



◀ Crossrail-Moving London Forward

- ◀ Chris Dulake
- ◀ Chief Engineer

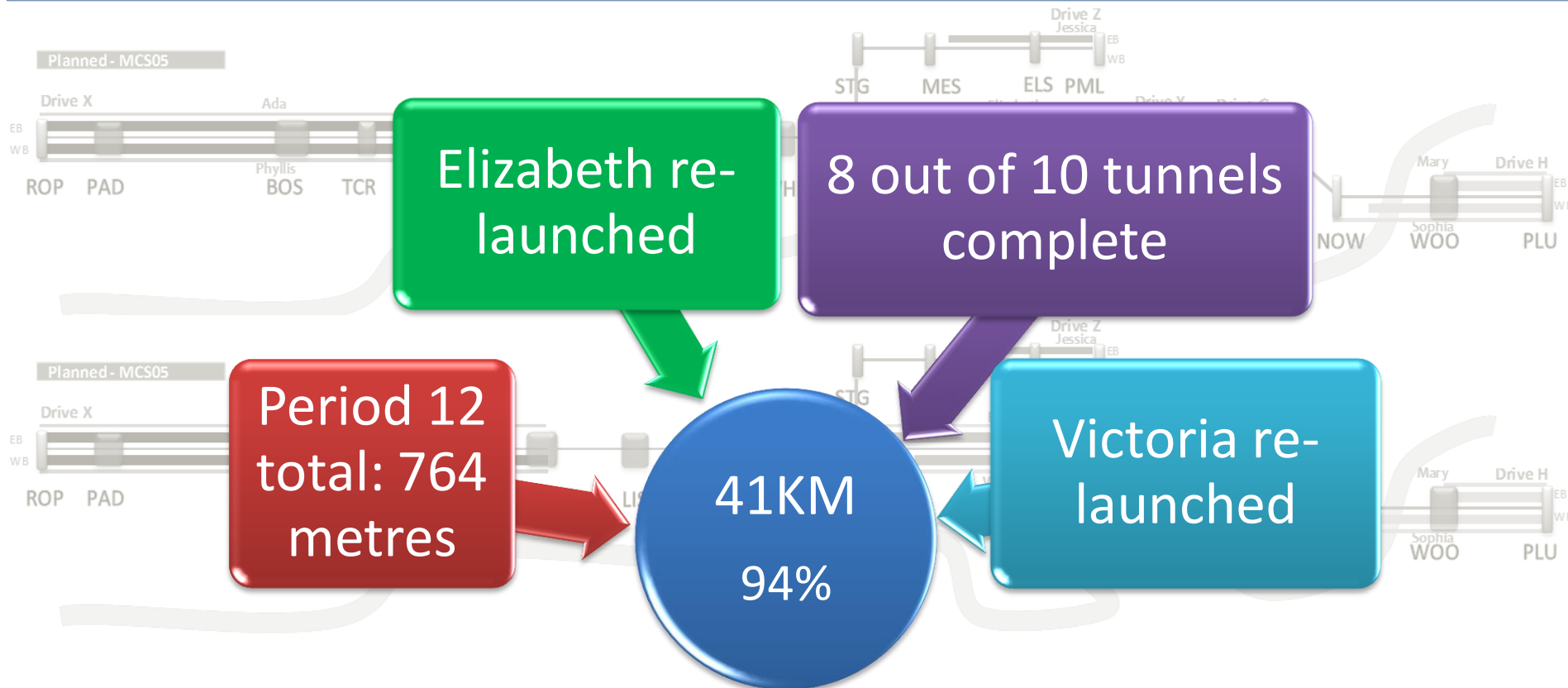
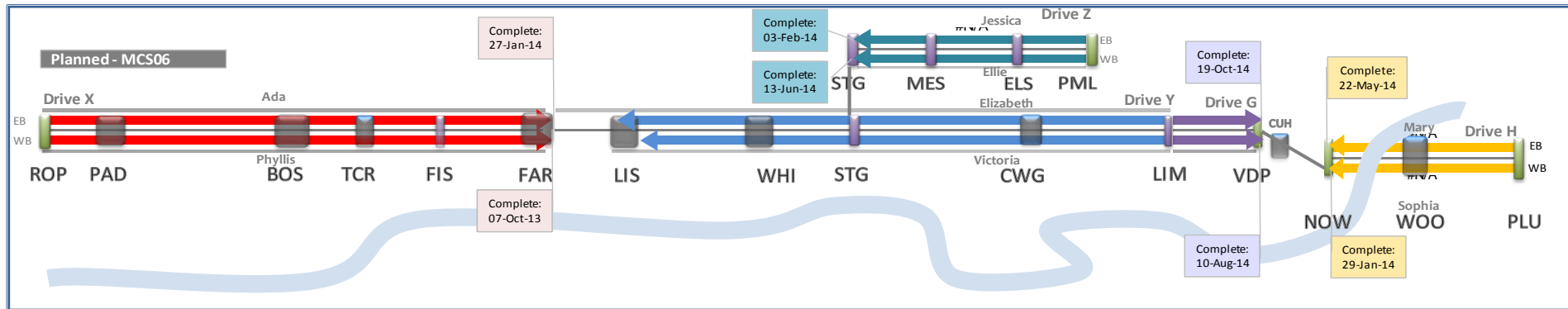
MOVING LONDON FORWARD







