct-15 | |
| 25 | Contingency management | Micro-report | Elizabeth Gilbe / Walter Macharg | | Targeted contingency by Project / Sector / Programme, based on risk matrix allocation. Summary of key principles | 1 Project and Programme Management | | 04-Dec-15 | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 26 | Trend process and quantitative risk analysis | Micro-report | Julian Bartlett / Rob Halstead | | Management of budget and AFC, control / authority of changes via Prism cost management system. Summary of key principles | 1 Project and Programme Management | | 04-Dec-15 | |
| 27 | Cost & Schedule Integration | Micro-report | Julian Bartlett / Rob Little | | Recording the decision and rationale to not cost load the programme | 1 Project and Programme Management | | 04-Dec-15 | |
| 28 | Crossrail approach to Cost Control | Case Study | Julian Bartlett / TBC | | Case study detailing the approach to cost control across the programme, incorporating estimating, stakeholder engagement & approvals, OCI, cost capture tools and systems, project reporting, WBS etc. Will need to link to risk, change, reporting, planning and assurance work. Clarify what already exists under Transcend products. | 1 Project and Programme Management | 1f. Cost Control | 29-Jan-16 | |
| 29 | Crossrail approach to Earned Value | Micro-report | Julian Bartlett / TBC | | | 1 Project and Programme Management | 1f. Cost Control | 04-Dec-15 | |
| 30 | Approach to Estimating | Micro-report | Julian Bartlett / TBC | | | 1 Project and Programme Management | 1f. Cost Control | 04-Dec-15 | |
| 31 | Getting to RP 4.2 | Micro-report | Julian Bartlett / TBC | | Incorporating benchmarking exercise | 1 Project and Programme Management | 1f. Cost Control | 04-Dec-15 | |
| 32 | Crossrail Approach to Planning | Case Study | Rob Little - support TBC | | 10-12 page study describing Crossrail's overall approach to planning including: Schedule development and baselining, Organisation, Schedule Structure, Software, Schedule Risk Analysis, Communication & the Planning Page | 1 Project and Programme Management | 1g. Planning | 29-Jan-16 | |
| 33 | Reporting | Micro-report | TBC | | TBC - covered by Reporting section / best practice / other micro-reports? | 1 Project and Programme Management | 1g. Planning | 04-Dec-15 | |
| 34 | Crossrail approach to managing interfaces | Micro-report | TBC | | | 1 Project and Programme Management | 1g. Planning | 04-Dec-15 | |
| 35 | Crossrail approach to managing and planning design | Micro-report | TBC | | | 1 Project and Programme Management | 1g. Planning | 04-Dec-15 | |
| 36 | Commodities | Micro-report | TBC | | | 1 Project and Programme Management | 1g. Planning | 04-Dec-15 | |
| 37 | Planning Manual | Best Practice Document | TBC | | | 1 Project and Programme Management | 1g. Planning | 02-Oct-15 | |
| 38 | Planning requirements under the NEC form of contract | Best Practice Document | TBC | | | 1 Project and Programme Management | 1g. Planning | 02-Oct-15 | |
| 39 | The Planning Page | Best Practice Document | TBC | | | 1 Project and Programme Management | 1g. Planning | 02-Oct-15 | |
| 40 | Milestone management and reporting | Best Practice Document | TBC | | | 1 Project and Programme Management | 1g. Planning | 02-Oct-15 | |
| 41 | Stage Diagrams | Best Practice Document | TBC | | | 1 Project and Programme Management | 1g. Planning | 02-Oct-15 | |
| 42 | Managing Interfaces with Industry Partners | Best Practice Document | TBC | | | 1 Project and Programme Management | 1g. Planning | 02-Oct-15 | |
| 43 | Implementing Risk Management | Case Study | Rob Halstead/ Amy Farrer | IRM (Institute of Risk Management)<br>ICE<br>APM | From an early stage Crossrail recognised that managing risk was critical to the success of the project. Crossrail implemented risk management across the organisation with three core objectives: to support delivery, provide assurance and inform decision making. To emphasise Leadership Support, Objectives of Risk Management, performance indicators | 1 Project and Programme Management | 1h. Risk management | 29-Jan-16 | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 44 | Dealing with Uncertainty and Risk in the Early Stages of Crossrail | Micro-report | Rob Halstead/ Amy Farrer | | Early in its development, Crossrail was innovative in its rejection of Optimism Bias in favour of quantitative risk assessment techniques. This approach placed an early focus on the management of risk and uncertainty and resulted in a helpful acknowledgement that outturn costs should be reported as a range. This was ultimately reflected in the PDA governance around Intervention Points and Crossrail's reporting of AFCDC at P50 and P95. | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 45 | Quantitative Risk Assessment At Crossrail | Micro-report | Rob Halstead Marwa Elcheikh | | In response to the PDA requirements for cost reporting, Crossrail implemented a comprehensive process for QRA throughout the organisation which was fully integrated within the cost management process. | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 46 | Engaging the Supply Chain in Risk Management | Micro-report | Rob Halstead/ Amy Farrer | | Crossrail's size, complexity, nature of the works, and 'thin client' operating model resulted in a novel requirement to extend risk management into the supply chain. Note contract form NEC Target Cost Contract. | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 47 | Risk and Assurance | Micro-report | Rob Halstead Robert Kemp | | Explaining how risk and assurance have worked together. | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 48 | Risk and Insurance | Micro-report | Rob Halstead Colin Hamling | | Explaining how risk and insurance have worked together. | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 49 | Strategic Risk Management | Micro-report | Rob Halstead/ Amy Farrer | | Crossrail senior management and independent board have shown support for the approach risk management. This report describes the approach to Strategic Risk Management. | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 50 | Managing Risk under NEC contract | Micro-report | Marwa Elcheikh, Amy Farrer | | Including relationship with NEC Target Cost Contract and the Early Warning process. | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 51 | Managing schedule risk | Micro-report | Jaimie Blagg | | Crossrail approach to managing schedule risk, including QSRA | 1 Project and Programme Management | 1h. Risk management | 04-Dec-15 | |
| 52 | Risk Management Policy | Best Practice Document | Rob Halstead/ Amy Farrer | | | 1 Project and Programme Management | 1h. Risk management | 02-Oct-15 | |
| 53 | Risk Management Plan | Best Practice Document | Rob Halstead/ Amy Farrer | | | 1 Project and Programme Management | 1h. Risk management | 02-Oct-15 | |
| 54 | Risk Management Procedure | Best Practice Document | Rob Halstead/ Amy Farrer | | | 1 Project and Programme Management | 1h. Risk management | 02-Oct-15 | |
| 55 | Briefing: Risk management critical to Crossrail's success | Technical Paper | Terry Morgan | ICE | http://www.icevirtuallibrary.com/content/article/10.1680/mpal.2011.164.2.57 | 1 Project and Programme Management | 1h. Risk management | 31-Jul-15 | |
| 56 | The importance of Risk Management to the success of Crossrail | Video Podcast | Rob Halstead | Active Risk | https://www.youtube.com/watch?v=DAuJM2wtsuY | 1 Project and Programme Management | 1h. Risk management | 31-Jul-15 | |
| 57 | Crossrail Case Study | Video Podcast | Rob Halstead | Active Risk | https://www.youtube.com/watch?v=A2vHNd41ThE | 1 Project and Programme Management | 1h. Risk management | 31-Jul-15 | |
| 58 | Strategies for successful collaborative risk management | Video Podcast | Rob Halstead | Active Risk | https://www.youtube.com/watch?v=KM7kAajSP38 | 1 Project and Programme Management | 1h. Risk management | 31-Jul-15 | |
| 59 | Managing Cost Risk and Uncertainty in Infrastructure Projects | Best Practice Document | Rob Halstead etc | Infrastructure Risk Group, IRM (Institute of Risk Management) | http://www.ice.org.uk/Information-resources/Document-Library/Managing-Cost-Risk---Uncertainty-in-Infrastructure | 1 Project and Programme Management | 1h. Risk management | 31-Jul-15 | |
| 60 | Change Control Overview | Case Study | Walter Macharg | | Control of change overall, in particular design change, incorporating lessons learned. Use the findings from PM Forum presentation and 'strangle change' initiative as the basis. | 1 Project and Programme Management | 1i. Change management | 29-Jan-16 | |
| 61 | Change Control and Budget Management | Best Practice Document | Walter Macharg | | Consider publishing full existing process | 1 Project and Programme Management | 1i. Change management | 02-Oct-15 | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 62 | Programme Change Process | Micro-report | Carl Chouler | | Defining, establishing and controlling the Programme Baseline, incorporating linkage to the scope book | 1 Project and Programme Management | 1i. Change management | 04-Dec-15 | |
| 63 | Investment authority | Micro-report | Carl Chouler | | Control of authority to incur expenditure against an approved baseline budget. | 1 Project and Programme Management | 1i. Change management | 04-Dec-15 | |
| 64 | Performance Assurance Overview | Micro-report | Richard Wood | | Describes the drivers for Performance Assurance and the need to increase supply chain capability in the context of Crossrail strategic vision. Outlines the approach (qualitative & quantitative), the contract / incentives, alignment of other audit regimes and the innovation programme, results & benefits and lessons learned / critical success factors | 1 Project and Programme Management | 1k. Performance Assurance | 04-Dec-15 | |
| 65 | Communication of results, feedback and performance improvement planning | Micro-report | Richard Wood | | Micro-report detailing the graphical communication methods and forums through which results are distributed. Will include a section on feedback reports to contractor's, performance improvement planning and knowledge sharing | 1 Project and Programme Management | 1k. Performance Assurance | 04-Dec-15 | |
| 66 | Commercial Assurance Procedure | Best Practice Document | Richard Wood | | Consider publishing full procedure | 1 Project and Programme Management | 1k. Performance Assurance | 02-Oct-15 | |
| 67 | Commercial Assurance Overview | Micro-report | James Corrigan / Richard Wood | | Describes the use of commercial lead and lag indicators to inform management decision making and the need for further assurance activity such as AFC reviews, Proactive reviews, Deep Dive reviews, desktop studies etc. Explains how the function provides confidence in the commercial management of the programme to sponsors. | 1 Project and Programme Management | 1k. Performance Assurance | 04-Dec-15 | |
| 68 | Commercial Assurance Procedure | Best Practice Document | Chris Shaw / Richard Wood | | Detailed document detailing the different types of commercial assurance, where assurance is applied and the processes and tools utilised. | 1 Project and Programme Management | 1k. Performance Assurance | 02-Oct-15 | |
| 69 | Commercial Indicator Report | Micro-report | Thomas Corbishley | | Micro-report detailing what the CIR is used for, how the metric were derived, how they link to corporate objectives and the benefits realised (e.g. management decision making, performance improvement, identification of further needs - training, guidance, targeted assurance etc.) | 1 Project and Programme Management | 1k. Performance Assurance | 04-Dec-15 | |
