



East West Rail

GRIP 4 Outline Business Case

**Final Report –
Executive Summary
July 2010**

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Final Report – Executive Summary

July 2010

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Executive Summary

Introduction

It has been a long held ambition of the local authorities along the former Oxford to Cambridge rail route to see this line re-opened for passenger traffic. The scheme to promote the reopening of this route is known as East-West Rail (EWR). It is recognised that, for practical reasons, the complete reopening of the line will have to be completed in a number of stages.

This business case report considers the western section of the EWR route linking Oxford, Milton Keynes, Aylesbury and Bedford. Future reports will consider the central and eastern sections of the route.

The western section of the EWR route is considered the most straightforward section to deliver as the entire track bed is still in place and parts of the route are still in use. However, most of the sections that are still in use have been reduced to single line working and low operating speeds.

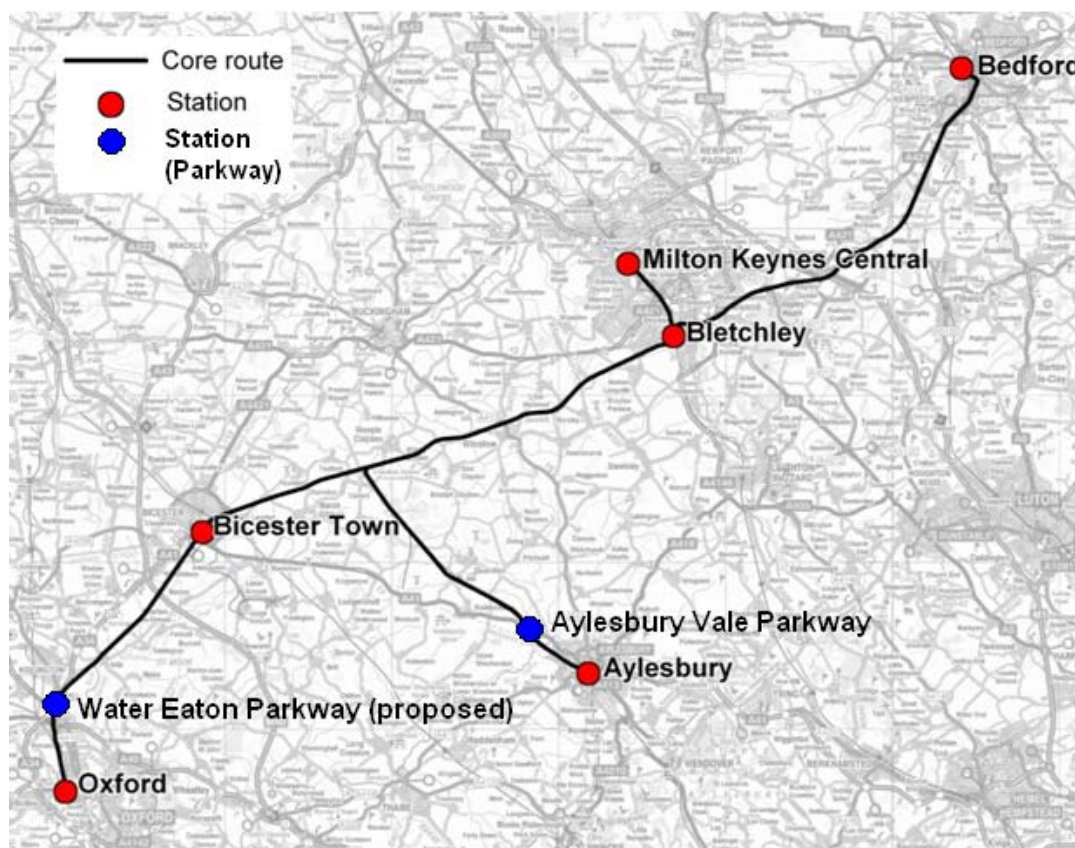
Delivery of the western section of EWR will see service restored between Oxford, Aylesbury, Bletchley, Milton Keynes and Bedford.

The western section of the EWR project will provide enhanced transport links between a number of areas where significant growth has been planned as part of the South East Plan and the East of England Plan.

With the abolition of Regional Spatial Strategies the level of planned and/or assumed growth is an issue that will need careful consideration during the forthcoming period leading up to a “programme entry” business case submission later in 2010.

Figure ES.1 shows the core route of the western section of EWR.

Figure ES.1 – Plan showing the extents of the Western Section of EWR



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Purpose of the Outline Business Case (OBC)

The purpose of this Outline Business Case (OBC) report is to provide a robust and comprehensive assessment of the western section of EWR consistent with the development of the scheme to GRIP4.

