

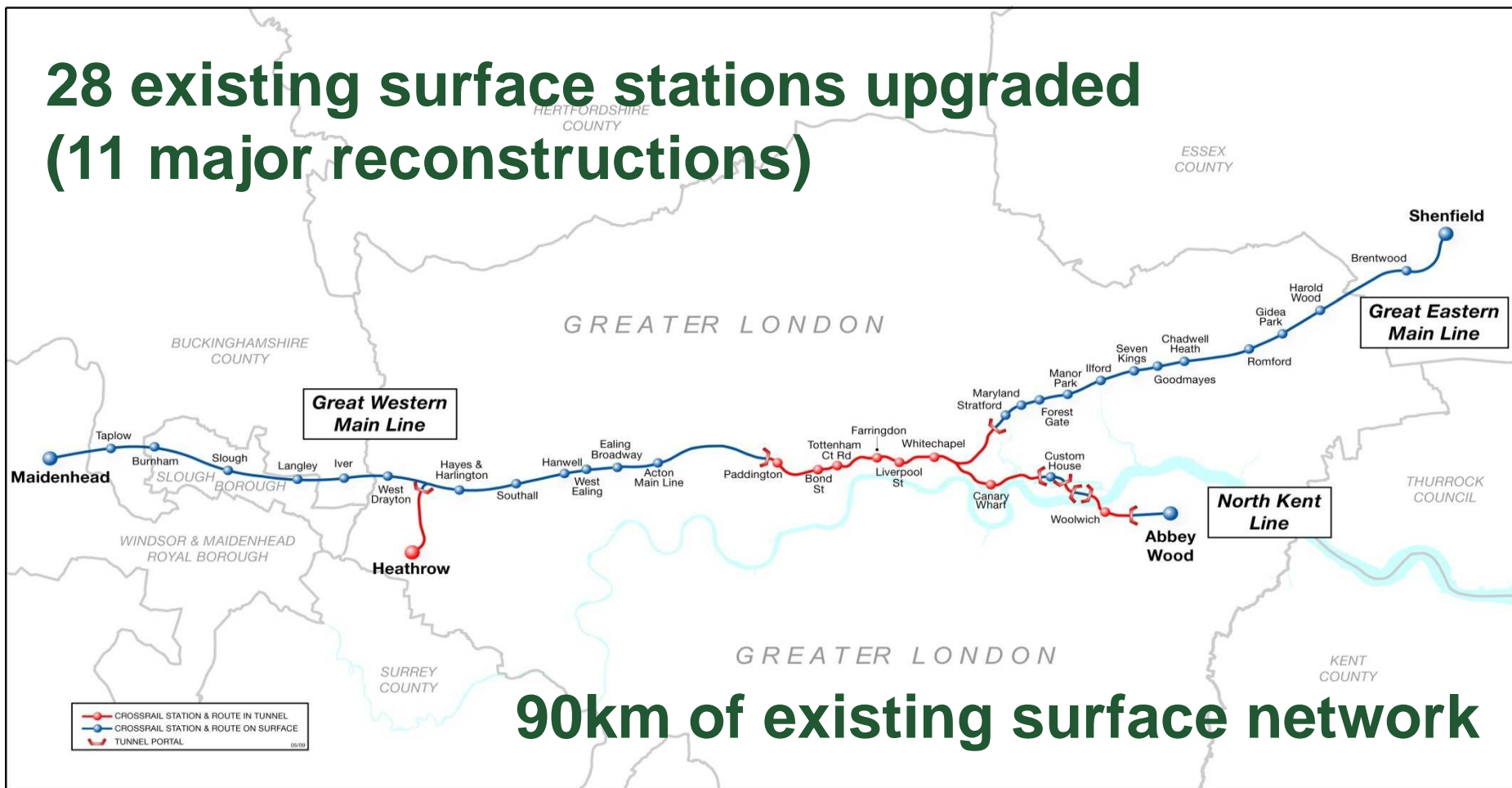
◀ Delivering a Sustainable Crossrail

◀ Dr Mike de Silva - Sustainability Manager



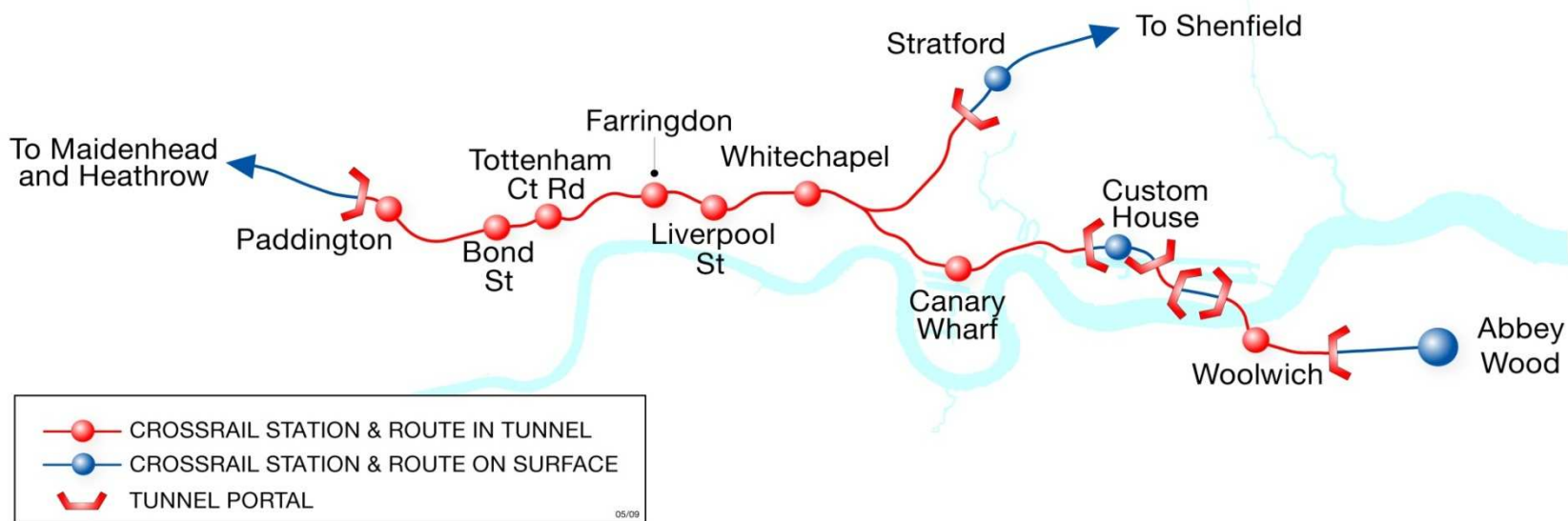
What is Crossrail?