| 70 | Title: 'Building capabilities to manage a megaproject: the case of Crossrail's delivery partner model' | *Research paper* | *Professor Andrew Davies* | *UCL* | *Aims: This research aims to examine the how the organisational structure and capabilities were established and applied to manage the Crossrail programme.*<br><br>*Data gathering: Interviews would be undertaken with three different organisations involved in this 'megaproject': the client (Crossrail Ltd), the programme delivery partner (Transcend) and central projects delivery partner (Crossrail Central). The research will explore how a temporary public client organisation can establish an organisational structure and build the capabilities required to manage the design, construction and integration of a complex 'system of systems' project. Interviews would address previous, subsequent and real-time phases of the programme.*<br><br>*Outputs: The research would compare Crossrail with previous delivery models (HS1, Heathrow T5 and London 2012) and identify key lessons and recommendations for the delivery of future megaprojects* | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | *TBC* | *TBC* |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 71 | Title: Issues and Governance in Lifecycle Transitions: The Case of Crossrail's Operational Delivery | *Research Paper* | *Dr Vedran Zerjev, Dr Andrew Edkins, Professor Andrew Davies* | *UCL ICIF* | *Aims: We propose to explore the issues of lifecycle transitions and operational delivery on the London Crossrail programme. The primary purpose of this effort is to develop organisational capabilities that will facilitate Crossrail to achieve a smooth transition between construction and operations.*<br><br>*Data gathering and timeline: Interviews with (a minimum of 20) key informants across the levels of (1) Programme Leadership, (2) Transitions Team, and (3) Technical Systems Teams. It is possible that in the course of these interviews reference may be made to critical documents such as project schedules, interface management plans and communication protocols. In such circumstances we would discuss the possibility of accessing these documents. We would like to begin collecting the data by approaching the focus group and key informants as soon as possible subject to informant's availability and location. Ideally we would like to start the project immediately and finish by mid 2016.*<br><br>*Outputs: (1) A teaching case study documenting lessons learned that can be used for subsequent projects and (2) Involvement in thematic workshops concerning innovative delivery methods and business models for infrastructure provision. The series of workshops will be hosted by the International Centre for Infrastructure Futures (ICIF).* | *1 Project and Programme Management* | *1p. Transition* | *ASAP* | *Mid-2016* |
| 72 | Title: The business case for a mega project: identifying and tracking wider socio-economic benefits | *Research Paper* | *Sarah-Louise Earl* | *UCL* | *In addition to Transport benefits (in the form of faster journeys, reduced congestion etc) and wider economic benefits (in the form of output and earnings), Crossrail seeks to deliver benefits in the spheres of regeneration, social inclusion and job opportunities.*<br><br>*This research aims to examine how wider social and socio-economic benefits of the Crossrail programme are dealt with as part of the business case, and how these are carried forward.*<br><br>*Data gathering: Interviews would be undertaken with those at Crossrail Ltd involved in developing and monitoring the programme business case, and those who have responsibility for benefits identification/tracking/management specifically. In particular, the research will consider initiatives that have been identified as beneficial in socio-economic terms during the construction phase, how the impact of these initiatives may be measured and tracked beyond construction and how they may be linked to the accrual of longer-term benefits.*<br><br>*Outputs: The research will articulate the challenges and opportunities of identifying and tracking longer-term socio-economic benefits and of identifying meaningful metrics.* | *1 Project and Programme Management* | *1b. Business case* | *TBC* | *TBC* |
| 73 | Crossrail Delivery Model | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |
| 74 | Crossrail Construction Manag | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |
| 75 | Execution Plans | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 76 | Organisational Evolution | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |
| 77 | Interface Management | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |
| 78 | Logistics | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |
| 79 | Use of Enabling Works Contra | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |
| 80 | Testing and Commissioning | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |
| 81 | Handover | Case Study | Bill Tucker | APM | | *1 Project and Programme Management* | *1e. Delivery/execution strategy* | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme |
|---|---|---|---|---|---|---|---|
| 1 | Effective working with Tier1 contractors. | Micro-report | Simon Pain<br>Callum church | | | 2 Procurement, Commercial and supply chain management | 2b. Supply chain management |
| 2 | Supply chain data management and control | Micro-report | Simon Pain<br>Callum church | | | 2 Procurement, Commercial and supply chain management | 2b. Supply chain management |
| 3 | Effective and sophisticated supply chain intelligence | Micro-report | Simon Pain<br>Callum church | | | 2 Procurement, Commercial and supply chain management | 2b. Supply chain management |
| 4 | Procurement of Rolling Stock | Case Study | Martin Buck<br>Phil Hinde | CIPS/IRO | Crossrail's concept of purchasing trains based on a output specification and a broad based whole life cost model was an innovative approach ensuring best whole life value. | 2 Procurement, Commercial and supply chain management | 2a. Procurement |
| 5 | Pocurement Overview | Case Study | Martin Rowark | RICS | | 2 Procurement, Commercial and supply chain management | 2a. Procurement |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme |
|---|---|---|---|---|---|---|---|
| 1 | Lessons learned from implementing the Schedule 17 Consents Regime | Case Study | Lorna Russell Daniel Bicknell / Charlie Thompson (Env Agency) | Environment Agency | The Crossrail Act set up a regime under Schedule 17 for consents relating to the water environment. Crossrail and the Environment Agency worked closely together to implment this regime successfully. This case study will set out how the regime was implemented on the project, the approach that was agreed to key issues (e.g. depressurisation, reuse of groundwater, use of Schdule 17 vs normal regime) and some of the lessons learned (changing designs, permanent consents, notifications). It will provide supporitng documents as best practice documents (e.g. consents procedure). It will be of use to other major projects. | 3 Consents and powers | |
| 2 | Lessons learned from implementing the Construction Code | Case Study | Cathy Myatt Rob Paris | Local authorities (peer review?) | The construction code was a key document that was negotiated with local authorities and other stakeholders to set out the requirements for Crossrail to implement during construction of the project. This case study will seto ut how the regime was implmented on the project, and some of hte lessons learned. | 3 Consents and powers | |
| 3 | Lessons learned - U&As | Micro-report | Iftikhar Abutin / Rob paris | HS2, CRL2, TTW | To enable successor projects to gain lessons learned of managing U&As over the course of the CRL project. | 3 Consents and powers | 3c. Undertakings and Assurances |
| 4 | Approach to Listed Builidng Settlment - | Best Practice Document | Julie Davis/David Keely/Mike Black | IHBC | Article/ Best Practice document on our approach to the protection of Listed building from settlement | 3 Consents and powers | 1g. Planning |
| 5 | | Technical Paper | Juie Davis | | Publication of the S7 Guide - updated with lessons learned from the process as practiced | 3 Consents and powers | 1g. Planning |
| 6 | | Best Practice Document | Juie Davis | RTPI? | Guidance and/or Best Practice note on the drafting of conditions in relation to Hybred Bill Planning Regimes | 3 Consents and powers | 1g. Planning |
| 7 | Lessons Learnt from the assessment and approval processes for Crossrail Lorry Routes | Micro-report | Gary Moreira | | The Crossrail ES identified and asessed routes for construction traffic between worksites and the main road network. Comparison of ES lorry routes and predicted lorry numbers with actual route approvals and use. | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 8 | Review of the effectiveness of the lorry route signing strategy and its implementation. | Micro-report | Gary Moreira / Greg Limna | | To enable successor projects to gain lessons learned from a review of the strategy and implementation of lorry route signing of Crossrail Lorry routes. | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 9 | Lessons learnt from implementing the Crossrail Act Highways Consents Regime | Micro-report | Gary Moreira | | To enable successor projects to gain lessons learned of managing highway consents and approvals over the course of the CRL project. | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 10 | Review of the effectiveness of traffic management planning and implementation during design and construction. | Micro-report | Brian Perryman/ Gary Moreira | | To enable successor projects to gain lessons learned rfom the planning and implementation of traffic management over the course of the CRL project. In particular how traffic management associated with utility works and worksites establishment was identified and implemented. | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 11 | Construction Traffic Management Case Study | Micro-report | Ben Whitton | | Case study from Paddington on traffic managment for worksite focussing on the lessons learnt from the Eastbourne Terrace closure | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 12 | Construction Traffic Management Case Study | Micro-report | Chris Boylan/ Gary Moreira | | Case study from Farringdon on traffic managment for worksite focussing on the lessons learnt from the Farringdon Road closure | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 13 | Construction Traffic Management Case Study | Micro-report | Chris Boylan/ Gary Moreira | | Case study from Liverpool Street on traffic managment for the worksites including Morgate directional closure, bus station closure | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 14 | Construction Traffic Management Case Study | Micro-report | Gary Moreira/ Brian Perryman | | Case study from North Woolwich on traffic managment for the worksites, bus diversions, taxi relocation | 3 Consents and powers | 3b. Traffic and Highways Consents |
| 15 | Construction Traffic Management Case Study | Micro-report | Gary Moreira | | Case study from C305 works on A12 on traffic managment including the closure of the A12. | 3 Consents and powers | 3b. Traffic and Highways Consents |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Crossrail partnership approach to urban realm | Case Study | TfL, LAs, CRL UIT; Future of London; | NLA; Urban Design London | Unique partnership approach to delivering urban relam | 4 Land and Property | 4c. Urban Integration | 2017 | 2017 |
| 2 | other project specific urban realm lessons | Micro-report | CRL UIT, designers | RIBA; Design Council/CABE; Urban Design London | To be defined nearer the time | 4 Land and Property | 4c. Urban Integration | 2017 | 2018 |
| 3 | Court Street, Whitechapel & Custom House urban realm schemes | Micro-report | CRL UIT; BDP | RIBA; Design Council/CABE; Urban Design London | Lessons learned on early schemes | 4 Land and Property | 4c. Urban Integration | 2016 | 2017 |
| 4 | Land values | Case Study | GVA | RICS | Land values and change around stations - better define effects on land values on railway stations | 4 Land and Property | 4c. Urban Integration | 2017 | 2018 |
| 5 | Acquisition of subsoil | Micro-report | CRL (HY), TfL | CPA | The process of defining strata of subsoil for acquisition and registration with HMLR. | 4 Land and Property | 4a. Land Management and Estates | 2015 | 2016 |
| 6 | Managing the acquisition process | Micro-report | CRL (HY), TfL | CPA | How to ensure quality control and efficiency, while leaving a clear auditable trail of activities, in the generation of large numbers of compulsory purchase notices. | 4 Land and Property | 4a. Land Management and Estates | 2015 | 2016 |