TBM Progress Highlights





◀ SCL Highlights

SCL Total Progress:
74%

Platform Enlargements
98%

Platform Secondary Lining
63%

Whitechapel Secondary Lining Ongoing
22%

Liverpool St Platform Enlargement:
100%

Liverpool St Secondary Lining:
41%

Fisher Street Enlargement
100%

Fisher Street Secondary Lining
14%

Bond St Other Enlargement on-going
75%

Bond St Secondary Lining
93%

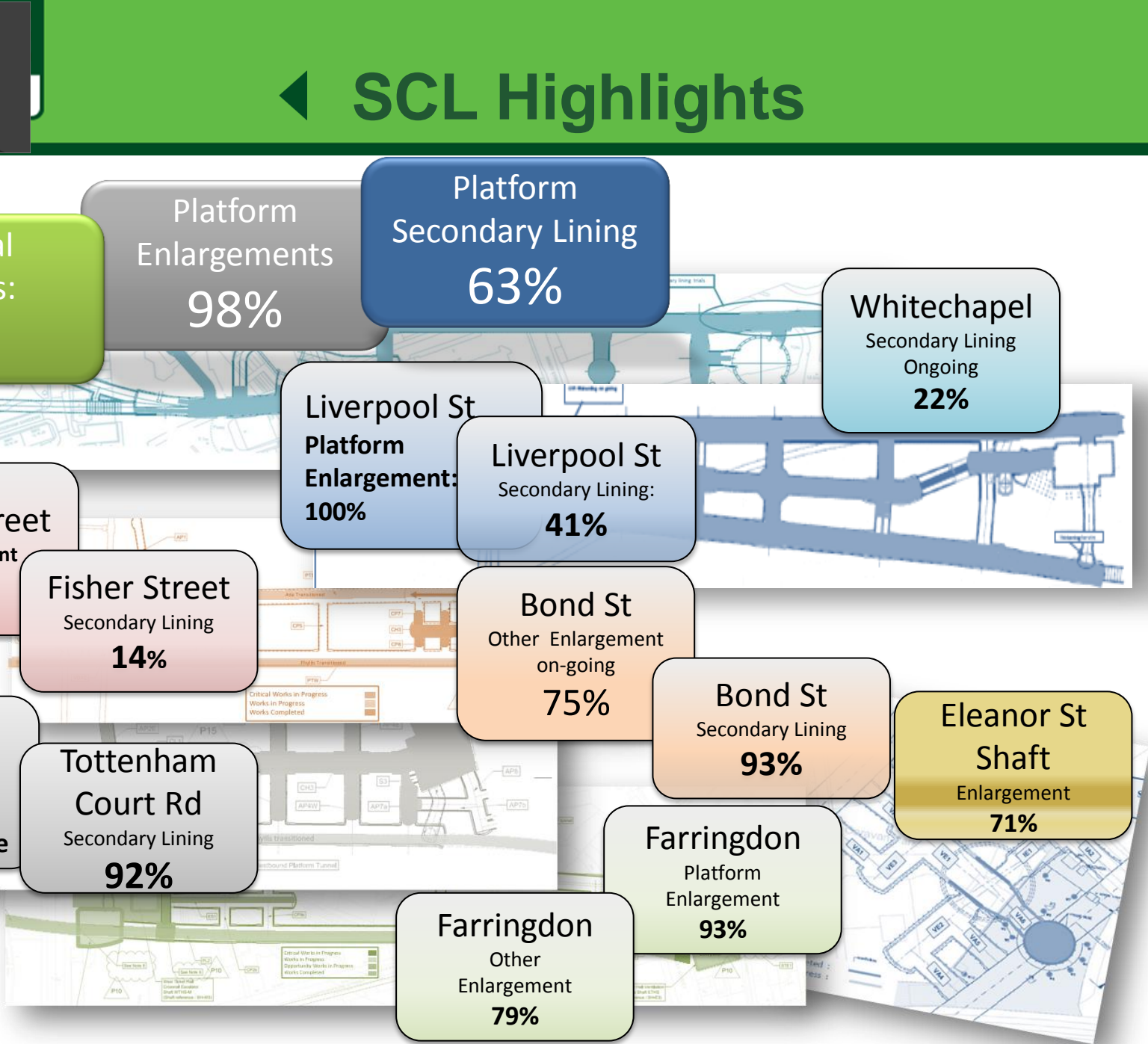
Eleanor St Shaft Enlargement
71%

Tottenham Court Rd Enlargement
100% complete

Tottenham Court Rd Secondary Lining
92%

Farringdon Platform Enlargement
93%

Farringdon Other Enlargement
79%



Crossrail will



- ▶ Monitor the contractors' management of the worksites to ensure they undertake their role safely and efficiently, and in compliance with their obligations. Require contractors to improve their performance where necessary

Crossrail will not



- Manage construction activity on site

Crossrail will



- ▶ Act as Technical Authority.
- ▶ Define requirements
- ▶ Manage Progressive Technical Assurance
- ▶ Maintain design configuration.
- ▶ Not relieve Designers of their obligations under CDM