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

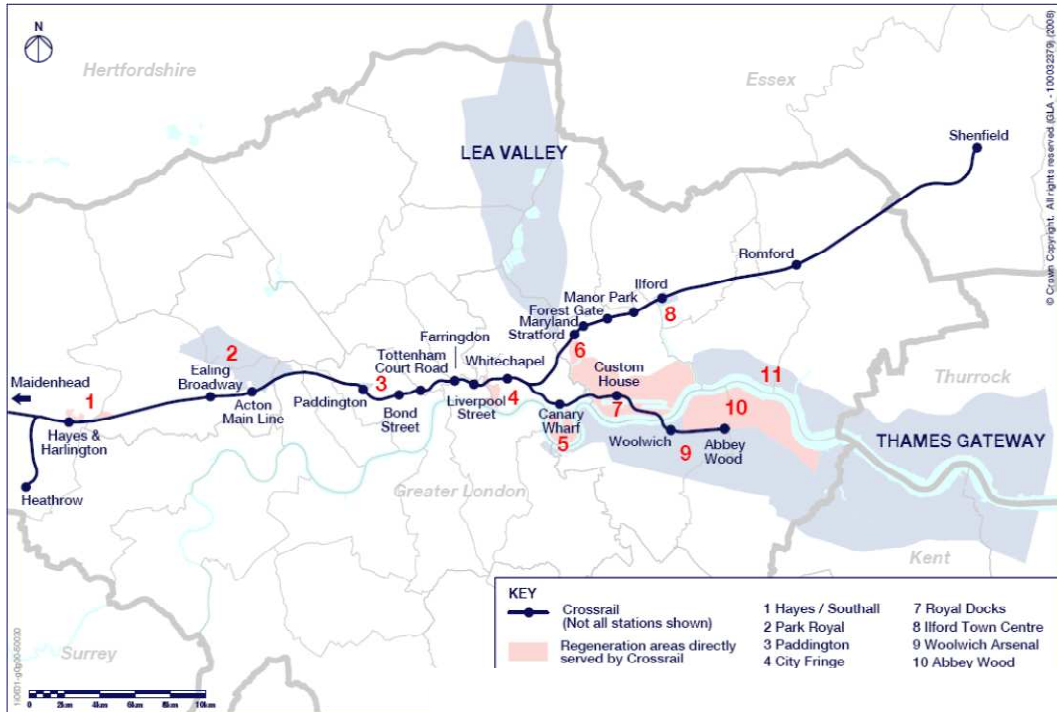




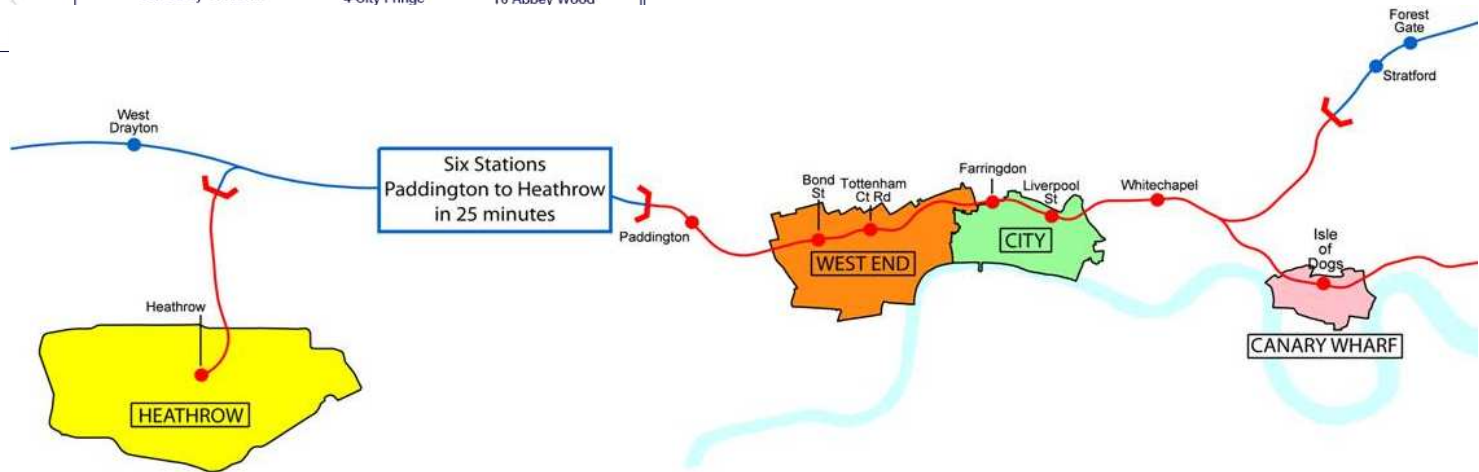
21 km of new sub-surface twin-bore railway through London