| 7 | Maintaining good stakeholder relations from cover letter to possession | Micro-report | CRL (HY), TfL | CPA | Lessons learned from the process of issuing CPO notices and subsequent letters and other communication in the approach to acquisition of land and property. | 4 Land and Property | 4a. Land Management and Estates | 2015 | 2016 |
| 8 | Collaboration Agreements and ensuring Public Sector Value from OSD Development | Case Study | CRL (NL), TfL | RICS/BCO | Working with single party owners to facilate the design, planning and delivery of OSDs. Optimising public sector profit returns for public sector captial investment | 4 Land and Property | 4b. Over site development (incl. route protection) | 2017 | 2018 |
| 9 | OSD/Station Interface Control Model | Micro-report | CRL (NL), TfL | RICS/BCO | Managing the technical interface between station boxes and the OSD structural transfer deck | 4 Land and Property | 4b. Over site development (incl. route protection) | 2017 | 2018 |
| 10 | Infrastructure & Asset Protection in Commercial Development Agreements | Micro-report | CRL (NL), TfL | RICS/BCO | Protecting railway infrastructures asset during OSD development and beyond. | 4 Land and Property | 4b. Over site development (incl. route protection) | 2017 | 2018 |
| 11 | Physically managing possession of land and property | Micro-report | CRL (PB), TfL | CIOB/RICS | Practical lessons learnt on successfully taking 4.7m sqm of land throughout London | 4 Land and Property | 4a. Land Management and Estates | 2016 | 2016 |
| 12 | Managing the largest construction estate in Europe | Micro-report | CRL (PB), TfL | CIOB/RICS | Lessons learnt on structuring a control system to account for land use, custodianship and risk during major multi-site construction activity across London and the home counties | 4 Land and Property | 4a. Land Management and Estates | 2016 | 2017 |

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|---|---|---|---|---|---|---|---|---|---|
| 1 | Stepping up week | Micro-report | Steve Crofts | | | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 2 | Stepping up week - collateral | Best Practice Document | Steve Crofts | | Example of collateral made availbable to contractor | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 3 | SHELT | Micro-report | Steve Crofts/ Steve Hails | | How SHELT has improved from Olympics. Some bits don't work. Mini SHELT helps address these. Super SHELT - annual. | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 4 | SHELT | Video Podcast | Steve Crofts/ Steve Hails | | | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 5 | SHELT ToR | Best Practice Document | Steve Crofts/ Steve Hails | | | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 6 | HSPI | Case Study | Steve Crofts/ Steve Hails/ Brendan Steamcamp | IOSH; HSE; ORR | Leading indicators and Gateway Assessment | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 7 | Diversity and inclusivity | Case Study | Pamela McInroy | | Impact on H&S performance | 5 Health and Safety | 5d. Diversity and Inclusion in H&S | | 2018 |
| 8 | Occupational Health | Case Study | Christina Butterworth | IOHA | | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 9 | Safety Alerts | Best Practice Document | | | Collection of single page safety alerts | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 10 | Good practice docs | Best Practice Document | | | Collection of single page docs | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 11 | Best practice guides | Best Practice Document | | | 5 glossy best practice guides | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 12 | Target zero | Micro-report | | | | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 13 | Behaviour Influences Behaviour | Case Study | | | | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 14 | Communications | Research Paper | | IOSH, | Research being undertaken by post grads in Middlesex University | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 15 | ? | Research Paper | | IOSH | Research being undertaken by post grads in Middlesex University | 5 Health and Safety | 5b. Health and Safety improvement | | |
| 16 | Air quality | Research Paper | IOM, BFK | IOM, BOHS, HSE (Professor Andrew Curran) | Measurement of particulates in the tunnels. Paper has already gone to a conference. Sharing with HSE, IOSH. - No time to lose (work related carconigens) | 5 Health and Safety | 5a. Occupational Health and Wellbeing | | end May |
| 17 | Air quality | Best Practice Document | CB 2 contractors | IOM | Guide on management of air quality in tunnels informed by research findings. | 5 Health and Safety | 5a. Occupational Health and Wellbeing | | Mid June |
| 18 | Mental health and wellbeing | Case Study | | IOSH, HSE | Ho wdo mental healyth in a client organisation. Public Health Responsibility Deal. Survey of staff and interventions. Roberts and Cooper will be doing survey. | 5 Health and Safety | 5a. Occupational Health and Wellbeing | 2015 | 2017 |
| 19 | Fatigue in tunnelling | Research Paper | | TfL IOSH (Middlesex) | Impact on shift work. Student funded by IOSH. | 5 Health and Safety | 5a. Occupational Health and Wellbeing | 2015 | 2016 |
| | Fatigue in tunnelling | Best Practice Document | | IOSH | Fatigue: You cant hide it. Leadership Guide | 5 Health and Safety | 5a. Occupational Health and Wellbeing | | 2014 |
| 20 | Mental health - Stepping Up Week (PC's) | Micro-report | PC's | IOSH, HSE | PC's run a number of events that could be incliuded | 5 Health and Safety | 5a. Occupational Health and Wellbeing | 2015 | 2015 |
| 21 | 4 corner stone model | Best Practice Document | | IOSH, HSE | Fits under target zero as occ strategy. | 5 Health and Safety | 5a. Occupational Health and Wellbeing | 2015 | 2017 |
| 22 | Collaborative approach to H&S assurance activities | Micro-report | Ian Charlick | IOSH, HSE | | 5 Health and Safety | 5c. Health and Safety Assurance | | |
| 23 | Collaborative approach to H&S assurance activities | Video Podcast | Ian Charlick | IOSH, HSE | | 5 Health and Safety | 5c. Health and Safety Assurance | | |
| 24 | Best practice guides - safe maintenance and opartions Construction Railways | Best Practice Document | Darren Sellman | IOSH, BTS | | 5 Health and Safety | 5c. Health and Safety Assurance | | |
| 25 | Best practice guides - Construction site fire safety | Best Practice Document | Darren Sellman | IOSH, FPA | | 5 Health and Safety | 5c. Health and Safety Assurance | | |
| 26 | CDM 2015 - multi-site arrangements | Case Study | Peter Shannahan | | | 5 Health and Safety | 5c. Health and Safety Assurance | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 27 | Elected clients | Case Study | Darren Sellman | | Under CDM. CW, OAC depot. All CDM responsibilities devolved to elected clients. Partners such as NT and LU are elected clients. Chaired meetings to ensure that performing elected client role to same standard as rest of Crossrail. | 5 Health and Safety | 5c. Health and Safety Assurance | | |
| 28 | Audit Assurance approach | Micro-report | John Tyler | | Assurance gives us the ability to respond in a way that an audit schedule doesn't. | 5 Health and Safety | 5c. Health and Safety Assurance | | |
| 29 | Emergency services liaison - integrated team | Micro-report | Steve Coleman | | | 5 Health and Safety | 5c. Health and Safety Assurance | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme |
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| 1 | Incorporation of EIA Mitigation into the Project Design and Construction | Micro-report | Claire Wright | Network Rail IEMA | With the changes to the EIA directive, there will be a greater focus on mitigation identified in the ES being incorporated into development. Crossrail used a mitigation register (REMAOI) to record the committed mitigation in the ES. This was cumbersome and difficult to update, and in many cases duplicated what was elsewhere (e.g. in the construction code). However, there were some mitigation that had the potential to be "lost" e.g. offsite. planting. There was no evidence that items listed on the opportunities for improvement register did not get taken up by designers or contractors. | 6. Sustainability | 6b. Environmental |
| 2 | ~~Schedule 7~~ Environmental Management Plans | Best Practice Document | Claire Wright Cathy Myatt | Thames Tideway HS2 | It was a requirement of the Construction Code to produce EMPs and to discuss these with local authorities. A decision was taken for these to be submitted alongside the Schdule 7 consents and consequently they were produced early in the project (RIBA C/D) and the information available to input to these was limited. There was little feedback from local authorities in the central section. They provide little benefit to the client organisation or to the future contractors (duplicated the works inforamtion and hence not used as a contractual document) and appeared not to provide valuable information to local authorities. Nevertheless, if other projects have a similar requirement to meet, they do provide a successful format for meeting the requirement. The process of standardisation of EMPs was also helpful. | 6. Sustainability | 6b. Environmental |
| 3 | Writing contractual requirements to promote environmental performance and behaviours | Case Study | Cathy Myatt | Contractor Corporate Environmental contacts | The works information was a crticial document for cascading environmental requirements to tier 1 contractors. This case study will set out the areas of best practice that have resulted in successful environmental performance. It will also provide recommendations where performance could have been improved by amending the Works Information. It will be informed by lessons learned workshops to be held with contractors. | 6. Sustainability | 6b. Environmental |
| 4 | Environmental Supplier Performance | Case Study | Rhian Locke | Contractor Corporate Environmental contacts Major clients (Highways Agency, British Land, Network Rail) | The environmental performance of Crossrail was reliant on performance by our Tier 1 contractors. Supplier performance appraisals were successful in driving environmental performance. A bespoke matrix and method were developed on the project. This case study will set out the best practice that has been used and lessons learned. It will be of use to other client organisations. | 6. Sustainability | 6b. Environmental |
| 5 | Using the Green Line Recognition Scheme to promote positive environmental behaviour in the supply chain | Case Study | Lorna Russell | Contractor Corporate Environmental contacts Academic (UCL / Leeds?) Major clients (Highways Agency, British Land, Network Rail) | The Green Line Recognition Scheme was used to incentivise contractors to concentrate on engagement and behaviour. There are no known examples of a similar scheme. This case study will set out the approach that was taken and the lessons learned. | 6. Sustainability | 6b. Environmental |
| 6 | Green Line Library of Environmental Behaviour Initiatives | Best Practice Document | Lorna Russell | UKCG? Contractor Corporate Environmental contacts | This is a library of best practice and innovative approaches taken by contractors to improve enviornmental behaviour on their sites. | 6. Sustainability | 6b. Environmental |
| 7 | The effectiveness of environmental management during design | Micro-report | Claire Wright | Thames Tideway HS2 | This mirco-report will pull out lessons learned during the design of Crossrail. The IDR / SDR / gates procedure was effective at ensuring compliance with EMR requirements (although there remains uncertainty as to when an EDS was required). There are some lessons learned from both Crossaril and NR on how the EDS relates to the design stages and obtaining consents. However, the IDR / SDR / gates process was not a good process for promoting envronmental enhancements. These were covered by proceses outside fo the gates procedure (e.g. BREEAM requirements), but there was not a big focus on this during design. | 6. Sustainability | 6b. Environmental |