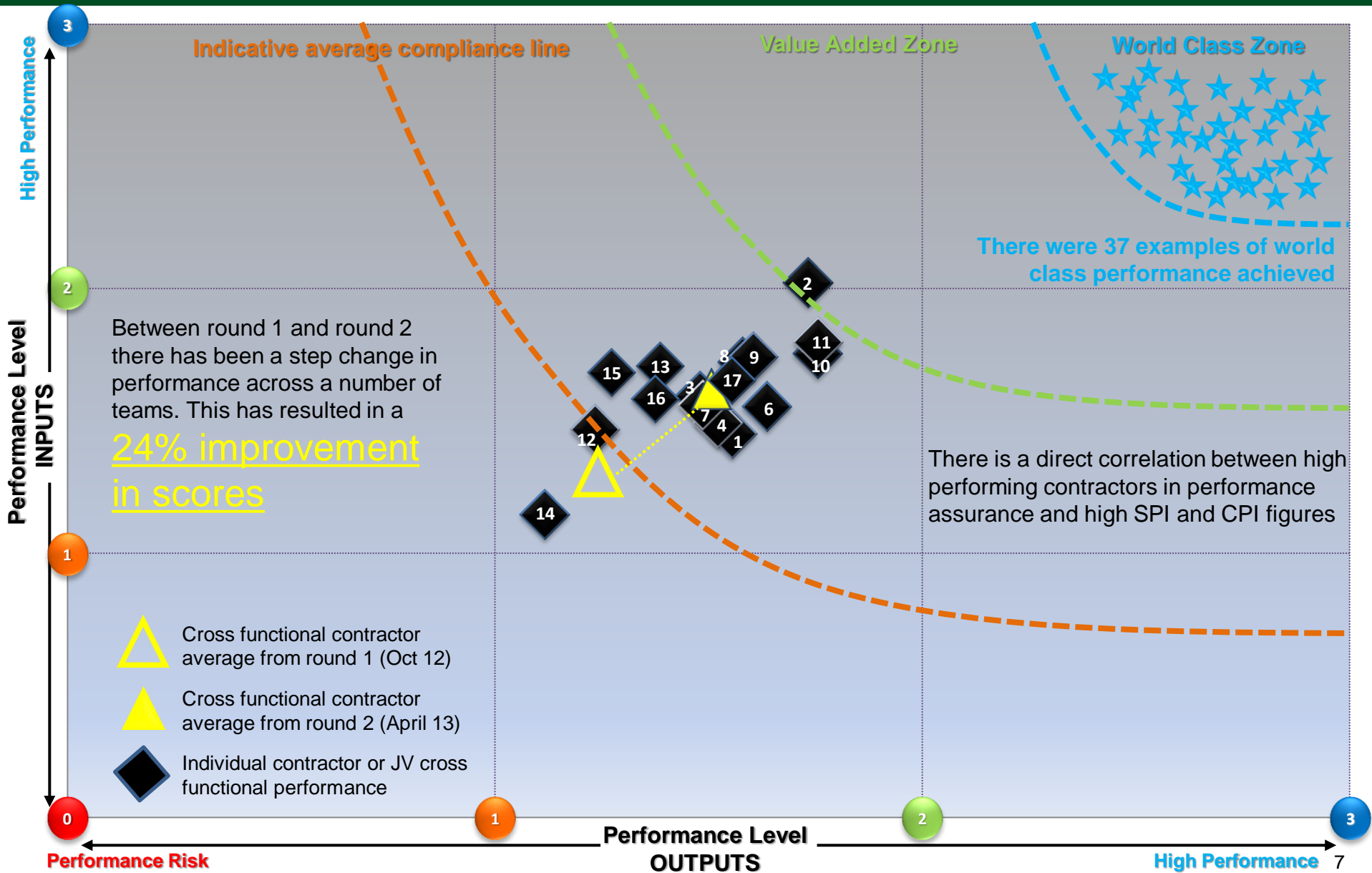
Crossrail will not



- Design the works



Performance Assurance





◀ Getting it Right First Time -The cost of rework

£420m - £1.68bn Opportunity Cost

Construction Industry Institute research has already identified