This assessment takes into account the capital and operating costs of the scheme and assesses the benefits of the scheme across a wide range of headings to demonstrate to the project board, key stakeholders and funding partners that the western section of EWR is a viable and affordable project which should be taken to the next stage of project development.

Our Approach

Our approach when developing this OBC has been to critically analyse and assess the scheme to ensure that we understand:

- The capital cost of the scheme, the risks associated with it and the dependencies that it may have on external factors;
- The operation of the EWR passenger services, what stations will be served, at what frequency and what rolling stock would be required;
- The benefits that will be generated by the scheme in terms of providing a return on the capital investment, the revenue generated by passenger services, the benefits to travellers in terms of time savings and the level of support to the regional economies.

The conclusions of this comprehensive assessment provide a clear indication of the viability of the western section of the EWR scheme.

Project Context, Challenges and Objectives

The Growth Agenda and associated challenges

Significant growth was planned as part of the South East and the East of England plans. Locations where significant growth in both housing and employment numbers included:

- Didcot;
- Oxford;
- Bicester;
- Aylesbury Vale;
- Milton Keynes and an immediately adjoining area within Aylesbury Vale District; and
- Bedford-Marston Vale.

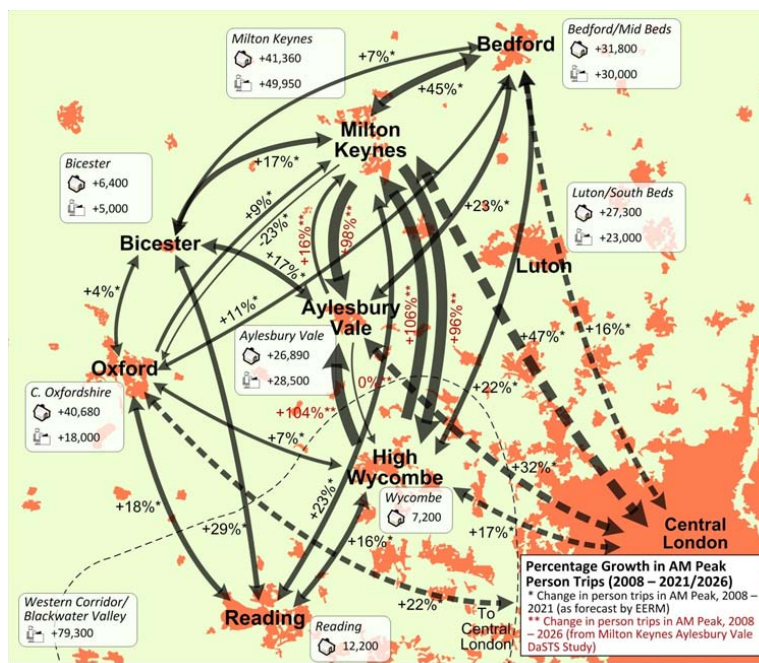
In total approximately 100,000 additional homes and 100,000 additional jobs are planned to be delivered along the EWR corridor over the next 20 years. This represents a significant proportion of the planned growth in the South East and East of England Regions.

Delivering growth on this scale in a sustainable manner is going to be difficult without providing the supporting infrastructure to enable the planned development of housing and employment to be realised. A number of studies have been undertaken examining the challenges and developing transport proposals for the area in question. The need for rail intervention has been identified as a priority with existing rail infrastructure offering significant potential for improving accessibility and connectivity.

Potential Impacts of Growth

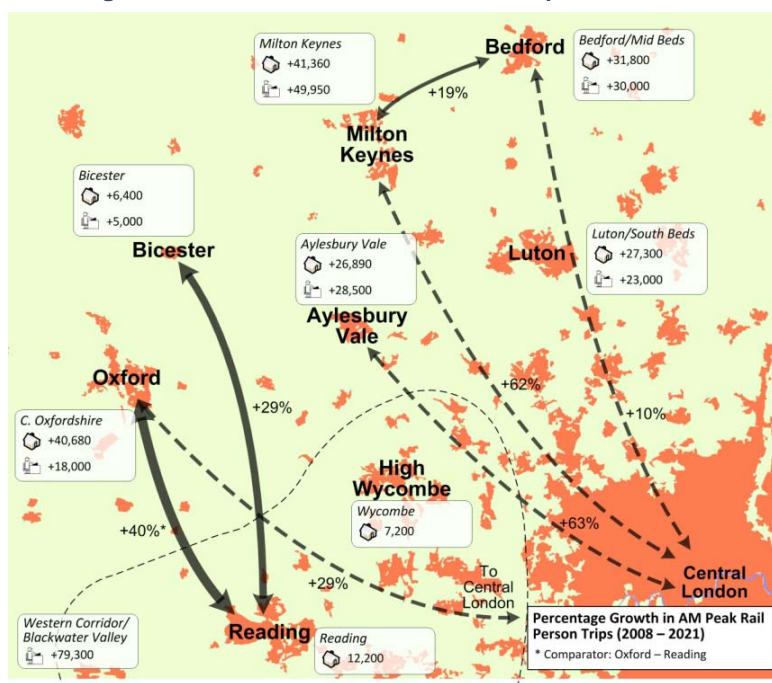
Figure ES.2 provides a visual representation of the overall forecast increase in trips associated with the growth in housing and employment that is planned within the study area. These increases in trip making will put increasing strain on the transport networks and lead to increasing levels of congestion and journey time unreliability.