8 sub-surface stations

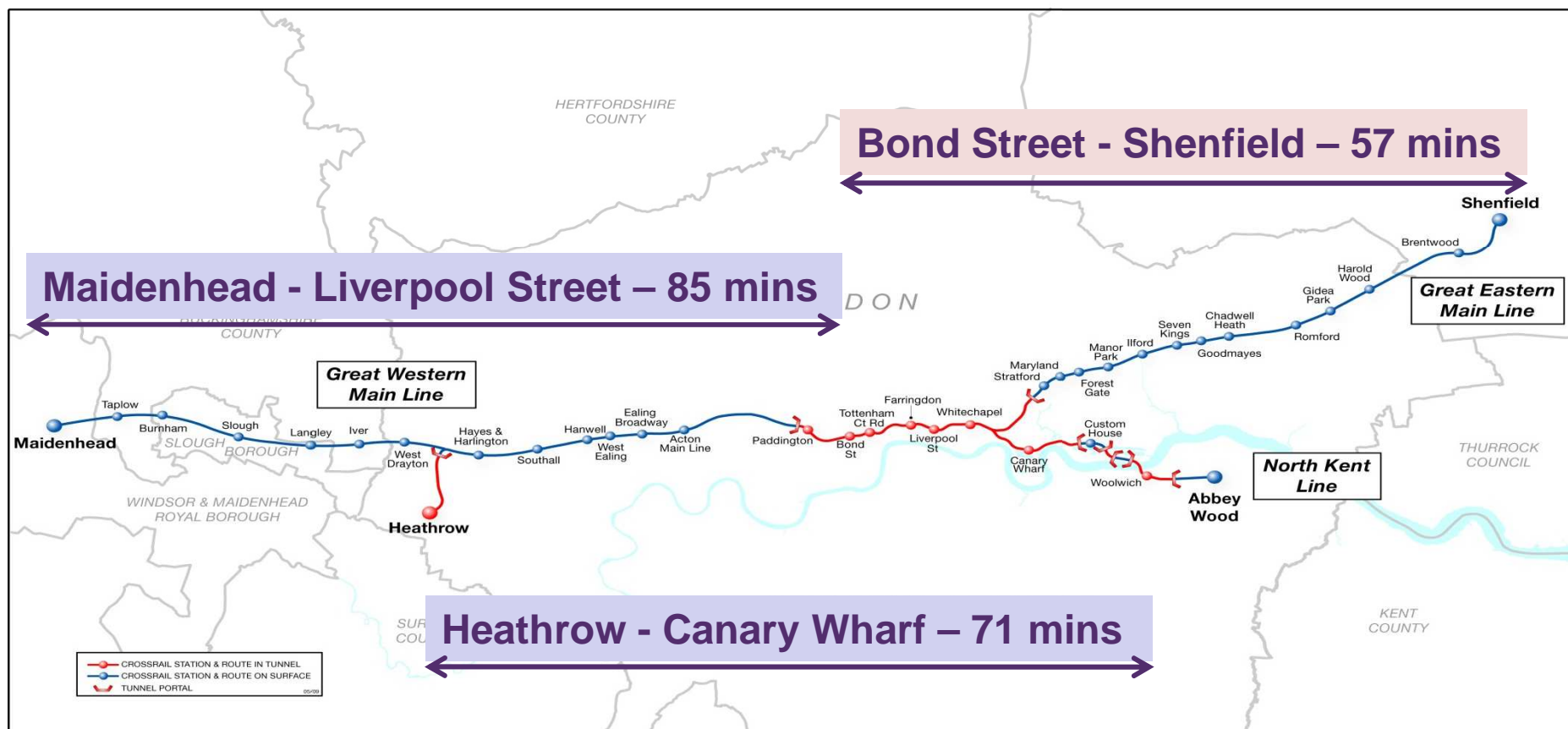


◀ **Linking London's key business and regeneration areas**



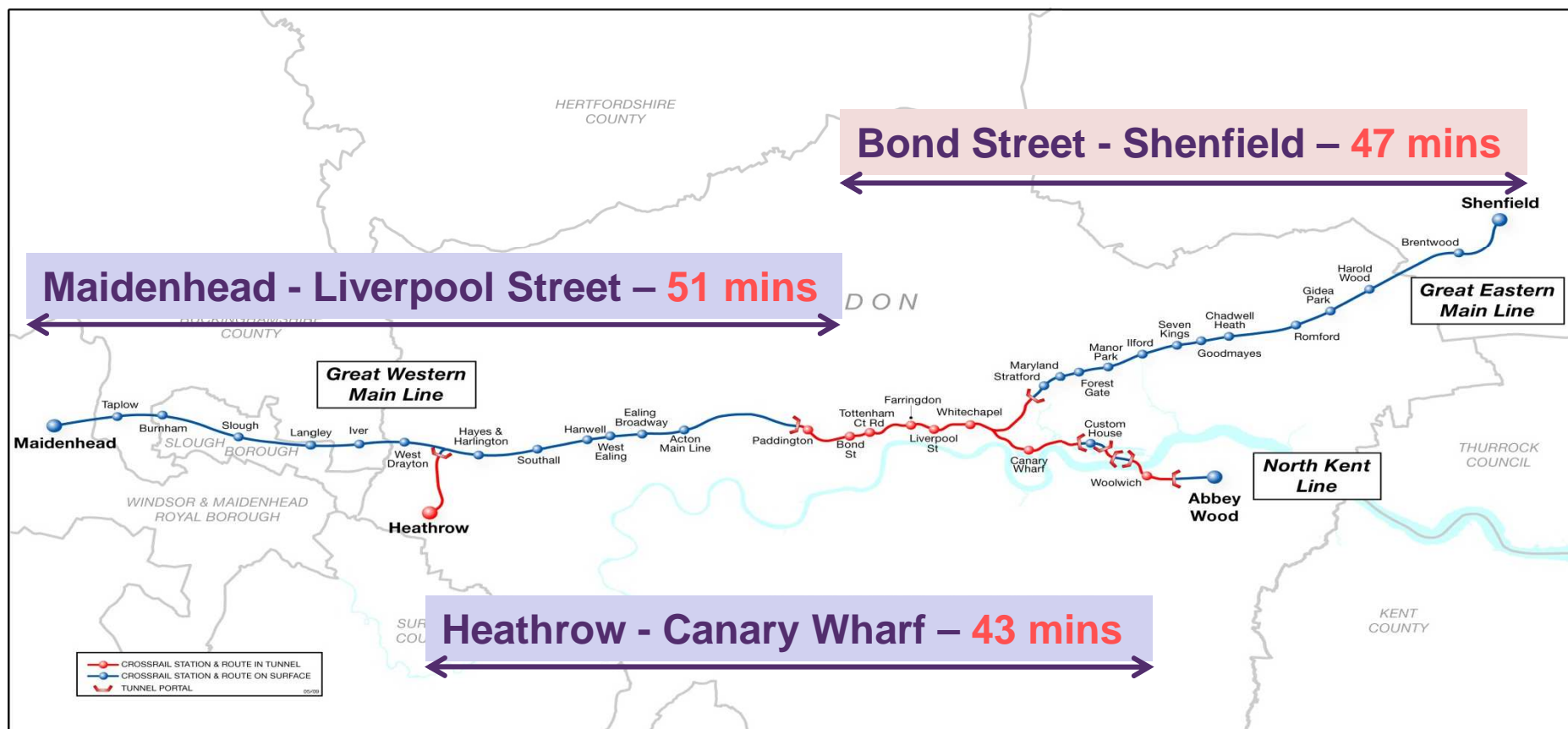