that the average cost of rework can be between 3% to 12% of project cost

Leading Indicators

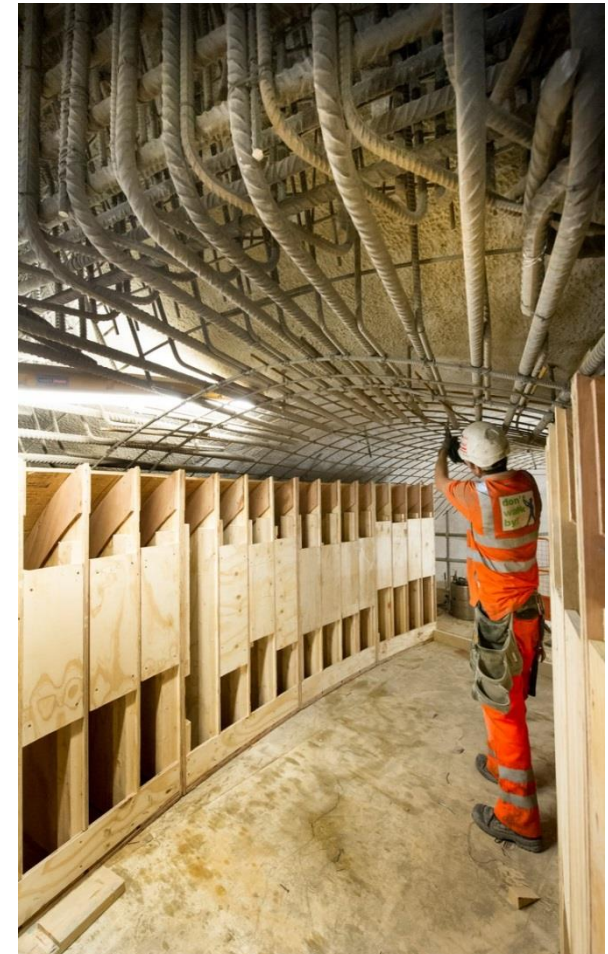
Number of Observations and NCRs raised by Contractors are leading indicators of quality performance-evidence of approach