| 8 | Excavated Materials Story | Case Study | Lorna Russell Greg Limna | ~~Thames Tideway HS2~~ CIRIA | Crossrail (as a client body) was involved in procuring disposal sites for excavated material (Wallasea island, Ingreborne and Fairlop). This case study will set out the regime that was implemented on the projectand some of the lessons learned. It will focus on the sustainability of the approach and recommendations for future projects. | 6. Sustainability | 6b. Environmental |
| 9 | NRMM emissons control lessons learned | Case Study | Cathy Myatt | Kings College Energy Savings Trust GLA | Crossrail was the first major client to require the use of emissions control for NRMM. This case study will set out the approach taken and lessons learned. ~~It will include modelling of the benefits of using emissions control.~~ | 6. Sustainability | 6b. Environmental |

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| 10 | NRMM emission control - modelling of benefits | Technical Paper | FDC | Kings College | Technical paper on the results of modelling of benefits of emission control | 6. Sustainability | 6b. Environmental |
| 11 | Lessons Learned from Crossrail's air quality monitoring requirements | Micro-report | Cathy Myatt | Local authorities (peer review?) HS2 Kings College? | Crossrail has required daily dust logs and use of Osiris continuous monitors. Dust has not been a major issue for the project. This micro-report will collate lessons learned from contractors on the use of this monitoring. | 6. Sustainability | 6b. Environmental |
| 12 | Environmental data collection and reporting for a major project | Research Paper | KPMG or similar? Academic? (support by Cathy Myatt, Ben Weldin, Lorna Russell) | Contractor corporate environmental contacts | Crossrail has reported environmental data from numerous contractors and partners covering waste, recycled content, incidents, complaints, BREEAM, CEEQUAL, emisson control, supplier performance, biodiversity, construction and operational energy. Dashboard metrics have been prepared at different levels of the project and have proved very successful in driving performance. The data requirements are spread between different reporting systems and have evolved over the life of the project, and are time consuming to input. This research will use the experience of Crossrail to pull out lessons learned with the aim of defining funcionality of a future major project. It will cover lessons learned from Rivo, Smartwaste etc | 6. Sustainability | 6b. Environmental |
| 13 | Air quality data from Osiris monitors | Dataset | | Possible collabration with Kings College for upload to London Air Quality Database but subject to resolution of funding | Data collected from Osiris monitors is a useful resource for future research, particularly when combined with site information (e.g. site diary). The raw data and associated files will be stored on the legacy website. The data could be archived onto the London Air Qualtiy Database, but this is currently subject to a funding request from KCL. | 6. Sustainability | 6b. Environmental |
| 14 | Lessons learned from implementing the contamined land regime | Case Study | Chris Barrett (Lorna Russell) | CIEH, CIWEM Local authorities EA | This case study will set out how the legal requirements relating to contaminted land were implemented on the project, particularly focussing on the role of the clilent in relation to the contractor. Key issues encountered related to the client responsibilities for land ownership, programme and multple contractors on a site. It will provide supporitng documents as best practice documents. It will be of use to other major projects. | 6. Sustainability | 6b. Environmental |
| 15 | Contaminated land data | Dataset | Lorna Russell | Not required | FDC reports, Contractor risk assessments, contractor verification reports | 6. Sustainability | 6b. Environmental |
| 16 | Environmental incident benchmarks | Research Paper | Academic? FDC? (Rhian Locke) | Contractor corporate environmental contacts | Benchmark data exists for H&S incident rates (AFR) but does not exist for environmental incidents. Crossrail has collected a lot of data on incidenrts and more data has been collated by contractors (observations cards). This research will review the data with the purpose of establishing benchmarks for future projects. | 6. Sustainability | 6b. Environmental |
| 17 | Waste data held in smartwaste | Dataset | Ben Weldin Lorna Russell | Institute of Waste Management? WRAP? BRE? | The waste data held by Crossrail may be of use for research or for benchmarking for future projects. Identify a home for this data or host on Crossrail website? | 6. Sustainability | 6b. Environmental |
| 18 | Environmental competencies and training | Research Paper | Needs an external resource (supported by Rhian Locke) | IEMA Contractor Corporate Environmental contacts CIRIA | This is a research project, working with IEMA, other major projects and our contractors to identify the environmenttal skills/competency requirements of a major project. This can then be used to develop certified training that can be taken from project to project. This should cover key roles in both the client body and contractors (e.g. recognising the critical role of the supervisor). It will also inform the contract requirements for future projects by setting clear requirements for competency. | 6. Sustainability | 6b. Environmental |
| 19 | Environmental Observation Forms | Best Practice Document | Rhian Locke | | EOFs have been used to encourage greater involvement of Crossrail delivery staff in environmental issues on site. | 6. Sustainability | 6b. Environmental |
| 20 | Contractor Environmental Best Practice | Best Practice Document | | | There is a library of contractor best practice information on collaborate / innovate. This needs a "home"after Crossrail. | 6. Sustainability | 6b. Environmental |
| 21 | Biodiversity | Micro-report | Lorna Russell | CH2MHill Network Rail CIRIA, HS2? | Lessons learned on the implementation of biodiversity enhancement. | 6. Sustainability | 6b. Environmental |
| 22 | Lessons learned from noise and fixed plant | Case Study | Colin Cobbing Steve Sheridan | Local authorities | Crossrail has set out the approach for dealing with noise from fixed plant on a major project. This is a best practice case study which sets out the approach taken and lessons learned e.g. contract specifications, engagement with local authorities. | 6. Sustainability | 6b. Environmental |
| 23 | What makes a world class contractor in construction noise management? | Case Study | Colin Cobbing | CIRIA UKCG Contractors | Crossrail has created a bespoke matrix for defining world clas noise management as part of supplier performance. This case study will set out the approach to promoring noise management with case studies from contractors. | 6. Sustainability | 6b. Environmental |
| 24 | Noise insulation and temporary rehousing | Case Study | Colin Cobbing | | Lessons learned on noise insulation and temporary rehousing | 6. Sustainability | 6b. Environmental |

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| 25 | Noise and temporary construction railway | Case Study | Colin Cobbing | | Lessons learned on implmeneting noise requirements for the temporary construciton railway | 6. Sustainability | 6b. Environmental |
| 26 | Noise and permanent trackform design | Case Study | Colin Cobbing | | Lessons learned from implementing noise requirements for permanent trackform | 6. Sustainability | 6b. Environmental |
| 27 | Innovation to measure community response to noise | Case Study | | | Innovate project | 6. Sustainability | 6b. Environmental |
| 28 | Trends and variations in noise levels | Micro-report | | | Discuss with noise team | 6. Sustainability | 6b. Environmental |
| 29 | Noise resulting from tunnelling through clay | Technical Paper | Arup (supported by Colin Cobbing) | | Techincal data from tunnelling through clay | 6. Sustainability | 6b. Environmental |
| 30 | Lessons learned from groundborne noise and spray concrete lining | Technical Paper | Colin Cobbing C510 (BBMV) | | Lessons learned from groundborne noise from SCL works. Include information from Vahnid's complaints database. | 6. Sustainability | 6b. Environmental |
| 31 | Vibration management and listed biuldings | Technical Paper | Colin Cobbing David Keeley C405 (CSJV) | | Case study from Paddington on vibration management for works adjacent to listed buildings. | 6. Sustainability | 6b. Environmental |
| 32 | Noise and behavioural change | Research Paper | Cathy Myatt Colin Cobbing Academic Institution Needs external input | ?Sally Russell, Univ of Leeds? ?Niamh Murtagh, UCL? | This research project will aim to develop a beviioural model to fit noise management in a tier 1 contracotr and will be used to develop recommendations for improving behavioural noise management. | 6. Sustainability | 6b. Environmental |
| 33 | Water data | Micro-report | Lorna Russell | Contractor Corporate Environmental contacts | The water data held by Crossrail may be of use for research or for benchmarking for future projects. Identify where WI didn't work, include case studies from contractors and reference the use a water model similar to that of the energy model | 6. Sustainability | 6b. Environmental |
| 34 | The link between Character, Sustainability and Performance | Research Paper | Rhian Locke | Accademic research with Stafforshire University | Research into how environment performance is influenced by character and behaviour patterns. Discussions with Andy Hill Research fellow at Staffordshire University have began on the ethics of character and sustainability. Would be good to collaborate to develop the SP tools and think about the wider contexts for the ethics of character as an enabler to improve organizational cultures and sub-cultures. | 6. Sustainability | 6b. Environmental |
| 35 | Designing out waste | Case study | Mike de Silva | TfL, HS2, CRL2,TTW | What did we do during the design to reduce waste and was it effective? E.g. WRAP workshops were held to reduce waste during the design process (designing out waste). What was the effectiveness of these and are they a good tool to recommend? | 6. Sustainability | 6b. Environmental |
| 36 | Ceequal | Technical Overview Paper | Mike de Silva | TfL, HS2, CRL2,TTW | Lessons learned on contract packages and the relationship with CEEQUAL. Did CEEQUAL help to drive performance? | 6. Sustainability | 6b. Environmental |
| 37 | BREEAM | Technical Overview Paper | Mike de Silva | TfL, HS2, CRL2,TTW | Lessons learned on contract packages and the relationship with BREEAM. Did BREEAM help to drive performance? Cover areas such as: problematic credit areas, the need for interface management due to the contract breakdown structure used, costed proposal for very getting to excellent and the pathway to excelent more generally, using BREEAM to drive environemntal design, tracking performance in BREEAM using credits, use of BREEAM to achieve energy reduction | 6. Sustainability | 6b. Environmental |
| 38 | Carbon Footprint | Best Practice Document | Mike de Silva | TfL, HS2, CRL2,TTW | Crossrail's carbon footprint - provides a benchmark for future projects | 6. Sustainability | 6b. Environmental |
| 39 | Recycled content in construction materials | Best Practice Document | Mike de Silva | TfL, HS2, CRL2,TTW | Recycled content database (from netwaste) How well was recycled content dealt with on the project. What would be done differently next time? | 6. Sustainability | 6b. Environmental |
| 40 | Tunnel energy segments | Technical Paper | Mike de Silva | TfL, HS2, CRL2,TTW | Tunnel energy segments - lessons learned | 6. Sustainability | 6b. Environmental |
| 41 | low carbon concrete | Technical Paper | Mike de Silva | TfL, HS2, CRL2,TTW | Cem-free concrete | 6. Sustainability | 6b. Environmental |
| 42 | Energy piles | Technical Paper | OSD team/Mike de Silva | TfL, HS2, CRL2,TTW | Ground source heat pumps in stations | 6. Sustainability | 6b. Environmental |
| 43 | Repurposing of grout shafts | Best Practice Document | Mike de Silva | TfL, HS2, CRL2,TTW | Grout shafts reuse | 6. Sustainability | 6b. Environmental |
