Maximising HS2 opportunities

• **Phase Two:**
  - Single HS2/Network Rail Integrated Plan, including east-west rail connections

• **Crewe:**
  - The consultation route for Phase Two has the potential for a new station at Crewe
  - This new station can be an interchange for the region

• **Old Oak Common:**
  - West London’s major rail interchange, linking long-distance and commuter rail services to the West and North

• **Euston:**
  - Central London’s single biggest redevelopment opportunity
Integrating Phase Two with existing rail network to maximise connectivity

• Leveraging HS2 as an Engine for Growth through:
  ▪ Coordination with Network Rail Control Period 6 (April 2019 – 2024), so that the Network Rail Strategic Business Plan is considered at the same time as the Second Reading for Phase Two and approval
  ▪ A more ambitious plan to link Manchester and Leeds
  ▪ Further electrification and line speed improvements across the North, integrated with HS2 from Liverpool to Hull
A new, integrated station at Crewe, six years early

• A new station that integrates HS2 to West Coast and enables transfer at one station to other services, including trains to North Wales and Liverpool
• Designed as a transport interchange that maximises proximity of the existing road network to facilitate easy connection to surrounding cities
• Regeneration plan to maximise housing and business development
• Consider early delivery of HS2 to Crewe by 2027 – a six-year acceleration
Old Oak Common – West London’s major rail interchange

- HS2 will be a catalyst for comprehensive redevelopment of Old Oak Common. However, it cannot be the funding solution for a long-term community of over 20,000 homes and associated businesses to be developed over 20 to 30 years.
- The Mayoral Development Corporation must be properly resourced with people and funding, and given appropriate powers to see through at least 20 years of development.
- Decisions required on existing rail depot relocations.
- Decisions needed on London commuter connectivity, including North/West London Lines and West Coast connection to Crossrail.
Euston station – transformational inter-city gateway

- A new combined station to become a world-class transport hub that creates potential for considerable over-site development
- Needs to be designed to accommodate Crossrail 2
- Early engagement with private sector to provide development expertise and long-term funding for over-site development
- Will require relocation of certain existing rail services from Euston during construction
- Street-level connectivity from station to existing communities as part of broader regeneration of surrounding area
HS1 – HS2 link

• The current proposal is the most cost-effective solution to deliver 3 trains per hour

• The proposal has operational limitations (single track – 3 trains per hour) and impacts:
  ▪ freight capacity on West Coast Main Line
  ▪ future commuter growth on North London Line
  ▪ the community of Camden

• Deletion reduces the Phase One forecast by £700m (including risk provision)

• Recommend a study to consider alternative connectivity
Phase One schedule challenges

- Parliamentary process
- Depot relocation and clearing the Old Oak Common site is critical
- Decisions on Euston and early engagement to source a private partner
- Major utilities diversions
A realistic, robust timeline is key to making the right decisions, reducing uncertainty and controlling costs

- A timely Parliamentary process is essential, leading to the granting of powers delivered by Royal Assent
- Constructing the London stage is the biggest challenge:
  - Euston – a major redevelopment of an existing station while continuing to run a service
  - Old Oak Common – new site linking to Great Western Main Line and Crossrail while services are running
  - Tunnelling – 74 single-track km in Chilterns and London approaches; no easy access for tunnelling machines
Phase One schedule – target 2026

- Target completion for December 2026 operational service
- Dependent on Parliamentary process and powers granted by Royal Assent
- Depot relocation and start on site at Euston & Old Oak Common are critical
Phase Two – delivery in 2033

- Formal consultation in progress
- Route will be announced in 2015
- Current scheduled completion 2033

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Phase Two opportunity to accelerate completion – target 2030

- Target completion for 2030, not 2033
- Crewe station & approaches could be commissioned in 2027, six years early

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<tr>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
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</table>

**HS2 Review Phase 2 Target Schedule**

- **Construction**
  - Tunnels – Hopton, Whitmore Heath, Madeley, Crewe
  - Crewe station & approaches
  - Manchester Airport station
  - Rostherne to Ardwick construction including Manchester tunnels
  - Manchester Piccadilly station
  - Manchester leg railway systems
  - Golborne rolling stock depot