◀ Right First Time Metrics

Metric	Measure	Target	Performance 2012/13/14
Inspection & Test Plans (ITP)	This metric measures the number of incidents where there was no accepted ITP in place for the actual or planned start of works.	Zero Incidents	80% Reduction 2012/13 = 51 incidents 2013/14 = 10 incidents
Partial Rework Rate	This metric measures the cost of rework in a period divided by the Actual Cost of Works Performed (ACWP) in the period, expressed as a percentage.	2% Stations 0.25% Tunnels	0.23% Increase 2012/13 = 0.80% 2013/14 = 1.03%
Satisfactory Observations	This metric measures the number of satisfactory observations of the work in progress, as witnessed by the Supervisor's representatives.	90% Satisfactory	No Change 2012/13 Average = 84% 2013/14 Average = 84%
Non Conformance Reports (NCRs) Raised by Contractor	This metric measures the percentage of NCRs that were first raised by the Contractor.	95% Raised	6% Improvement 2012/13 Average = 84% 2013/14 Average = 90%



Note: 2013/14 data is to date.



◀ NEC for Crossrail

◀ NEC 3

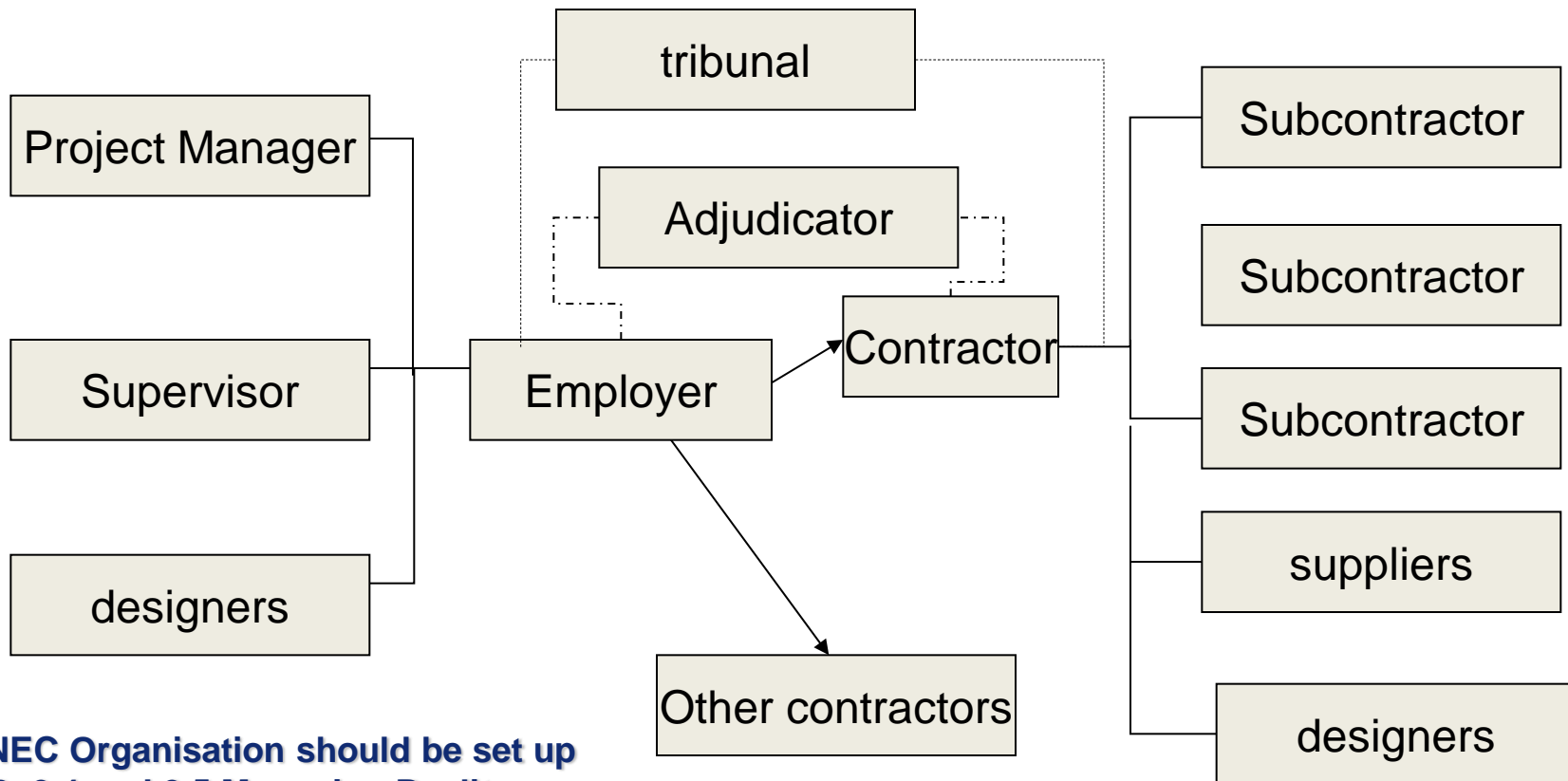
In my 1994 report 'Constructing the Team' I said the first edition of the then New Engineering Contract met 11 of the 13 principles that characterised an effective, modern construction contract – far more than any other contract form then available.

