Monitoring & Control
Team F
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TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

Monitoring & control

- Scope

- Quality

  - Change Control

- Budget

  - Contracts

- Risk Mangement
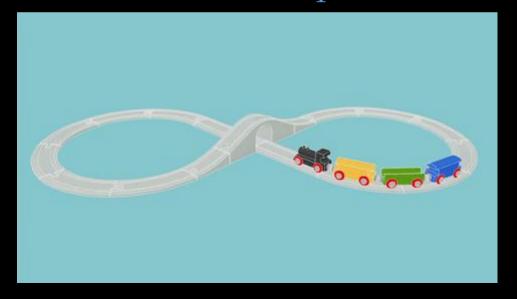
- Schedule

This is how London
Found a Solution

Classroom Experiment

-   Each Team will be given a train set
-   The Team must build the set in a loop
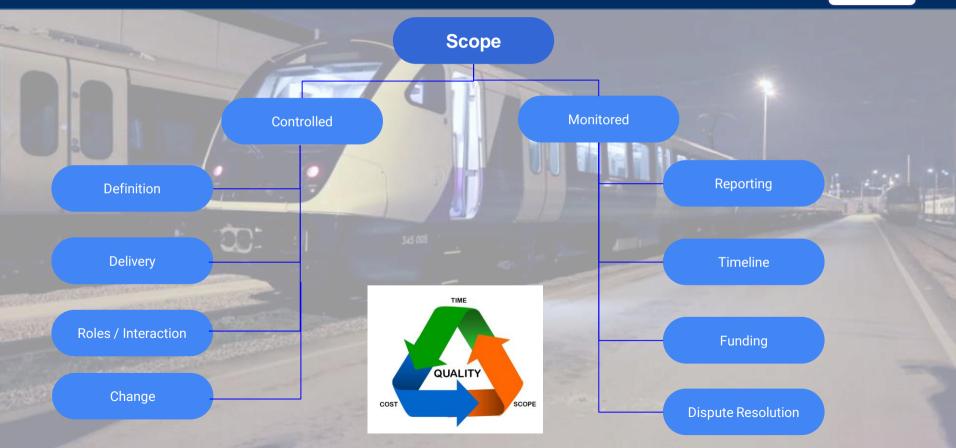-   Time is 1 minute

Scope Control

- Control of the Scope was through the Project Development Agreement (PDA)

Crossrail will deliver a world-class, affordable railway, with a high frequency, convenient & accessible train service across the capital from 2017

- This approach was used because of "Lessons Learned" through other major projects.
    - Olympic Stadium in London
    - "Chunnel" or the tunnel under the English Channel.

Quality Policy

- Achieve the vision & values of CRL

- Manage all functions in an effective & efficient manner

- Set realistic, measurable objectives & targets for all activities

- Apply the principles of "right 1st time" & continual improvement

- Ensure compliance with Legislation, Regulations, Codes, Specs, & Stds

- Implement review, surveillance & audit programs to monitor compliance

Quality Management

The 7 Quality Management Principles are:

- QMP 1 – Customer focus

- QMP 2 – Leadership

- QMP 3 – People Engagement

- QMP 4 – Process approach

- QMP 5 – Improvement

- QMP 6 – Evidence based decision making

- QMP 7 – Relationship Management

Quality Management

- *Contractor(s) **shall** have an ISO 9001 QMS in place*
  - *Ensure getting consistent, good Quality products & services.*
  - *Appoint a QM, who's certified professional & acts as the POC for all Quality Management issues.*
- *Contractor(s) **shall** ensure subs & suppliers also are ISO 9001 certified.*
- *Contractor(s) **shall** not commence work activity until a Quality Plan has been accepted by the CROSSRAIL-PM.*

Quality Plans

- Quality objectives committing to Quality policy

- How work is measured & reported against policy & req's

- Roles, responsibilities & obligations within the organization

- Detailed processes describing how Quality managed

- Methodology to measure effectivity & efficiency

- Required resources description to manage Quality;

- Continual improvement activities.