- **Testing & commissioning**
  - Manchester leg complete Mar 30
  - Leeds leg complete Jun 30
HS2 cost review validates Phase One budget

• Eight-week review of HS2
  ▪ holistic review of infrastructure and trains budget
  ▪ focused on Phase One cost estimate
  ▪ Phase Two cost estimate to be confirmed once route is announced

• Conclusion: review confirms Phase One budget

• Cost estimate - main changes:
  ▪ reallocation of train depot costs to train budget as per Crossrail, Thameslink and Intercity Express
  ▪ Additional allowances for rail systems, and costs during commissioning
  ▪ Increase in indirect costs to bring into line with Olympic Delivery Authority and High Speed One
  ▪ Reduction of train unit costs
**HS2 funding envelope (Spending Round 2013)**

- Phase One: London to Birmingham
- Phase Two: Birmingham to Manchester and Leeds
- Included contingency at P95*

<table>
<thead>
<tr>
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<th>HS2 funding envelope</th>
<th>Phase One</th>
<th>Phase Two</th>
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<tr>
<td>Phase 1 Infrastructure</td>
<td>£21.4bn</td>
<td>£21.4bn</td>
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<tr>
<td>Phase 2 Infrastructure</td>
<td>£21.2bn</td>
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<td>£21.2bn</td>
</tr>
<tr>
<td>Trains</td>
<td>£7.5bn</td>
<td>£3.0bn</td>
<td>£4.5bn</td>
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<td><strong>Total</strong></td>
<td><strong>£50.1bn</strong></td>
<td><strong>£24.4bn</strong></td>
<td><strong>£25.7bn</strong></td>
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*NOTE: P95 denotes a maximum reasonably foreseeable cost, and gives a high confidence that the forecast is adequate (with only a 1 in 20 chance of being exceeded)*
## Forecast cost for Phase One infrastructure and trains

### Costs at 2Q 11 - prices excluding contingency

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<tr>
<td>1</td>
<td>Land &amp; Property</td>
<td>1.721</td>
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<td>2</td>
<td>Tunnels</td>
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<td>3</td>
<td>Civil Engineering</td>
<td>3.760</td>
<td>(0.044)</td>
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<td>4</td>
<td>Stations</td>
<td>2.898</td>
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<td>Depots &amp; Stabling</td>
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<td>6</td>
<td>Rail Systems</td>
<td>1.721</td>
<td>0.308</td>
<td>2.029</td>
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<td>7</td>
<td>Modifications to existing network</td>
<td>0.609</td>
<td>0.030</td>
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<td>8</td>
<td>Indirect Costs including client design</td>
<td>1.953</td>
<td>0.392</td>
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<td>9</td>
<td>Interim Maintenance</td>
<td>0.000</td>
<td>0.100</td>
<td>0.100</td>
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<td></td>
<td><strong>Sub total</strong></td>
<td><strong>16.595</strong></td>
<td><strong>0.524</strong></td>
<td><strong>17.119</strong></td>
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<td>10.1</td>
<td>Value Engineering &amp; Efficiency Challenge</td>
<td>(1.419)</td>
<td>(0.050)</td>
<td>(1.469)</td>
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<tr>
<td>10.2</td>
<td>Spending Round Reconciliation Adjustments</td>
<td>0.468</td>
<td>(0.468)</td>
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<td><strong>Infrastructure Forecast Cost Estimate</strong></td>
<td><strong>15.644</strong></td>
<td><strong>0.006</strong></td>
<td><strong>15.650</strong></td>
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<td>11</td>
<td>Trains</td>
<td>2.215</td>
<td>(0.562)</td>
<td>1.653</td>
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<td>12</td>
<td>Train Depot</td>
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<td>0.370</td>
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<tr>
<td></td>
<td><strong>Trains Forecast Cost Estimate</strong></td>
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<td>(0.192)</td>
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<td><strong>Infrastructure &amp; Trains Forecast Cost Estimate</strong></td>
<td><strong>17.859</strong></td>
<td>(0.186)</td>
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### Key Adjustments