Within a year the NEC 2nd edition came out and became the only contract to comply with all 13 principles. It is thus not surprising that the NEC 3rd edition remains at the forefront of best practice, becoming the first contract to meet all criteria of the UK Government's Achieving Excellence in Construction initiative.

In addition to supporting the Office of Government Commerce's recommendation that NEC3 be used by all public-sector construction procurers, I also commend its adoption by any private sector client wishing to procure their construction work on time, within budget and without litigation.

Sir Michael Latham

◀ How NEC Relationships should work –Managing Reality



How NEC Organisation should be set up
Fig 2.3, 2.4 and 2.5 Managing Reality

◀ Who's Who in the NEC 3

NEC Title	Crossrail Appointment
<i>Employer</i>	Programme Director
<i>Project Manager</i>	Area Director
Project Manager's Representative	Project Manager
<i>Supervisor</i>	Head of Quality
Supervisor's Representative	Project Field Engineer

◀ *The Project Manager or PM's Representative*

- ▶ The Project Manager carries out the role of contract administrator on behalf of the Employer, acting impartially, including
 - ◆ Certifying the amount due for payment (Clause 51)
 - ◆ Certifying the amount to be paid for delay damages (Option X7)
 - ◆ Deciding if an event is a compensation event (Clause 61)
 - ◆ Changing certain completion dates or key dates (Clause 63)
 - ◆ Assessing compensation events (Clause 64)
 - ◆ Certifying Completion (Clause 30.2)

“The Contractor and the Project Manager are intended to work together to see the contract through to completion. And, for the Employer, the outcome of the contract depends on the competence of the project manager”