Existing Journey Times



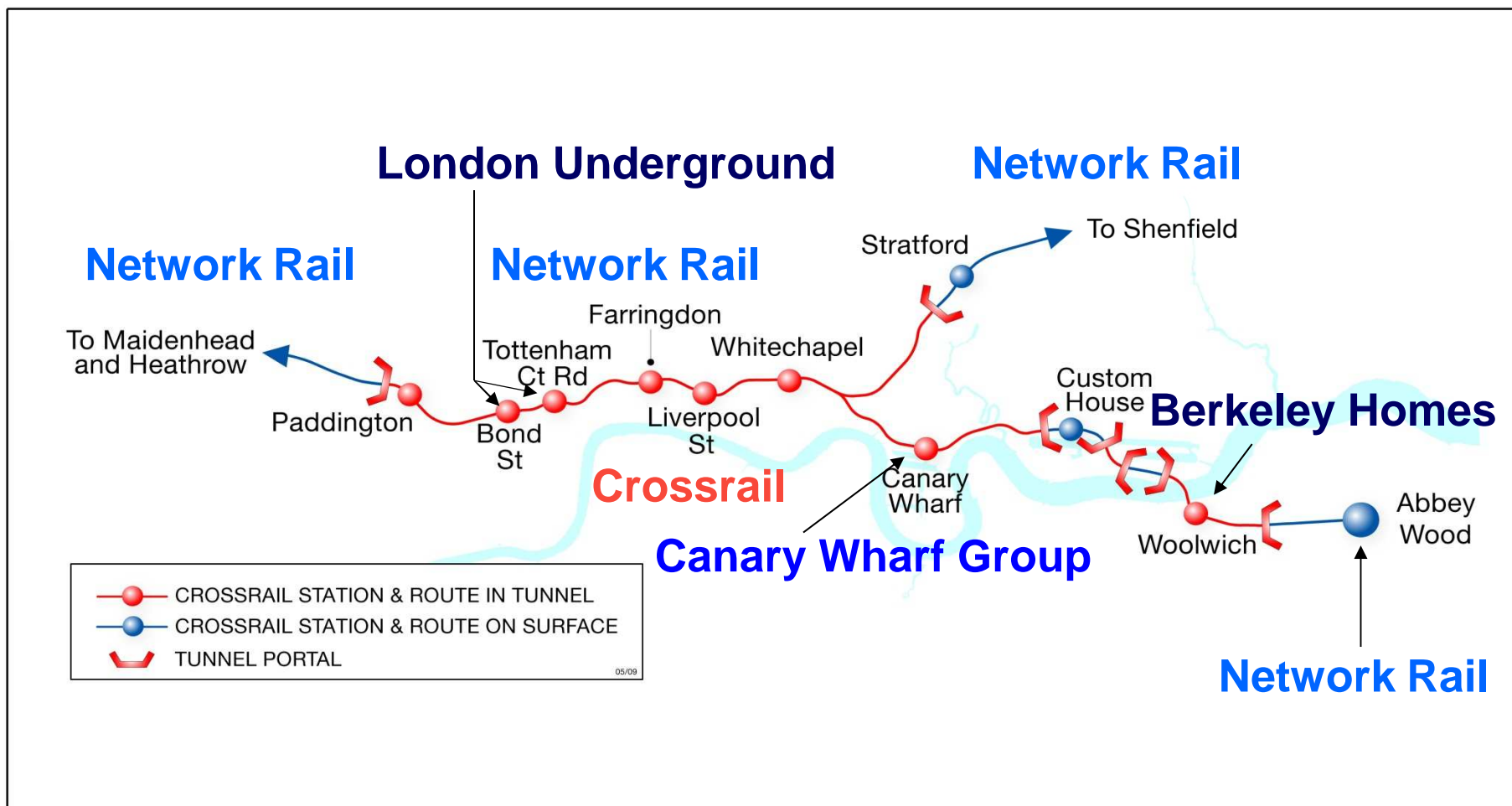


← Crossrail Journey Times





◀ Industry Partners



◀ Project Development Agreement

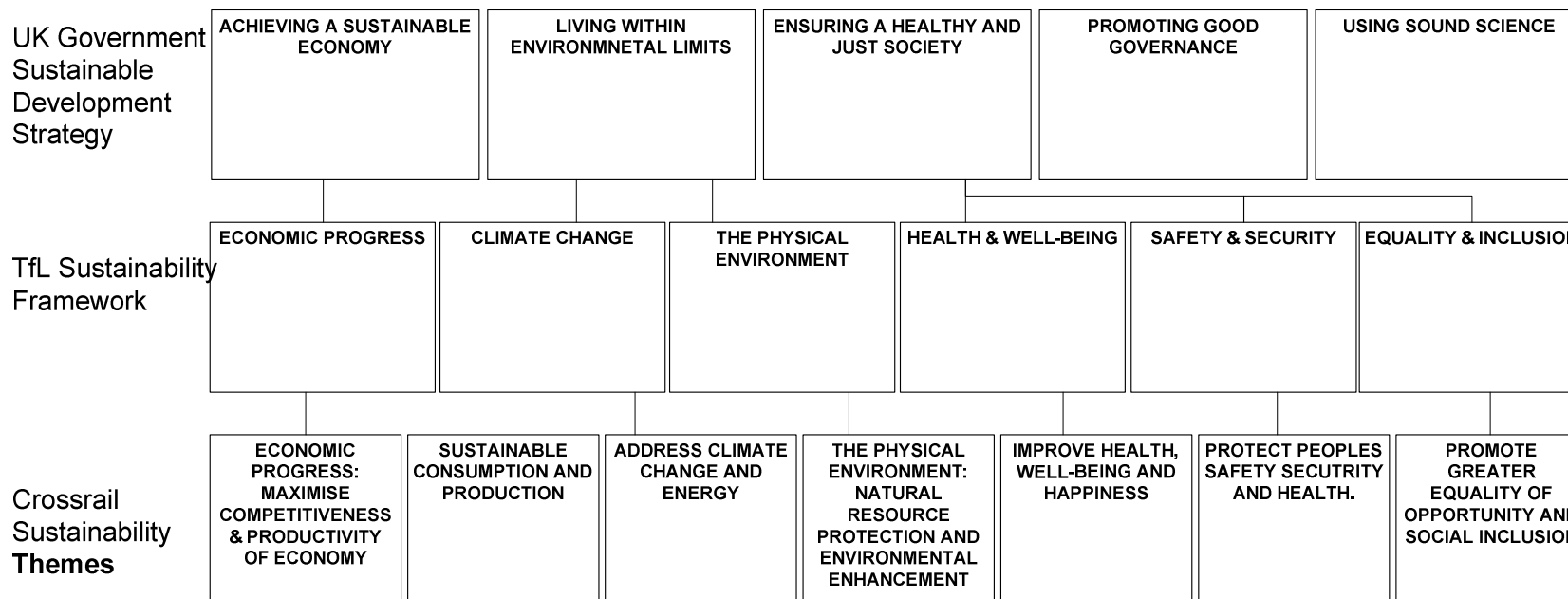
- ▶ *“Crossrail should support the Secretary of State’s plans for public transport provision, ... and shall be integrated with the Mayor’s transport and sustainability strategies.”*