| 44 | Operational Energy | Best Practice Document | Mike de Silva | TfL, HS2, CRL2,TTW | Lessons learned - should have started earlier? Should have been more specific in the contract? Plant performance criteria/efficiencies/ECA etc in contracts. Also evaluate the pros/cons of RIBA stage at which work is tendered | 6. Sustainability | 6b. Environmental |

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| 45 | Ethical Sourcing | Best Practice Document | Mike de Silva | TfL, HS2, CRL2,TTW | Tools and approaches used by Crossrail | 6. Sustainability | 2a. Procurement |
| 46 | Strategy for delivering a sustainable project | Technical Paper | Mike de Silva | TfL, HS2, CRL2,TTW | A holistic approach to delivering sustainable infrastructure | 6. Sustainability | 6a. Sustainability |
| 47 | Title: Behaviour Change Programmes for Environmental Sustainability | Research Paper | Dr Niamh Murtagh, Dr Aeli Roberts | UCL | Aims: This research will review existing programmes for behaviour change around environmental sustainability, to assess successes and challenges and to document learning points for future infrastructure projects.<br><br>(Details to be agreed with Sub-theme Champion). | 6. Sustainability | 6b. Environmental |
| 48 | Title: Behaviour Change towards Environmental Sustainability: Case Study on Noise | Research Paper | Dr Niamh Murtagh, Dr Aeli Roberts | UCL | Aims: This research aims to examine the implementation of behaviour change programmes on noise in order to develop a model suitable for use generically at (rail) infrastructure sites.<br><br>(Details to be agreed with Sub-theme Champion). | 6. Sustainability | 6b. Environmental |
| 49 | Ensuring delivery of environmental requirements via partner organisations | Micro-report | Cathy Myatt | | Crossrail works were undertaken by a number of partner organisations (e.g. Network Rail, London Underground, Berkeley Homes, Canary Wharf Group, utilities) under agreements with these organisations. The agreements contained high level requirements for compliance with the EMR but no detail on how this would be implemented. This workstream will set out lessons learned on providing EMR assurance for works undertaken by partners. | | |
| 50 | Environmental assessment of OSDs | Micro-report | Claire Wright | | Environmental issues assoicated with the oversite development and relationship to main works design. The relationship of the OSD and the EIA process was also important. A lot of resource was used to undertake the EIAs to Crossrail criteria and guidance was important. D25 integration issues. | | |

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|---|---|---|---|---|---|---|---|---|---|
| 1 | Crossrail Project: Infrastructure Design and Construction Vol 1 | Technical Paper | Various Editors: Mike Black Christian Dodge | ICE | Collection of technical papers produced through the Crossrail Technical Papers competition, covering aspects of tunnelling, geotechnics, MEP, architecture, rail systems and environment. | 7. Engineering | 7a. Civils | Existing | |
| 2 | Crossrail Project: Infrastructure Design and Construction Vol 2 | Technical Paper | Various Editors: Mike Black Christian Dodge | ICE | Collection of technical papers produced through the Crossrail Technical Papers competition, covering aspects of tunnelling, geotechnics, MEP, architecture, rail systems and environment. | 7. Engineering | 7a. Civils | New | Jun-15 |
| 3 | Crossrail Project: Infrastructure Design and Construction Vol 3 | Technical Paper | Various | ICE | Collection of technical papers produced through the Crossrail Technical Papers competition, covering aspects of tunnelling, geotechnics, MEP, architecture, rail systems and environment. | 7. Engineering | 7a. Civils | New | |
| 4 | Crossrail Project: Infrastructure Design and Construction Vol 4 | Technical Paper | Various | ICE | Collection of technical papers produced through the Crossrail Technical Papers competition, covering aspects of tunnelling, geotechnics, MEP, architecture, rail systems and environment. | 7. Engineering | 7a. Civils | New | |
| 5 | Crossrail Project: Infrastructure Design and Construction Vol 5 | Technical Paper | Various | ICE | Collection of technical papers produced through the Crossrail Technical Papers competition, covering aspects of tunnelling, geotechnics, MEP, architecture, rail systems and environment. | 7. Engineering | 7a. Civils | New | |
| 6 | Ground Treatment | Case Study | C122 Mike Black | BGA BTS CIRIA | Several ground treatment approaches have been implemented across the programme, including compensation grouting, permeation grouting and deep soil mixing. A critique of each approach will be undertaken to record the relative benefits of such factors as installation effects of TAM drilling and grouting; compensation grouting pressures, volumes injected, grout mixes and grouting efficiencies; the effectiveness and impacts of grouting exclusion zones; effectiveness in reducing the mass soil permeability; soil strength increases and heave effects in soil mixing. | 7. Engineering | 7a. Civils | New | Funds required. Simon Wright discussing with C122 directors |
| 7 | Instrumentation and Monitoring | Case Study | C122 Mike Black | BGA | New approaches to efficiently deliver data to control the construction works and protect 3rd party assets have been developed on the Crossrail project. In particular the use of satellite interferometry and algorithm based trend analysis and prediction will be summarised and the opportunity for their more extensive use discussed. | 7. Engineering | 7a. Civils | New | Funds required. Simon Wright discussing with C122 directors |
| 8 | Civil Engineering Design Standards | Best Practice Document | Mike Black | ICE | | 7. Engineering | 7a. Civils | Existing | |
| 9 | Civil Engineering Design Standards | Case Study | Mike Black | ICE | The Crossrail Civil Engineering Design Standards (CEDS) were developed to bring together industry-wide best practice, drawing upon existing EN/BS standards and defining project-specific requirements where necessary. An update of these standards will be undertaken based on their development through the Crossrail project lifecycle. | 7. Engineering | 7a. Civils | New | |
| 10 | Geotechnical Baseline Reports | Case Study | Mike Black | BGA BTS CIRIA | the use of GBRs on Crossrail have been successful in controlling and defining compensation events across all contracts. A critique of the CRL experience will be undertaken looking at the parameters that were baselined, clarity of the GBR, was risk appropriately allocated, ease of use by contract administrators. | 7. Engineering | 7a. Civils | New | |
| 11 | Geology | Technical Paper | Mike Black | GSL | The extent of the CRL ground investigations and construction has significantly increased our understanding of the London Basin stratigraphy. A review will be undertaken which will include collating information and assessing the practical impacts of, among other things, scour features, Lambeth Group sand channels, faulting and other structural discontinuities. This will be submitted for publication in the Quarterly Journal of Engineering Geology. | 7. Engineering | 7a. Civils | New | |

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|---|---|---|---|---|---|---|---|---|---|
| 12 | Groundwater | Technical Paper | Mike Black | GSL | dewatering has been extensively used on Crossrail. This study will document the work done and will include the following issues: logistical challenges of dewatering in urban areas, surface settlement impacts, migration of contamination, monitoring and gas entrapment during groundwater recovery. It would be submitted for publication in the Quarterly Journal of Engineering Geology. | 7. Engineering | 7a. Civils | New | |
| 13 | Sprayed Concrete Linings Best Practice Guide | Case Study | Mike King | BTS | 1. Crossrail SCL Best Practice Guide - CRL intends to develop a best practice guide to consolidate the lessons learned on the programme. This is being done independently of the BTS, however they have been consulted and the approach has been agreed. A detailed index has been developed, we will engage with our designer and contractor teams to develop the content.<br>2. Crossrail Management of SCL Falls During Construction - CRL will consolidate all the summary data and analysis into one paper. The paper will describe the rationale for the best practice developed on Crossrail. The Contractors have already agreed to co-operate in the production of the paper through discussions held in the SCL Working Group. | 7. Engineering | 7a. Civils | New | 10,000 word document. Possibly get Motts to fund? |
| 14 | Piling and deep foundations conference proceedings | Case Study | Various<br>Mike Black | FPS | Proceedings of a conference where members of the FPS, Crossrail, Foundation Consultants, Main Contractors and Designers discussed and debated technical issues that the project has experienced to date focussing on: foundation construction and specialist methods; specifications and technical standards; innovative methods and equipment solutions; monitoring results, performance and foundation related research.. | 7. Engineering | 7a. Civils | New | Nov-15 |
| 15 | Piling and deep foundations conference proceedings | Video Podcast | Various<br>Mike Black | FPS | Video of a conference where members of the FPS, Crossrail, Foundation Consultants, Main Contractors and Designers discussed and debated technical issues that the project has experienced to date focussing on: foundation construction and specialist methods; specifications and technical standards; innovative methods and equipment solutions; monitoring results, performance and foundation related research.. | 7. Engineering | 7a. Civils | | Nov-15 |
| 16 | Settlement and building damage case studies | Case Study | Various<br>C122<br>Mike Black | ICE<br>CIRIA<br>BGA<br>BTS | The Crossrail Case Studies initiative will collate latest thinking and case studies from Crossrail relating to asset protection. The primary objectives are to disseminate lessons learnt and new innovative thinking relating to: ground movement assessment; mitigation design and implementation; specification and implementation of ground and structural monitoring. | 7. Engineering | 7a. Civils | | |
| 17 | Tunnel survey technicques and tolerance | Case Study | Various<br>Mike King | BTS | The Crossrail project has involved long tunnel drives with complex alignment which has resulted in alignment issues coming to light late in the day. This is partly related to current advice provided in standard docuemtns that needs reassessment following the lessons learnt on Crossrail | 7. Engineering | 7a. Civils | | |
| 18 | Sprayed Waterproof Membranes | Case Study | Various<br>Mike King | BTS<br>Mott MacDonald<br>Manufacturers | The performance and application requirements of sprayed membranes is more complex than current literature suggests. On the Crossrail project we have gathered additional long term performance evidence, and the changes in performance that can be expected under saturated conditions which is not provided by the various suppliers which only details performance under ideal conditions. | 7. Engineering | 7a. Civils | | |

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| 19 | Fire protection and fire testing | Case Study | Peter Shuttleworth<br>Mike King | BRE | Crossrail has advanced fire testing in terms of load application, testing of curved sections, and preparation of sprayed concrete lining smaples. We have also gathered additional evidence relevant to the amount of protection required to be icorporated into the concrete (by use of monofilament fibres) and use of fire protection layers. | 7. Engineering | 7a. Civils | | |
| 20 | Sprayed concrete primary linings as permanent works | Case Study | Various<br>Mike King | BTS | There are a number of issues associated with the incorporation of the primary lining into the permanent works related to quality control, supervision requirements, testing and the ability to compensate for non-conformances which need to be taken into consideration along with the more obvious advantages of reduced overall lining thickness. | 7. Engineering | 7a. Civils | | |
| 21 | Uphill excavations | Case Study | C510 contractor<br>Mike King<br>GTE (equipment supplier) | BTS | The project has undertaken several excalator barrel advances uphill, which although in line with British Standards, does require the introduction of additional contrainits, equipment use and consideration of saftey of workers | 7. Engineering | 7a. Civils | | |