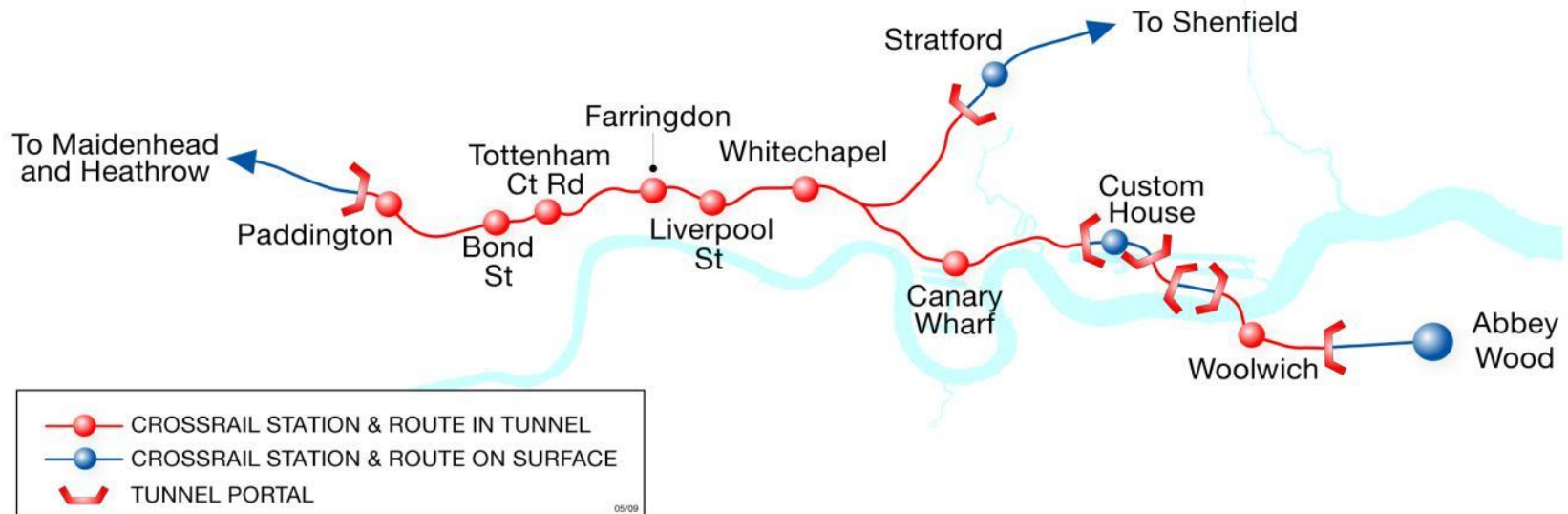
Crossrail – Agenda for today

- **The Crossrail NEC Contracts**
- **The Crossrail NEC terms – key aspects**
- **Change**
- **Key issues**
- **Systems and solutions**