- **2,3,5,6,7** Tunnels/Civil Engineering/Rail Systems/On Network: Contractor oncosts adjustment and correction to 2Q11 prices.
- **2** Tunnels: Tunnel monitoring and spoil removal rate adjusted.
- **4** Stations: Additional allowance for pedestrian interchange.
- **5** Depots & Stabling: Transfer of Washwood Heath Depot to Trains.
- **8** Indirect Costs: Revised indirect costs to align with industry benchmarking.
- **9** Interim Maintenance: Interim maintenance during construction period.
- **10.1** Value Engineering & Efficiency Challenge: Reassessment of opportunities.
- **10.2** Spending Round Reconciliation Adjustments: Item reallocated.
- **11** Trains: Improved benchmarking data.
- **12** Train Depot: Washwood Heath Depot added to trains.
## Contingency

### Phase One infrastructure and trains

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<th>HS2 budget</th>
<th>Estimated cost</th>
<th>Contingency</th>
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<tbody>
<tr>
<td>Phase One trains</td>
<td>£3.0bn</td>
<td>£2.023bn</td>
<td>£0.977bn</td>
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<tr>
<td>Phase One infrastructure</td>
<td>£21.4bn</td>
<td>£15.650bn</td>
<td>£5.75bn</td>
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</tbody>
</table>

- Phase One infrastructure contingency £5.750bn
- Phase One trains contingency £0.977bn
- Potential scope saving (including risk reduction) £0.700bn
- Potential Phase One infrastructure & trains contingency £7.427bn
Infrastructure cost comparison with HS1

Benchmarking HS2 P50 Economic Case budget with HS1 Outturn final cost confirms 15% premium for higher capability line

<table>
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<tr>
<th></th>
<th>HS2 Phase One</th>
<th>HS1</th>
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<tbody>
<tr>
<td>Maximum running speed</td>
<td>360</td>
<td>300</td>
</tr>
<tr>
<td>Route length</td>
<td>225 km</td>
<td>109 km</td>
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<tr>
<td>Capital cost</td>
<td>P50 £19.4bn</td>
<td>£8.2bn**</td>
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<tr>
<td>(Economic Case)</td>
<td></td>
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<tr>
<td>Passenger capacity of each train</td>
<td>1,100</td>
<td>750</td>
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</table>

* P50 and P95 budgets as per ‘The Economic Case for HS2’ Oct 2013
** HS1 completion price, inflation adjusted to 2Q 11 using UK RPI
**Comparison of indirect project costs with HS1 and Olympic Delivery Authority**

Benchmarking with HS1 and the London 2012 Olympic and Paralympic Games confirms revised HS2 indirect costs are adequate.

Indirect costs include: corporate staff, project management, accommodation, IT and consultancy costs (e.g. legal, surveys), but excludes design.
Comparison of train unit costs

Benchmarking with other rolling stock types confirms revised HS2 train costs are adequate

Rolling Stock Vehicle Cost Comparison SR2013, March 2014 and Benchmarking

COST RELATIVE TO THE AVERAGE BENCHMARK RATE

ALL PRICES USED FOR COMPARISON @ 2Q11.
Summary

- Phase One estimate and contingency for infrastructure and trains are enough to deliver Phase One
- A robust and realistic timeline is essential for controlling cost
- An achievable Phase One Parliamentary process needs to be understood
- Critical decisions on Old Oak Common depot relocation and Crossrail connection to West Coast Main Line are required
- Decision on HS2 – HS1 link is required
- Guidance on early delivery of Crewe is essential
- Decision is required on early engagement with private-sector partner to seek more ambitious solution at Euston
- Opportunity to deliver Phase Two up to three years early
- An integrated HS2/Network Rail plan for the North, including improved east-west connections, is fundamental