| 22 | TBM reception/breakthrough | Case Study | Various<br>Mike King | CRL Contractors | The number of launches and breakthroughs by TBMs has involved a variety of ground treatment techniques and TBM operational constraints to meet the various ground conditions, geometries of reception chambers and methods used to ensure sealing of the pressure balance machines to maintain the ground movement limits. | 7. Engineering | 7a. Civils | | |
| 23 | Flexural strength testing requirements and interpretation of results | Technical Paper | Various<br>Mike King | Mott MaDonald | The increased use of steel fibre reinforced concrete has meant an increase in the use of tests to validate flexural strengths and residual strengths. The test methods currently used in the industry present challenges in terms of sample preparation, assessment of test results, repeatability, statistical assessment of results and the use for quality control or design verification | 7. Engineering | 7a. Civils | | |
| 24 | Best practie guide - high pressurisation system | Best Practice Document | Mike King | | | 7. Engineering | 7a. Civils | | |
| 25 | Best practie guide - exclusion zone management | Best Practice Document | Mike King | | | 7. Engineering | 7a. Civils | | |
| 26 | Whole Life Cost Analysis for Sprinklers vs. Water mist | Technical Paper | Sarah Ward, Patrick Stone | IET; IMechE; CIBSE | The purpose of this technical paper is to compare the whole life cost of sprinklers and water<br>mist as a method of water-based automatic fire suppression and conclude the most<br>appropriate/cost effective suppression system to be recommended across all Crossrail stations,<br>shafts and portals, where appropriate. | 7. Engineering | 7b. MEP | | |
| 27 | Public Platform Spaces Ventilation Strategy | Technical Paper | Gavin Vandecar | IET; IMechE; CIBSE | This technical paper is to clarify the ventilation and cooling strategy for public platform areas | 7. Engineering | 7b. MEP | | |
| 28 | Uninterruptible Power Supply (UPS) Systems | Technical Paper | Hamed Fikouhi | IET; IMechE; CIBSE | The purpose of this technical paper is to clarify the requirements and common design arrangements for the uninterruptible power supply (UPS) systems. | 7. Engineering | 7b. MEP | | |
| 29 | Station Platform Baggage Fire Size | Technical Paper | Mary Sheehan | IET; IMechE; CIBSE | The Crossrail project (consistent with best industry practice) has a need to establish the 'Design Fire Sizes' for purposes of calculating various system/s (such as ventilation and fire suppression, detection etc) so that the characteristics and performance of such equipment can be specified in the design as adequate for the perceived hazard/risk. | 7. Engineering | 7b. MEP | | |

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| 30 | Proximity of PES Systems to OHLE System | Technical Paper | Derek Tyner | IET; IMechE; CIBSE | The purpose of this position paper is to address the issues raised by the Infrastructure Managers (IMs) relating to the proximity of the Platform Edge Screen (PES) systems to the 25 kV OHLE system in the Station FDCs' platform common design cross-section arrangement, as currently incorporated into the designs for all the Central Section Stations. This paper details the key information tabled by CRL MEP team to the IMs at the Platform Workshop of 08 September 2011 to confirm that the PES systems can be maintained safely, from the platform, with the OHLE system energised ON. | 7. Engineering | 7b. MEP | | |
| 31 | Platform Smoke Extract Actuation | Technical Paper | Clare Hebden | IET; IMechE; CIBSE | It has been documented that the regulators, especially London Fire Brigade (LFB), require an automatic system, in order to save time and avoid confusion during the incipient stages of a fire threatening persons on or near the platforms, with no requirement for 'a button to be pushed' or a decision made by operators, for such smoke extract to begin. | 7. Engineering | 7b. MEP | | |
| 32 | Visibility of Signage at Crossrail Stations | Technical Paper | Clare Hebden | IET; IMechE; CIBSE | This technical note considers the visual tenability (tenability for seeing the route for escape, and movement without disorientation) and visibility of the emergency signage on Crossrail platforms during the period of evacuation. The period of evacuation is also considered in this technical note, in particular the pre-movement time and margin of safety. | 7. Engineering | 7b. MEP | | |
| 33 | Application of UPS to Critical HVAC Systems | Technical Paper | Matthew David | IET; IMechE; CIBSE | This Technical Paper details that investigation and in particular the safety, reliability, maintenace and cost implications of omitting these UPS systems. The progression of these assessment activities, including sample calculations, modelling, measurements. | 7. Engineering | 7b. MEP | | |
| 34 | Preparation of Testing and Commissioning Plan | Technical Paper | Wing Fung | IET; IMechE; CIBSE | Successful commissioning on Crossrail means the handover of all Systems to the Stakeholders with all necessary approvals and evidence in place showing that the requirements have been met and that the Stakeholders are ready to move fully into operation and maintenance after successfully completion of the Dynamic Testing. A good Testing &Commissioning plan will provide the basis for managing the testing and commissioning activities by providing detailed steps to successfully report and deliver systems to the expectations required for acceptance and ensure consistent definition and understanding of commissioning activities, and thus allows the development of an integrated commissioning programme. | 7. Engineering | 7b. MEP | | |
| 35 | Sturcture of Commisioning Lots | Technical Paper | Wing Fung | IET; IMechE; CIBSE | The purpose of the document is to provide technical guidance for the development of commissioning lots structure and provide a consistent line wide approach on system breakdown structure and geographic distribution of commissioning lots to support consolidation and management of commissioning and testing activities. | 7. Engineering | 7b. MEP | | |
| 36 | Integration methodology | Case Study | *Jeremy Bates* | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 37 | Integration documents | Best Practice Document | Jeremy Bates | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 38 | PWHR approach | Case Study | *J patel* | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 39 | PWHR | Best Practice Document | J patel | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 40 | Systems safety plan | Case Study | *J patel* | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 41 | Interface management approach | Technical Paper | G Georgiou | | | 7. Engineering | 7g. Technical assurance and integration | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 42 | Interface management | Best Practice Document | *G Georgiou* | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 43 | Requirements management lifecycle | Technical Paper | M Verma | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 44 | Systems engineering lessons | Case Study | *tbc* | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 45 | Ops Concepts / MIRP / SIRP | Micro-report | tbc | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 46 | Systems architecture / systems breakdown struture | Micro-report | *tbc* | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 47 | Standards baseline and approach to standards management | Case Study | tbc | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 48 | Technical Assurance Plan | Technical Paper | *J Crosfield* | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 49 | CARE database | Micro-report | J Crosfield | | | 7. Engineering | 7g. Technical assurance and integration | | |
| 50 | CARE database | Best Practice Document | *J Crosfield* | | | 7. Engineering | 7g. Technical assurance and integration | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Possible Contributing Partners | Abstract | Theme | Sub-Theme | Indicative Timing (Calendar Year) |
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| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Possible Contributing Partners | Abstract | Theme | Sub-Theme | Indicative Timing (Calendar Year) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | People Strategy | Case Study | Valerie Todd/Nathan Pascutto | CIPD | London Business School | None | *Crossrail's overarching approach to the people challenges and issues throughout the lifetime of the programme* | 9. Talent and Resources | 9a. People Strategy |
| 2 | Vision, Mission & Values | Micro-report | Rob Jones / Richard Davies | CIPD | TBC | None | *Lessons learned from launching a new Vision, Mission and Values across an integrated team and bringing them to life* | 9. Talent and Resources | 9b. Culture, Values and Engagement |
| 3 | Employee Engagement | Micro-report | Rob Jones / Richard Davies | CIPD | | None | *Lessons learned on effective employee engagement across an integrated team of multiple sites and multiple partners* | 9. Talent and Resources | 9b. Culture, Values and Engagement |
| 4 | Succession & Talent | Micro-report | Rob Jones | CIPD | | None | *Lessons learned on succession and talent planning across an integrated organisation.* | 9. Talent and Resources | 9c. Talent and Development |
| 5 | Leadership Development | Micro-report | Rob Jones | CIPD | | None | *Lessons learned on efficently and effectively delivering leadership development across multiple levels of an integrated organsiation.* | 9. Talent and Resources | 9c. Talent and Development |
| 6 | Driving Team Alignment | Micro-report | Rob Jones | Sheppard Moscow | | Sheppard Moscow | *Lessons learned on effectively aligning teams across contractual boundaries* | 9. Talent and Resources | 9e. Alignment and Collaboration |
| 7 | Building Collaborative Teams | Micro-report | Rob Jones / Ally Salsbury | Sheppard Moscow | | Sheppard Moscow | *Taking lessons from Crossrail to understand the development of collaborative individuals and teams* | 9. Talent and Resources | 9e. Alignment and Collaboration |
| 8 | Recruiting for an integrated team | Micro-report | Dawn Barker / Luke Koswoski/ PP / PDP | CIPD | TBC | None | *Lessons learned on Crossrail's approach to recruiting talent for an integrated team.* | 9. Talent and Resources | 9f. Resourcing and People Management |
| 9 | Working in an integrated way | Micro-report | Dawn Barker / Mark Pinchen / PP / PDP | CIPD | TBC | None | *Lessons learned from Crossrail's approach to working with multiple partners in an integrated way.* | 9. Talent and Resources | 9f. Resourcing and People Management |
| 10 | Skills & Employment Strategy | Case Study | Paul Butler/ Andrew Eldred/Nathan Pascutto | CIPD | Prof. Linda Clarke (Univ Westminster) | None | *Lessons learned from the establishment of the Crossrail Skills & Employment Strategy to ensure the project has the right skills in place at the right time, and to create a lasting skills legacy for the industry and the UK.* | 9. Talent and Resources | 9g. Employment and Skills |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Possible Contributing Partners | Abstract | Theme | Sub-Theme | Indicative Timing (Calendar Year) |
|---|---|---|---|---|---|---|---|---|---|
| 11 | Addressing skill gaps through direct intervention (TUCA) | Case Study | Paul Butler/Nathan Pascutto | CIPD | TBC | NCC | *Lessons learned from establishing a world class tunnelling and underground academy to address skills gaps wthin the tunnelling and underground construction industry.* | 9. Talent and Resources | 9g. Employment and Skills |
| 12 | Apprentices | Micro-report | Anne Sophie Blin/ Andrew Eldred | National Apprenticeship Service | Prof. Linda Clarke (Univ Westminster) | CITB | *Lessons learned from the Crossrail apprenticeship programme, including the identification and diffusion of good employer practice.* | 9. Talent and Resources | 9g. Employment and Skills |