Quality Management Systems
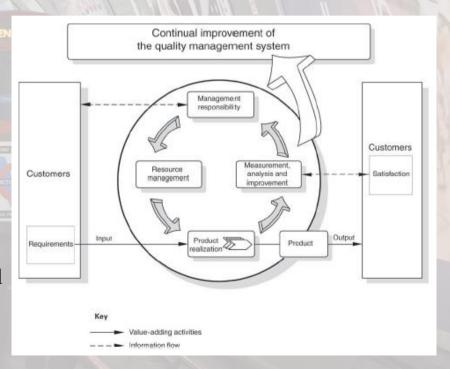
- Quality dashboard is how Crossrail reports Quality across

  - 1st project to implement Quality Performance Index (QPI)

    - Work starting without Inspection & Test Plan (ITP)

    - % Crossrail satisfactory observations

    - % Non Conformance Reports (NCRs) & % overdue

    - % Certification completed on time

    - On time closed Corrective Action Reviews (CARs)

KPI = Accomplishment vs failures (%)

Quality Reporting

- *Contractor(s) & **shall** include in weekly reports*:

  - Audit progress results

  - Outstanding issues

  - Status of site queries & nonconformities

  - Summary of actions taken to close out

  - Progress on certification & records

  - Quality issues identified &/or anticipated

  - Improvement activities

  - Performance against KPIs
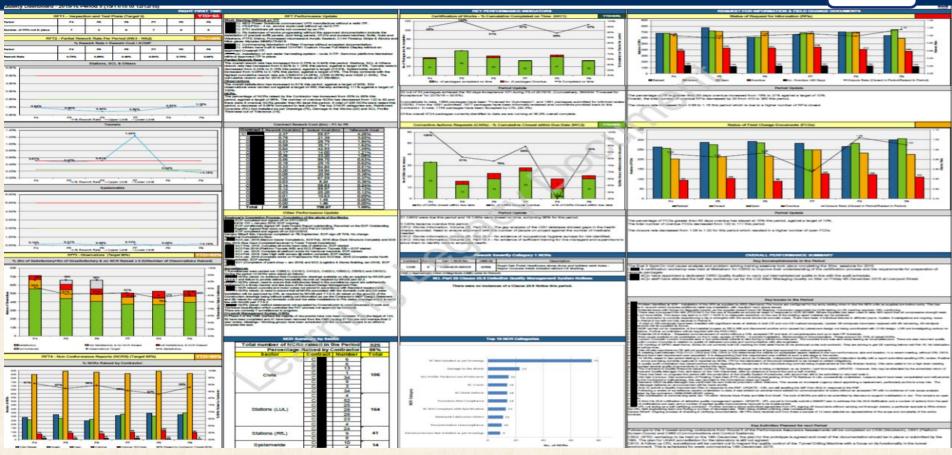
Real-Time Quality Dashboard

Key Procedures

Key Procedures

- **Cost management function**
  - ➤ Processes and procedures

- **Financial**
  - ➤ Management and accounting
  - ➤ Consultation

- **Projects cost data**
  - ➤ Accurate and reflective
  - ➤ Budget, forecast, actual costs

- **Current Control Budget (CCB)**
  - ➤ Administration of change management
  - ➤ Contracts
  - ➤ Scope

- **Managing**
  - ➤ Bank accounts
  - ➤ Financial documents.

- **Audit and validation**
  - ➤ Reported costs

Cost tracking

Funding

2007   2008   2009   2010   2011   2012   2013   2018

Cost Monitoring

‘Sponsors’

Secretary of State for Transport

Mayor

Sponsors Agreement

DfT

TfL

JSB
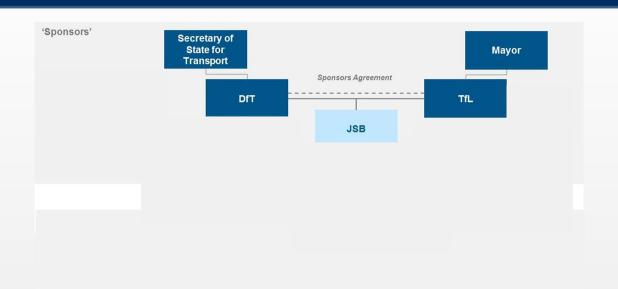
Source of Funds

Local government	Central government
Transport for London direct funding £1·9 billion	Department for Transport direct funding £4·8 billion
Fundraising for which Transport for London is responsible £5·25 billion	**Fundraising for which Department for Transport is responsible £480 million**
Business rate supplement, borrowing and direct contributions £4·1 billion	City of London committed funding £250 million
Community infrastructure levy £300 million	Heathrow Airport Limited £70 million
Sale of surplus land and property £500 million	Voluntary funding from London businesses £100 million
Developer contribution £300 million	Network Rail financing for work on the existing network £2·3 billion