◀ Sustainability Strategy



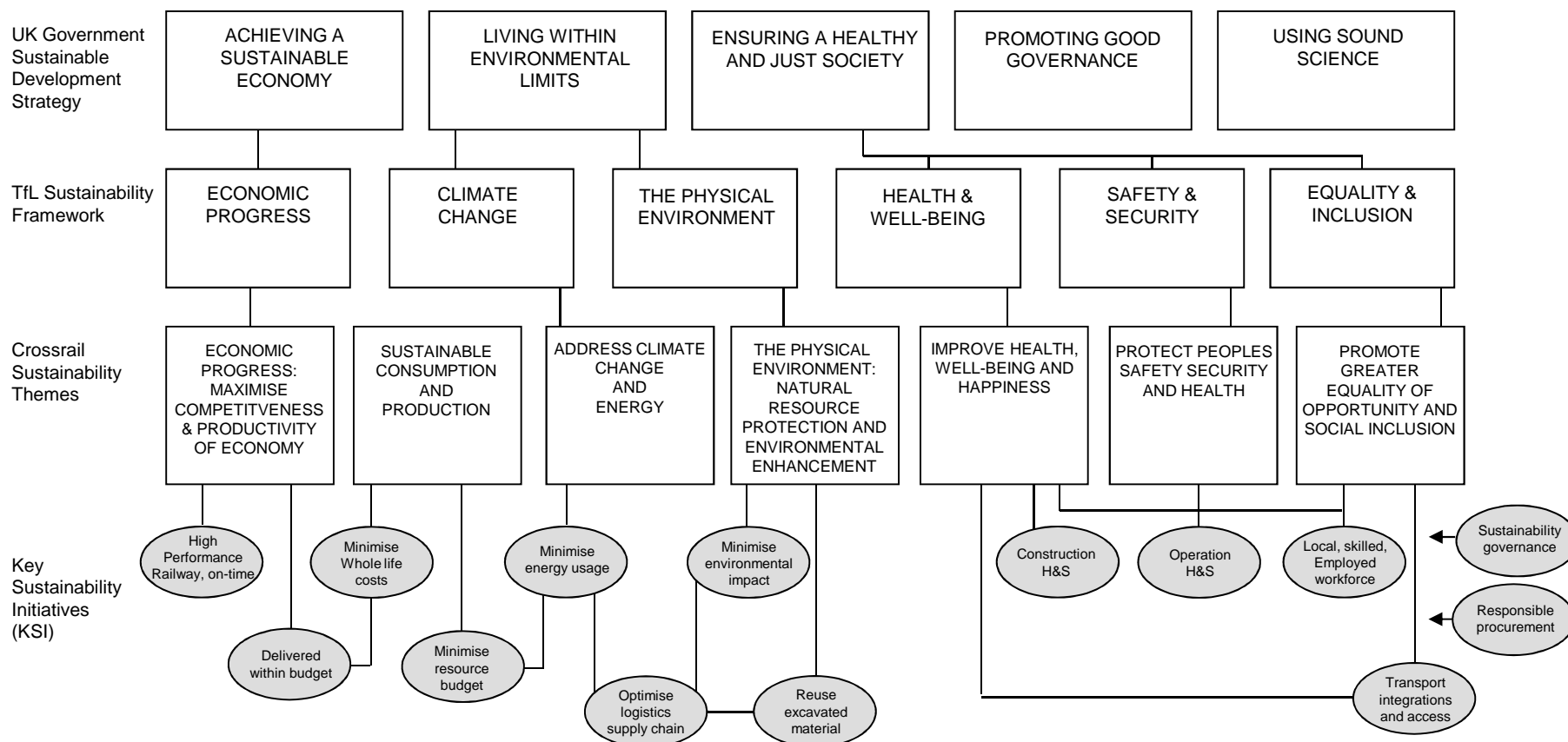
- ▶ Definition.
- ▶ Governance:
 - ◆ Sustainability Committee
 - ◆ Sustainability Coordination Group.
- ▶ Key Themes.
- ▶ Sustainability Initiatives.