| 13 | Jobs Brokerage | Micro-report | Chris Dransfield/ Andrew Eldred | CIPD | Prof. Linda Clarke (Univ Westminster) | JobCentre Plus, contractors | *Lessons learned from the establishment of the Jobs Brokerage to maximise work opportunities for local and unemployed people in partnership with Job Centre Plus.* | 9. Talent and Resources | 9g. Employment and Skills |
| 14 | Implementing the London Living Wage | Micro-report | Anne Sophie Blin/ Andrew Eldred | CIPD | Prof. Geoff White (Univ. Greenwich) | Living Wage Foundation | *Lessons learned from requiring contractors working on the project to observe the London Living Wage as a minimum hourly rate of pay* | 9. Talent and Resources | 9g. Employment and Skills |
| 15 | Implementing Strategic Labour Needs and Training targets | Micro-report | Anne Sophie Blin/ Andrew Eldred | CIPD | Prof. Linda Clarke (Univ Westminster) | TfL | *Lessons learned from requiring contractors to commit to explicit Strategic Labour Neets and Training (SLNT) targets to maximise employmenet and skills outcomes.* | 9. Talent and Resources | 9g. Employment and Skills |
| 16 | Social Sustainability Performance Assurance Framework (PAF) | Best Practice Document | Anne Sophie Blin/ Andrew Eldred | CIPD | Prof. Linda Clarke (Univ Westminster) | None | *Lessons learned from implementing a Social Sustainability Performance Assurance Framework to allow Crossrail to monitor and score contractors' performance across a range of employment and skills criteria.* | 9. Talent and Resources | 9g. Employment and Skills |
| 17 | Employment and Skills Forum | Micro-report | Valerie Todd/ Andrew Eldred | CIPD | Profs Linda Clarke/ Jan Druker Univ Westminster | Contractors | *Lessons learned from holding regular joint meetings to allow contractors and Crossrail to share information on matters of shared interest. The forum has also acted as a catalyst for the identification and diffusion of good practice.* | 9. Talent and Resources | 9g. Employment and Skills |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Possible Contributing Partners | Abstract | Theme | Sub-Theme | Indicative Timing (Calendar Year) |
|---|---|---|---|---|---|---|---|---|---|
| 18 | Employment and skills partnerships | Micro-report | Chris Dransfield/ Andrew Eldred/Kath Morore / BuildForce | CIPD | Prof Linda Clarke (Univ Westmiinster) | Local councils & employability schemes, Women into Construction, Construction Youth Trust, CITB | *Lessons learned from establishing employment and skills partnerships across London, to increase local awareness of opportunities on the project amd reduce the obsicales that some groups face in seeking to enter/re-enter employment* | 9. Talent and Resources | 9g. Employment and Skills |
| 19 | Work Experience | Micro-report | Sally Speed | EPB, STEM NET | TBC | None | *Lessons learned from estabilishing a work experience programme for 16-19 year olds as part of the Young Crossrail Programme.* | 9. Talent and Resources | 9h. Youth Strategy |
| 20 | Women in the Construction Industry | Micro-report | Sally Speed, Sandi Arthur | CIPD | Centre for Research in Equality and Diversity | Women into Construction | *Lessons learned from engaging with schools as part of the Young Crossrail program to raise interest in STEM subject and raise the profile of engineering and construction careers, particularly for young women.* | 9. Talent and Resources | 9h. Youth Strategy |
| 21 | Transition of Young Crossrail Programme | Case Study | Sally Speed | London Transport Museum; Royal Academy of Engineering | TBC | TfL | *Lessons learned from Young Crossrail's transition fto Transport for London to provide a lasting youth engagement strategy* | 9. Talent and Resources | 9h. Youth Strategy |
| 22 | Diversity & Equality Strategy | Case Study | Nathan Pascutto | CIPD | Centre for Research in Equality and Diversity | TBC | *Lessons learned from establishing and implementing the Crossrail Equality Strategy to promote diversity and equality across the project.* | 9. Talent and Resources | 9a. People Strategy |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 1 | The Arts and Cultural Strategy for Crossrail | Research Paper | Christina Andersen<br>Will Parkes | DCMS, GLA, TfL | The Crossrail Art Programme team was responsible for permanently embedding art into the central London station. This research paper would be a summary of the critical issues that arose over the Art Programme's ten year life span. | 10. External Affairs | 10e. Art | | |
| 2 | The value of external experts for guiding choice on arts commissions | Case Study | Christina Andersen<br>Will Parkes | DCMS, GLA, TfL | This case study would explain how the Crossrail Art Programme team founded partnerships with high-profile galleries across the central station, and set up a high profile and varied Round Table panel to help guide the selection and development of the art commissions across the route. | 10. External Affairs | 10e. Art | | |
| 3 | Using art to tell the story of Crossrail | Case Study | Christina Andersen<br>Will Parkes | DCMS, GLA, TfL | With the aim of providing a collection of artistic representations of the construction progress and community engagement events across the route, an artist-in-residence worked with Crossrail to tell the Crossrail story. | 10. External Affairs | 10e. Art | | |
| 4 | Funding The Culture Line | Research Paper | Christina Andersen<br>Will Parkes | DCMS, GLA, TfL | The Culture Line falls outside Crossrail's £14.8 billion core funding and is funded through private sponsorship. The City of London Corporation is match funding the art at Crossrail's central London stations. A diverse group of funders are being given a once in a generation opportunity to associate their brand with an iconic piece of London infrastructure and some of the world's most famed galleries and artists. This research paper is the opportunity to tell the story of how Crossrail made it work despite the challenges, and the lessons learned. | 10. External Affairs | 10e. Art | | |
| 5 | Stakeholder research studies | Best Practice Document | Ben White<br>Will Parkes<br>Cynthia Andoh-Arthur | TfL, Ipsos MORI | External Affairs undertake annual surveys of residents and businesses located at different Crossrail sites, local authorities along the Crossrail routes, helpdesk users, MPs and transport journalists and use the results to measure KPI of "improving favourability of Crossrail among key stakeholders." Research findings and feedback from Crossrail events as well as social media also help to develop a better understanding of the attitudes and opinions of key stakeholder groups and enable a further refinement of the way we engage with them. | 10. External Affairs | 10a. Community relations | | |
| 6 | Stakeholder research studies | Best Practice Document | Ben White<br>Will Parkes<br>Cynthia Andoh-Arthur | TfL, Ipsos MORI | TfL carried out a tendering process prior to engaging the services of Ipsos MORI for its reputational research programme. The contract was negotiated to allow GLA family members (to which Crossrail belongs) to purchase surveys directly from Ipsos MORI under the TfL "umbrella" making it more cost effective for Crossrail. | 10. External Affairs | 2a. Procurement | | |
| 7 | External Communications Strategy | Best Practice Document | Will Parkes<br>Cynthia Andoh-Arthur | TfL, DfT, GLA, NR, Crossrail's contractors and project delivery partners | Every year, External Affairs produce the External Communications Strategy for Crossrail outlining the strategic approach to effective communications to support the project and promote its wider benefits. The strategy takes into account the communication approach adopted by Crossrail's sponsors: TfL, DfT, GLA, NR, Crossrail's contractors and other project delivery partners and through close liaison with all departments within Crossrail. Regular meetings held with sponsors and other delivery partners enable coordination of communications strategies and management of on-going communications risks. | 10. External Affairs | 1e. Delivery/execution strategy | | |
| 8 | Public affairs strategy | Best Practice Document | James Gray<br>Will Parkes | | Building and maintaining cross-party support is essential to the successful delivery of major infrastructure projects. As part of the External Affairs strategy, the Crossrail public affairs team leveraged wide ranging support by focusing on an array of policy areas beyond just the core construction narrative, encouraging a large pool of stakeholders from Whitehall, Westminster and City Hall to share in the project's successes. | 10. External Affairs | 10b. Wider stakeholders/Public Affairs | | |

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|---|---|---|---|---|---|---|---|---|---|
| 9 | Media relations & digital strategy | Best Practice Document | Peter MacLennan<br>Will Parkes | | Building and maintaining a positive public profile is essential to the successful delivery of major infrastructure projects. As part of the External Affairs strategy, the Crossrail media and digital team has generated extensive media coverage, both UK and international, beyond just the core construction narrative. The Crossrail website and digital channels have been extensively expanded and updated to support media activity and growing external interest. | 10. External Affairs | 10c. Media relations | | |
| 10 | Integrated communications: The wider economic benefits of Crossrail | Case Study | Peter MacLennan<br>James Gray<br>Will Parkes | | As a new railway for London and the South East, and a huge public financial investment, Crossrail is always a likely candidate for the English regions and devolved nations making the case for more regional spending through negative campaigning. Crossrail developed a fully integrated media, public affairs and marketing campaign to demonstrate the economic and social benefits Crossrail is delivering to the whole of the UK. | 10. External Affairs | 10c. Media relations | | |
| 11 | The Crossrail Documentary | Case Study | Peter MacLennan<br>Will Parkes | | Case study on the key learnings and approach to undertaking the three-part BBC documentary - The Fifteen Billion Railway | 10. External Affairs | 10c. Media relations | | |
| 12 | Digital media best practice | Case Study | Peter MacLennan<br>Will Parkes | | Case study highlighting the key approaches to the use of digital and social media on a major infrastructure project. | 10. External Affairs | 10c. Media relations | | |
| 13 | Integrated communications: Health and safety | Case Study | James Gray<br>Peter MacLennan<br>Will Parkes | | Safety is the number one priority for any major construction project. In the event of a major incident, the reputation of the project and its fall out has already been determined long before; however communicating a project's positive progress and initiatives through traditional media channels can be difficult to land. Crossrail developed a stakeholder led engagement plan, underpinned by a targeted media campaign. | 10. External Affairs | 10b. Wider stakeholders/Public Affairs | | |
| 14 | Archaeology and media activity | Case Study | Peter MacLennan<br>Will Parkes | | Crossrail's archaeology programme has generated some of the significant media coverage for the project. Case study focussed on the media strategy and approach to communicating the Crossrail archaeology programme with specific reference to the Bedlam and Chaterhouse burials. | 10. External Affairs | 10c. Media relations | | |
| 15 | Working with other projects to mitigate impact | Best Practice Document | Jonathan Baggs<br>Ben White | Network Rail<br>London Underground | The need to understand the construction impact and potential mitigation in an area requires coordination with others working in that area. Local authorities and communities expect this coordination between projects and this document will look at the lessons learned from Crossrail working with others such as the ODA in the run-up to London 2012, Network Rail/Thameslink at Farringdon and London Underground at Tottenham Court Road and Bond Street | 10. External Affairs | 10a. Community relations | | |