Overall funding envelope

£14·8 billion
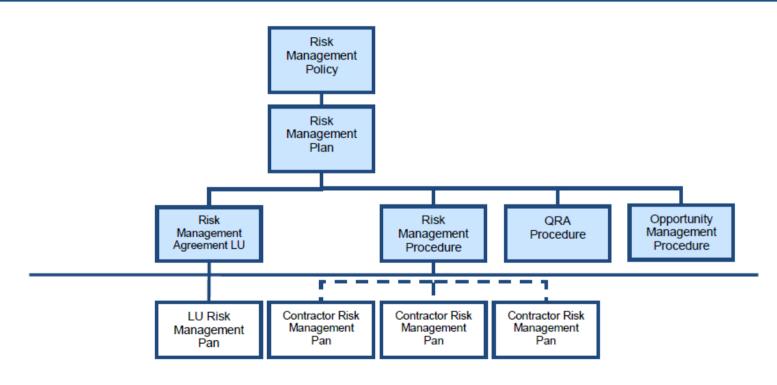
Allocation

- **Pre-Construction/Staging - 22 contracts - 119 million USD**

- **Tunnelling contracts – 5 contracts - 3 billion USD**

- **Civil engineering – 11 contracts -797 million USD**

- **Station buildout – 14 contracts - 3.45 billion USD**

- **MEP – 6 contracts - 119 million USD**

Risk Management

Risk Management framework of documentation

Risks Encountered

Description
- Rolling Stock is delivered late
- Old Oak Common Depot is late

Risk impacts
- Insufficient trains to deliver opening strategy
- Unable to stable trains at Old Oak Common

Mitigation Plan
- CRL project management team kept a teack of all the contracts and notified the respective contractors about their pending deliveries.

Risks Encountered

Description
- Budget of the project exceeds
- Railway fails to perform for technical reasons as intended / required by Sponsors

Risk Impact
- Delay in completing the project
- Sponsor requirements not met. Reputational damage
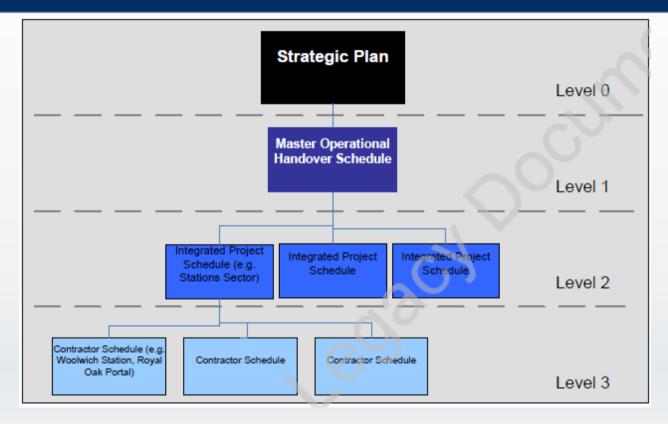
Mitigation plan
- Timely Cost Monitoring reports
- Phased opening strategy. Effective & progressive assurance. Performance modelling
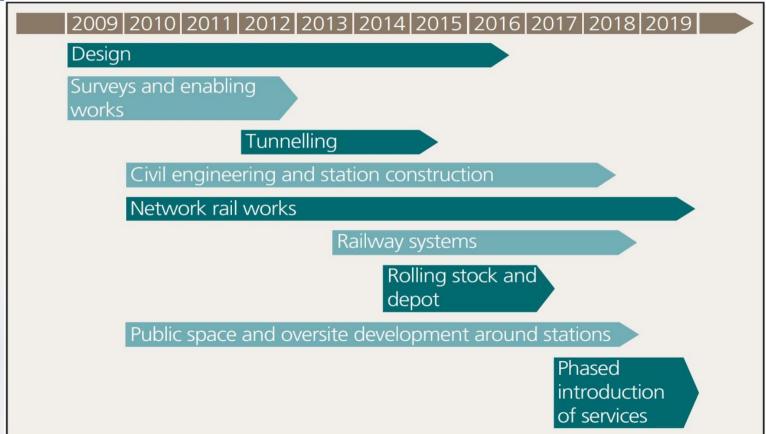
Schedule Hierarchy