Crossrail

**28 existing surface stations upgraded
(11 major reconstructions)**

90km of existing surface network upgraded



**21 km of new sub-surface twin-bore railway
through London
8 major sub-surface stations**



Crossrail Contracts

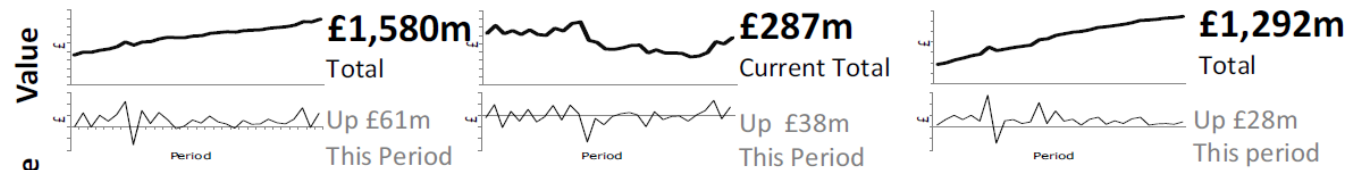
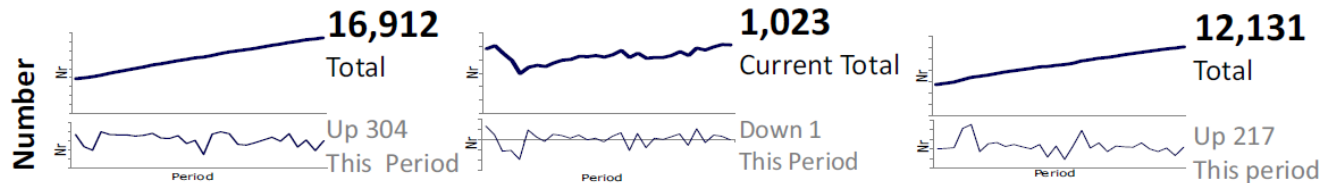
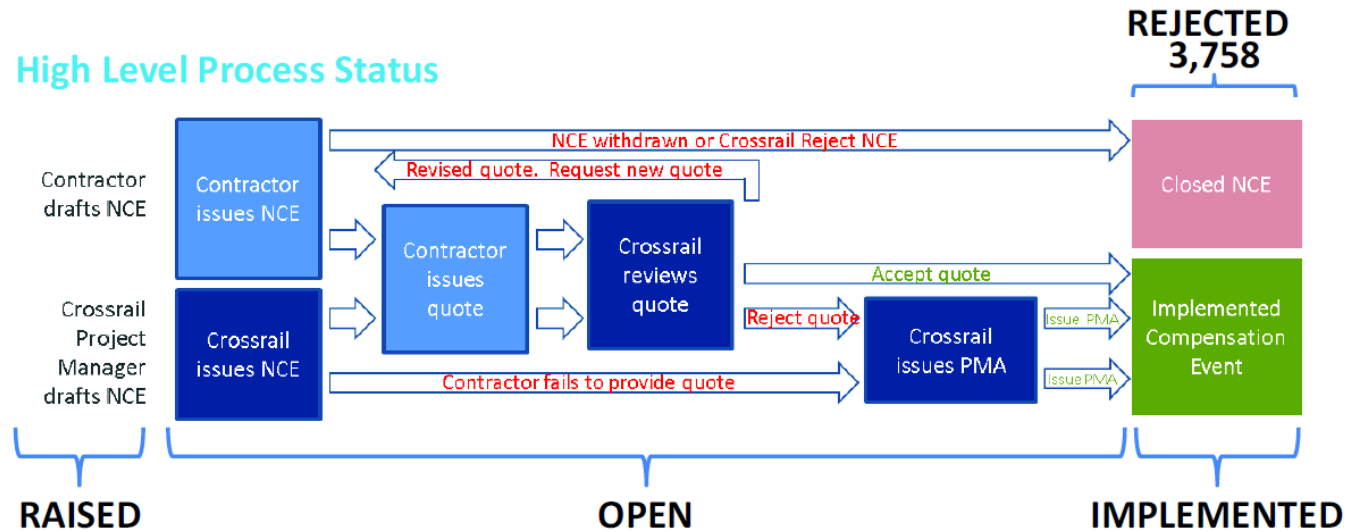
Contract Type	Value £M	Option	No. of Contracts
Tunnels/Portals/Shafts	2,500	C	11
Advance Civils	260	C	5
Stations	1,500	C	9
Systems	500	C	5
Systems	30	A	1
Miscellaneous	150	A/C/B	4
Works Contract Total	4,940		37
Design Services	500	C/E	30
Delivery Partners	500	E	2
Professional Services Total	1,000		32



The Crossrail NEC terms

- **Lessons from other major projects**
- **50/50 and no Fee over target**
- **“Pain share” applied progressively**
- **Substantial liquidated/unliquidated damages**
- **Duty to mitigate the effect of CEs**
- **30% LoL – excludes pain, damages, disallowed**
- **Geotechnical Baseline Report**
- **No retention, PCGs and Performance Bonds**
- **Project Bank Accounts with trust deed**

High Level Process Status





Key Issues

- **Time assessment**
- **No final account provisions**
- **Early pain/damages forces the commercial pace**
- **Failure to act – PM or Contractor or both**
- **Volume of change**
- **Value Engineering**
- **OCIP and option C**
- **Disallowed cost – not a significant issue**



Systems and solutions

- **Train all levels of staff – especially PMs**
- **NEC is not an easy option – it must be applied**
- **Contract Administration Manual**
- **Electronic communication systems are key**
- **Understand and explain time assessment**
- **PMs must act regardless of the Contractor**
- **Proactively manage the commercial risks**

- **Of the 9 major contract complete, 7 are settled**