| 16 | Tunnelling under the Barbican - engaging stakeholders | Case Study | Nina Radford<br>Ben White | | Tunnelling under the Barbican raised significant concerns from both the Barbican Centre and residents. The Barbican Centre required assurances that its concert programme would be undisturbed by both the construction and operational railway. And residents were concerned about settlement and building damage. An extensive programme of consultation, engagement and briefing was required to manage these concerns as well as changes to track design and construction methods. | 10. External Affairs | 10a. Community relations | | |
| 17 | Meaningful consultation - Hanbury Street | Case Study | Stephen Deaville<br>Ben White | | Case study exploring the decision to remove the Hanbury Street shaft from the scheme following consultation and significant concern raised by local stakeholders. | 10. External Affairs | 10a. Community relations | | |
| 18 | Meaningful consultation - petition response document | Best Practice Document | Stephen Deaville<br>Ben White | | Assessment of the role and value of the petition response document which detailed every single issue raised by petitioners and the nominated undertakers' response. | 10. External Affairs | 10a. Community relations | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 19 | Utility works - underestimating the impact | Case Study | Heather Scotcher<br>Ben Whitton<br>Ben White | Thames Water? | Case study highlighting the significant impact of utility strengthening and protection works on traffic, noise, vibration, consents and local authority and community relationships. This impact was not fully understood and there is learning to be shared with future projects to help avoid some of the issues encountered. | 10. External Affairs | 10a. Community relations | | |
| 20 | D9 - noise and vibration mitigation scheme | Case Study | Case Study | | Case study examining the role and application of information paper D9, including the use of mandated mitigation such as secondary glazing and temporary rehousing and discretionary measures such as respite accommodation. | 10. External Affairs | 10a. Community relations | | |
| 21 | Use of photography / video to communicate the Crossrail story | Best Practice Document | Sarah Allen Peter MacLennan<br>Will Parkes | TfL, Crossrail's contractors and project delivery partners | A paper on how photography / video have been used to communicate the Crossrail story and how it continues to generate huge public interest / engagement. | 10. External Affairs | 10d. Marketing comms | | |
| 22 | Public events/site access | Best Practice Document | Sarah Allen<br>Will Parkes | Stakeholders<br>Contractors<br>Members of the public | Public engagement through events and site access to demonstrate visibility of the Crossrail project | 10. External Affairs | 10d. Marketing comms | | |

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|---|---|---|---|---|---|---|---|---|---|
| 1 | Benefits Database | Dataset | | | | | | | |
| 2 | Innovation IMS | Dataset | | | | | | | |
| 3 | Basetone Red Line Review 6-Sigma Study | Dataset | | | | | | | |
| 4 | Pico Projector 6-sigma Study | Dataset | | | | | | | |
| 5 | 6-Sigma study 1 | Dataset | | | | | | | |
| 6 | 6-Sigma study 2 | Dataset | | | | | | | |
| 7 | 6-Sigma study 3 | Dataset | | | | | | | |
| 8 | 6-Sigma study 4 | Dataset | | | | | | | |
| 9 | 6-Sigma study 5 | Dataset | | | | | | | |
| 10 | 6-Sigma study 6 | Dataset | | | | | | | |
| 11 | 6-Sigma study 7 | Dataset | | | | | | | |
| 12 | 6-Sigma study 8 | Dataset | | | | | | | |
| 13 | Development of supplementary materials from London Clay | Research Paper | | | | | | | |
| 14 | CEMFREE Report | Research Paper | | | | | | | |
| 15 | Digital Image Correlation | Research Paper | | | | | | | |
| 16 | Innovation strategy in new transportation systems: The case of Crossrail | Research Paper | | | | | | | |
| 17 | Innovation and Collaboration in a major Construction project | Research Paper | | | | | | | |
| 18 | PMI Journal Paper on Innovation | Research Paper | | | | | | | |
| 19 | Additional Research paper 1 | Research Paper | | | | | | | |
| 20 | Additional Research paper 2 | Research Paper | | | | | | | |
| 21 | Additional Research paper 3 | Research Paper | | | | | | | |
| 22 | Additional Research paper 4 | Research Paper | | | | | | | |
| 23 | Additional Research paper 5 | Research Paper | | | | | | | |
| 24 | Additional Research paper 6 | Research Paper | | | | | | | |
| 25 | Additional Research paper 7 | Research Paper | | | | | | | |
| 26 | CEG Fibre Optic Paper 1 | Technical Paper | | | | | | | |
| 27 | CEG Fibre Optic Paper 2 | Technical Paper | | | | | | | |
| 28 | Army man deployed at Crossrail (Transport Professional Article) | Technical Paper | | | | | | | |
| 29 | Private Sector Skills for Public Sector Projects (NCE Article) | Technical Paper | | | | | | | |
| 30 | Innovation at Crossrail Publication (Project Magaine) | Technical Paper | | | | | | | |
| 31 | Grout Shaft Feasibility Study | Technical Paper | | | | | | | |
| 32 | Demand Forecasting Feasibility Report | Technical Paper | | | | | | | |
| 33 | Entrepeneur Country Briefing (Presentation link) | Technical Paper | | | | | | | |
| 34 | APM Conference Myth Busting Presentation Link) | Technical Paper | | | | | | | |
| 35 | Delivering Innovation through Programme Transition in a Major Conbstruction Programme | Technical Paper | | | | | | | |
| 36 | Additional Technical Paper 1 | Technical Paper | | | | | | | |
| 37 | Additional Technical Paper 2 | Technical Paper | | | | | | | |
| 38 | Additional Technical Paper 3 | Technical Paper | | | | | | | |
| 39 | Additional Technical Paper 4 | Technical Paper | | | | | | | |
| 40 | Additional Technical Paper 5 | Technical Paper | | | | | | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Possible Contributing Partners | Abstract | Theme | Sub-Theme | Indicative Timing (Calendar Year) |
|---|---|---|---|---|---|---|---|---|---|
| 41 | Additional Technical Paper 6 | Technical Paper | | | | | | | |
| 42 | Video Podcast 1 | Video Podcast | | | | | | | |
| 43 | Video Podcast 2 | Video Podcast | | | | | | | |
| 44 | Video Podcast 3 | Video Podcast | | | | | | | |
| 45 | Video Podcast 4 | Video Podcast | | | | | | | |
| 46 | Video Podcast 5 | Video Podcast | | | | | | | |
| 47 | Video Podcast 6 | Video Podcast | | | | | | | |
| 48 | Video Podcast 7 | Video Podcast | | | | | | | |
| 49 | Video Podcast 8 | Video Podcast | | | | | | | |
| 50 | Video Podcast 9 | Video Podcast | | | | | | | |
| 51 | Video Podcast 10 | Video Podcast | | | | | | | |
| 52 | Video Podcast 11 | Video Podcast | | | | | | | |
| 53 | Video Podcast 12 | Video Podcast | | | | | | | |
| 54 | Video Podcast 13 | Video Podcast | | | | | | | |
| 55 | Video Podcast 14 | Video Podcast | | | | | | | |
| 56 | Video Podcast 15 | Video Podcast | | | | | | | |
| 57 | Video Podcast 16 | Video Podcast | | | | | | | |
| 58 | C310 Closeout Case Study | Case Study | | | | | | | |
| 59 | Contract Closeout 1 | Case Study | | | | | | | |
| 60 | Contract Closeout 2 | Case Study | | | | | | | |
| 61 | Contract Closeout 3 | Case Study | | | | | | | |
| 62 | Contract Closeout 4 | Case Study | | | | | | | |
| 63 | Contract Closeout 5 | Case Study | | | | | | | |
| 64 | Contract Closeout 6 | Case Study | | | | | | | |
| 65 | Contract Closeout 7 | Case Study | | | | | | | |
| 66 | Contract Closeout 8 | Case Study | | | | | | | |
| 67 | Contract Closeout 9 | Case Study | | | | | | | |
| 68 | Contract Closeout 10 | Case Study | | | | | | | |
| 69 | Contract Closeout 11 | Case Study | | | | | | | |
| 70 | Contract Closeout 12 | Case Study | | | | | | | |
| 71 | Contract Closeout 13 | Case Study | | | | | | | |
| 72 | Contract Closeout 14 | Case Study | | | | | | | |
| 73 | Contract Closeout 15 | Case Study | | | | | | | |
| 74 | Contract Closeout 16 | Case Study | | | | | | | |
| 75 | Innovation Remit Template | Best Practice Document | | | | | | | |
| 76 | Period Reports | Best Practice Document | | | | | | | |
| 77 | Project Tracker | Best Practice Document | | | | | | | |
| 78 | Innovation Funding Summary | Best Practice Document | | | | | | | |
| 79 | Finance Register | Best Practice Document | | | | | | | |
| 80 | Lessons Learned | Best Practice Document | | | | | | | |
| 81 | Best Practice 1 | Best Practice Document | | | | | | | |
| 82 | Best Practice 2 | Best Practice Document | | | | | | | |
| 83 | Best Practice 3 | Best Practice Document | | | | | | | |
| 84 | Best Practice 4 | Best Practice Document | | | | | | | |
| 85 | Best Practice 5 | Best Practice Document | | | | | | | |
| 86 | Best Practice 6 | Best Practice Document | | | | | | | |
| 87 | Best Practice 7 | Best Practice Document | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 88 | Best Practice 8 | Best Practice Document | | | | | | | |
| 89 | Best Practice 9 | Best Practice Document | | | | | | | |
| 90 | Live Innovation Register | Dataset | | | | | | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4D modelling to manage complex projects - what we did | Technical Paper | Dom Wind | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 2 | 4D modelling to manage complex projects - what we learnt | Case Study | Dom Wind | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 3 | Deployment of Mobile IT in Construction - what we did | Technical Paper | Stephen Smith | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 4 | Deployment of Mobile IT in Construction - what we learnt | Case Study | Stephen Smith | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 5 | Various mobile IT microreports to support case study, eg, AR, iBeacons | Micro-report | Stephen Smith | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 6 | Enabling Quality Asset Information - what we did | Technical Paper | Ross Dentten | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 7 | Enabling Quality Asset Information - what we learnt | Case Study | Ross Dentten | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 8 | Effective Communication of Asset Information Requirements - what we did | Technical Paper | Mark Houghton | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 9 | Effective Communication of Asset Information Requirements - what we learnt | Case Study | Mark Houghton | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 10 | Top Down decomposition to Facilitate Information Modelling - what we did | Technical Paper | Michael Donovan | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 11 | Top Down decomposition to Facilitate Information Modelling - what we learnt | Case Study | Michael Donovan | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 12 | GIS - Building a spatial Infrstructure for Construction - what we did | Technical Paper | Daniel Irwin/Nart Tamash | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 13 | GIS - Building a spatial Infrastructure for Construction - what we learnt | Case Study | Daniel Irwin/Nart Tamash | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 14 | GIS - Workflows for managing Land and Property information | Micro-report | Milena Grujic | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 15 | Enabling mobile GIS for Land Management | Micro-report | Mervyn Wan | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 16 | Information Handover principles - what we did | Technical Paper | Ian MacDonald | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 17 | Information Handover principles - what we learnt | Case Study | Ian MacDonald | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 18 | Project Information Compliance principles - what we did | Technical Paper | Cynthia Akufo-Addo | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |

| Ref | Document Title | Document Type | Author (s) | Possible Industry Partners | Abstract | Theme | Sub-Theme | Start | End |
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| 19 | Project Information Compliance principles - what we did | Case Study | Cynthia Akufo-Addo | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 20 | Project Information Management | Case Study | Malcolm Taylor | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |
| 21 | BIM Metrics and Performance Analysis | Best Practice Document | Tahir Ahmad | APM; IET; ICE? | | 12. Information Management and Technology | 12a. Technical Information - GIS, BIM, IM | | |