Schedule Control

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | |

Design

Surveys and enabling works

Tunnelling

Civil engineering and station construction

Network rail works

Railway systems

Rolling stock and depot

Public space and oversite development around stations

Phased introduction of services
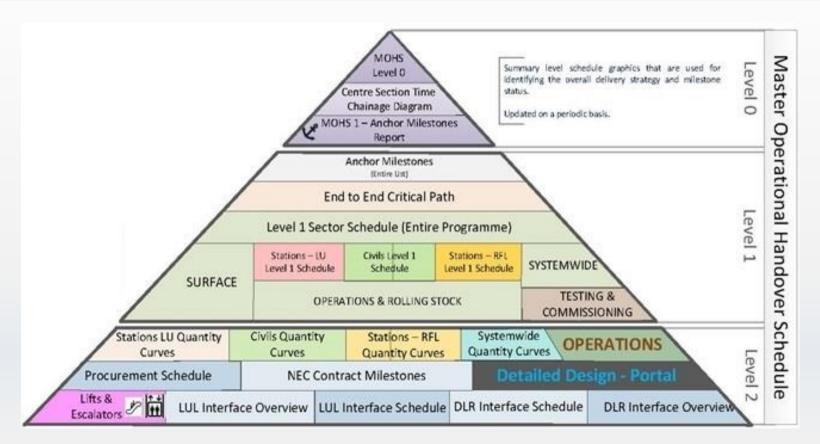
Schedule Monitoring

Schedule Monitoring

National Audit Office Analysis & semi-annual Construction Reports

Programme milestones planned compared to milestones completed

Crossrail Limited has achieved most or all milestones set for each six-month period on time

Number of milestones

Date	Planned milestones	Planned milestones achieved	Milestones achieved ahead of schedule
Sep 2011	24	24	
Mar 2012	21	18	2
Sep 2012	24	24	3
Mar 2013	25	23	2
Sep 2013	17	16	3

- Planned milestones
- Planned milestones achieved
- Milestones achieved ahead of schedule

Source: National Audit Office analysis of Crossrail Limited semi-annual construction reports

Trend in progress to date against the programme schedule

Progress against early completion dates is just behind schedule, but is improving

Schedule Performance Index

	Sep 2011	Mar 2012	Sep 2012	Mar 2013	Sep 2013
Schedule Performance Index	0.94	0.95	0.97	0.97	0.98

Source: National Audit Office analysis of Crossrail Limited semi-annual construction reports

Key Facts

Over 3 million tonnes of excavated material from the tunnels was shipped to Wallasea Island in Essex to create a new 1,500 acre RSPB nature reserve