◀ Crossrail Sustainability Themes





Sustainability Initiatives



◀ Environmental Objectives

- 1) Seek ways to reduce Carbon Footprint
- 2) Reduce the amount of construction waste going to landfill, with maximised beneficial reuse of the material;
- 3) Seek ways to incorporate environmental opportunities within the design;
- 4) Ensure that Contractors comply with the environmental management elements of the Crossrail Environmental Minimum Requirements and in particular the Construction Code;
- 5) Reduce waste and energy use within the Crossrail office.

◀ Sustainable Consumption & Production



- ▶ Beneficial reuse for excavated material – Wallasea Island.
- ▶ Concrete specifications including pfa and ggbs.
- ▶ Common design items provides palate of sustainable materials.
- ▶ Use of NetWaste to reduce waste through design.
- ▶ Use of recycled content in construction materials

◀ Climate Change & Energy



- ▶ Modelled carbon footprint – carbon return on investment 9-13 years.
- ▶ Best in class rolling stock energy efficiency requirements.
- ▶ Energy efficient station designs.
- ▶ Ground source heat pump technology for over site developments.
- ▶ Climate change adaptation measures incorporated into design and specifications.
- ▶ Lorry driver energy efficient driving training module.
- ▶ Reducing embodied energy in materials
- ▶ Use of river/rail transport where feasible

◀ The Physical Environment



- ▶ Environmental Minimum Requirements represents best practice.
- ▶ Crossrail and Contractors have certified 14001 environmental management systems.
- ▶ Plant required to be fitted with diesel particulate filters.
- ▶ Comprehensive archaeology programme.
- ▶ Have to obtain S61 consents.
- ▶ Traffic coordination centre for lorries.
- ▶ 85% of excavated material on tonne/km basis by rail or water (also revised tunnelling strategy).

◀ BREEAM

Environmentally efficient design delivered through:

Main categories covered by **BREEAM** assessment method listed below:-

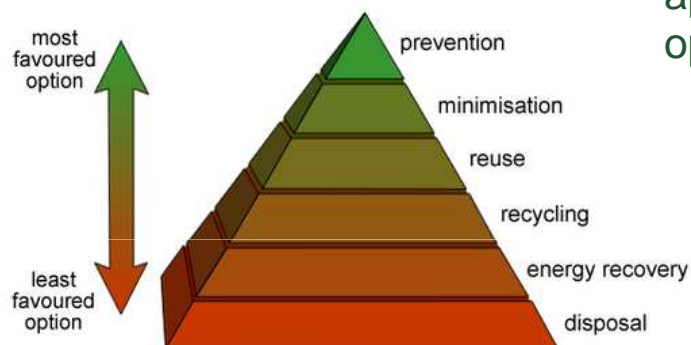
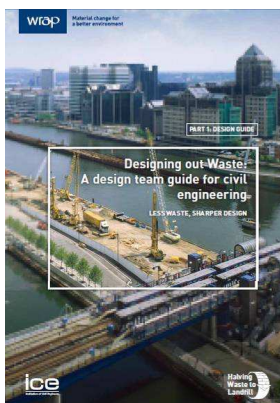
•Management	•Materials and Waste
•Water	•Land-use and Ecology
•Energy	•Pollution
•Transport	•Health and Well-being



- At design stage assessment BREEAM, the designs are achieving **VERY GOOD**
- Contractors are required to set out measures to maintain and achieve additional credits where possible



◀ CEEQUAL



- Provides rigorous and consistent approach to assessing impacts and opportunities:

- Management
- Land use
- Landscape/townscape
- Ecology & biodiversity
- Historic environment
- Energy & carbon
- Material use
- Waste management
- Transport
- Effect on neighbours
- Relations with stakeholders

- **EXCELLENT**



◀ Rolling Stock Design

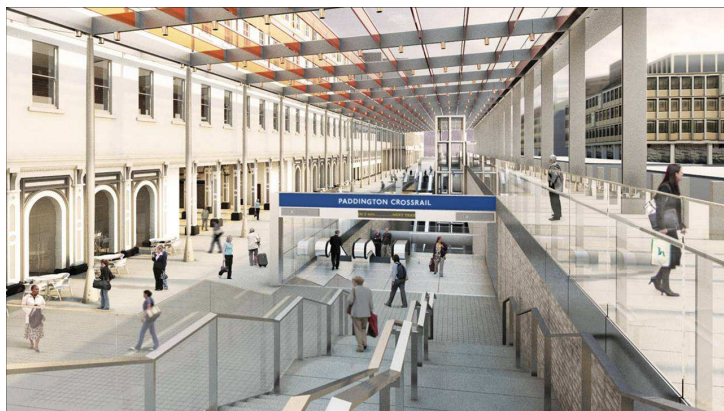
- ▶ Switching off electric trains overnight
- ▶ Improved driver training and more energy efficient train management
- ▶ Regenerative braking
- ▶ Reduced power consumption for heating and cooling
- ▶ More efficient and better managed lighting
- ▶ Lighter train batteries
- ▶ On-train energy storage
- ▶ Weight reduction
- ▶ Drag reduction