Art Deco-style crockery from 1920-1940. *Old Oak Common.*

Brunel's train workshops and turntable. *Westbourne Park.*

Vessels from the site of the Crosse & Blackwell factory. *Tottenham Court Road.*

Excavation of 3,000 bodies at Bedlam burial ground. *Liverpool Street.*

Victorian era chamber pot. *Stepney Green.*

TUNNEL
THE ARCHAEOLOGY OF CROSSRAIL
NEW EXHIBITION
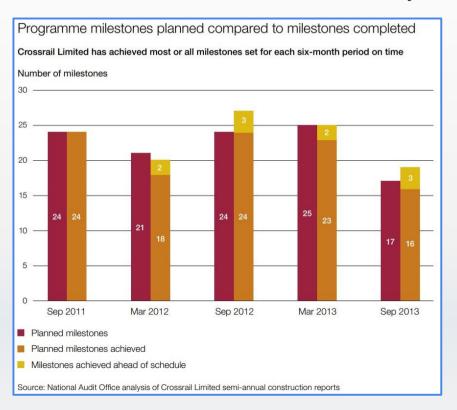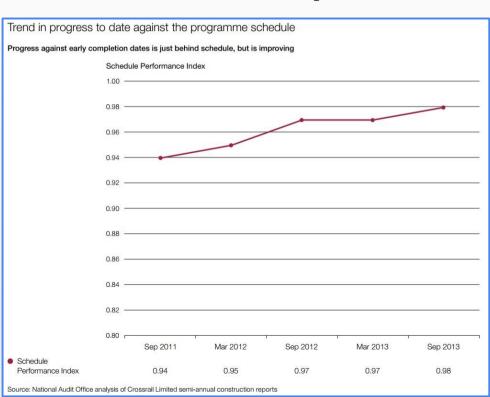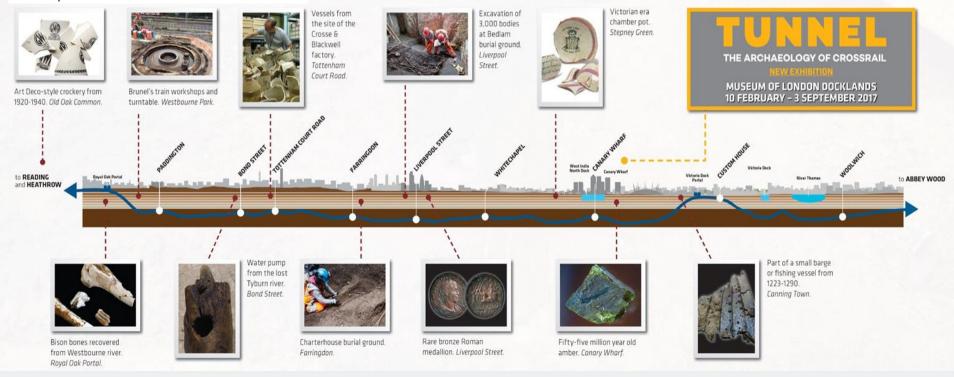MUSEUM OF LONDON DOCKLANDS
10 FEBRUARY – 3 SEPTEMBER 2017

to READING and HEATHROW

PADDINGTON — BOND STREET — TOTTENHAM COURT ROAD — FARRINGDON — LIVERPOOL STREET — WHITECHAPEL — West India North Dock — CANARY WHARF — Canary Wharf — Victoria Dock Portal — CUSTOM HOUSE — Victoria Dock — River Thames — WOOLWICH

Royal Oak Portal

to ABBEY WOOD

Bison bones recovered from Westbourne river. *Royal Oak Portal.*

Water pump from the lost Tyburn river. *Bond Street.*

Charterhouse burial ground. *Farringdon.*

Rare bronze Roman medallion. *Liverpool Street.*

Fifty-five million year old amber. *Canary Wharf.*

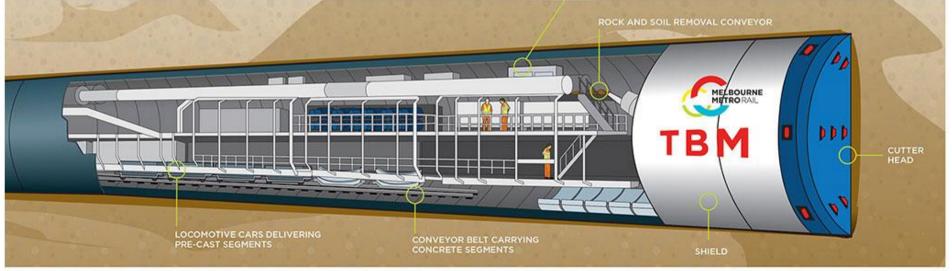Part of a small barge or fishing vessel from 1223-1290. *Canning Town.*

Key Facts

- ➤ Phyllis and Ada,
- ➤ Elizabeth and Victoria,
- ➤ Jessica and Ellie,
- ➤ Sophia and Mary

OPERATING ROOM
The TBM is operated and monitored here

ROCK AND SOIL REMOVAL CONVEYOR

MELBOURNE METRO RAIL

TBM

CUTTER HEAD

LOCOMOTIVE CARS DELIVERING PRE-CAST SEGMENTS

CONVEYOR BELT CARRYING CONCRETE SEGMENTS

SHIELD

Conclusion

- **Scope**

- **Quality**

- **Budget**

- **Risk Mangement**

- **Schedule**

Any Questions ???