◀ Customer Experience



◀ Health, Wellbeing & Happiness



- ▶ Attractive, open station designs.
- ▶ Rolling stock air conditioned.
- ▶ Art programme.
- ▶ Promoting local employment.
- ▶ Comprehensive skills training programme.
- ▶ Comprehensive community engagement programme – community liaison panels held up as best practice.
- ▶ Use of low VOC fixtures/fittings

◀ **Equality & Social Inclusion**

- ▶ Interchange
- ▶ Step free access
- ▶ DDA compliant
- ▶ Tunnelling & Underground Construction Academy
- ▶ Apprenticeships & job starts
- ▶ Job brokerage scheme/local advertising
- ▶ Compete4 portal
- ▶ Meet the contractor events

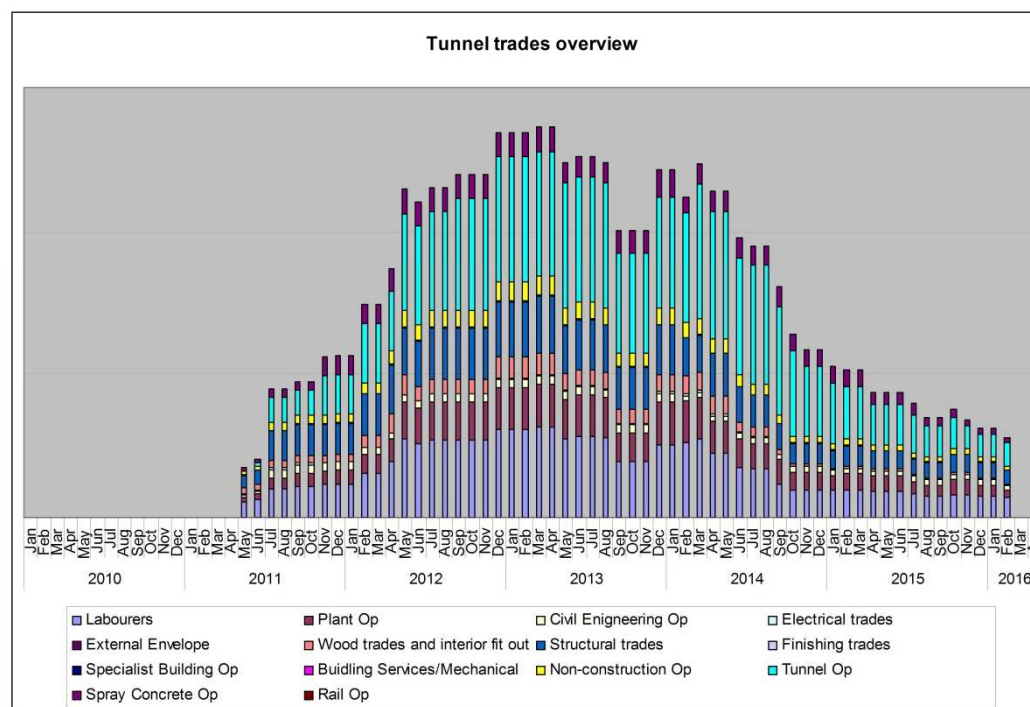
◀ Equality of Opportunity & Social Inclusion



- ▶ Tunnelling & Underground Construction Academy.
- ▶ Young Crossrail.
- ▶ Considerate Constructors Scheme – average score 36.2.
- ▶ 579 vacancies through job brokerage scheme to date with a conversion rate of 50%.
- ▶ 233 job starts.
- ▶ Over 100 Apprentices.
- ▶ 66 graduates working on the programme through formal schemes
- ▶ 14+ individuals reported to have benefited from London Living Wage.
- ▶ 1700 Opportunities posted on CompeteFor.
- ▶ 400 opportunities awarded on CompeteFor.
- ▶ 8+ meet the contractor events held to date.

◀ Crossrail Demand for Tunnelling Operations

- ▶ 3,500 people will be needed to work in tunnelling and underground construction on Crossrail
- ▶ Crossrail Skills & Labour Forecasting - outputs show detailed breakdown of trades over project life cycle



◀ Safety, Security & Health



A STATE OF MIND

- ▶ Designs and overall design security approach in line with Security in design of Stations (SIDOS).
- ▶ Processes delivering a safe, operable railway.
- ▶ Construction Design Management.
- ▶ Comprehensive construction health & safety – Safety is our Number 1 priority.

◀ **Safety, Security & Health**

- ▶ Design of rolling stock, signalling and stations
- ▶ Frequency of service
- ▶ Platform edge doors
- ▶ Wide platforms
- ▶ Spacious stations
- ▶ Aesthetics of internal design quality
- ▶ Urban realm



MOVING LONDON FORWARD