Figure ES.2 – Forecast Growth in Person Trips 2008 – 2026



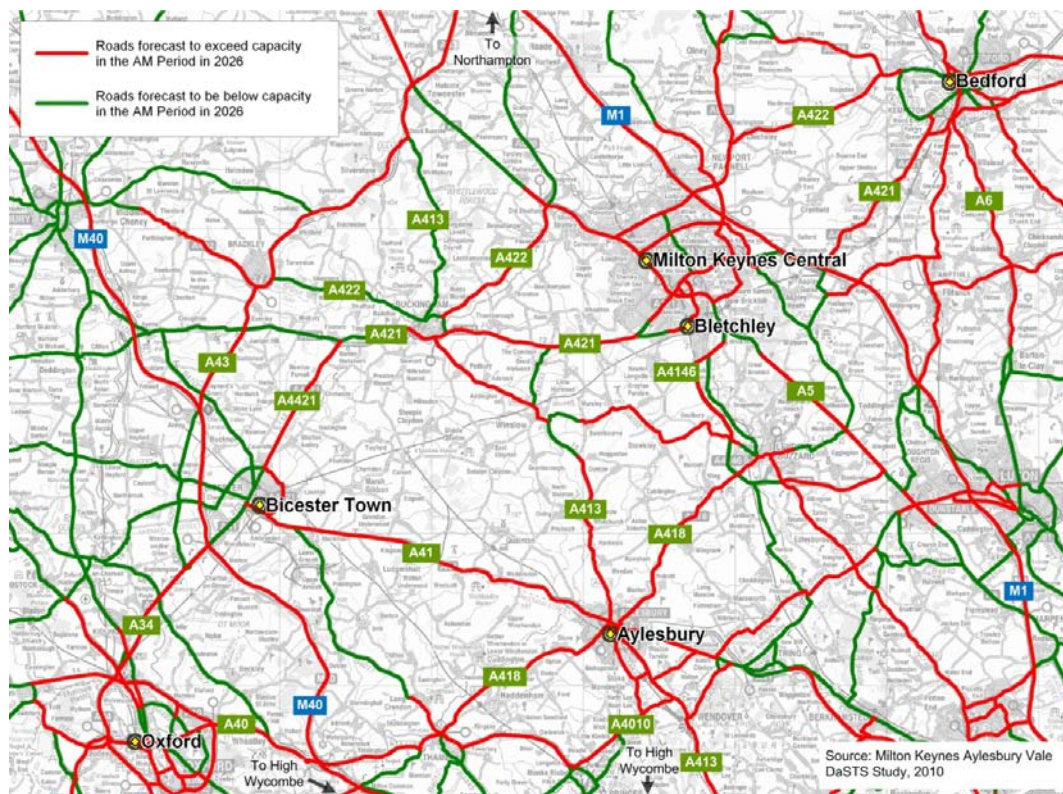
In stark contrast, the lack of alternative public transport services, most notably rail in the area means that the forecast growth in PT travel between these centres is in most instances negligible as in many instances the journeys cannot be conveniently made. This is illustrated by Figure ES.3.

Figure ES.3 – Forecast Growth in Rail Trips 2008 – 2026



Current travel patterns in the EWR study area are dominated by the use of the private car and with proposed growth in travel on highway forecast to increase significantly with consequent adverse impacts on the performance of the network. By 2026 it is anticipated that all the major highway routes between the key centres in the area will be operating at or over capacity in peak periods. Figure ES.4 highlights the extent of stress on the highway network in 2026; the links that are highlighted in red indicate those where the demand for traffic is in excess of the available capacity.

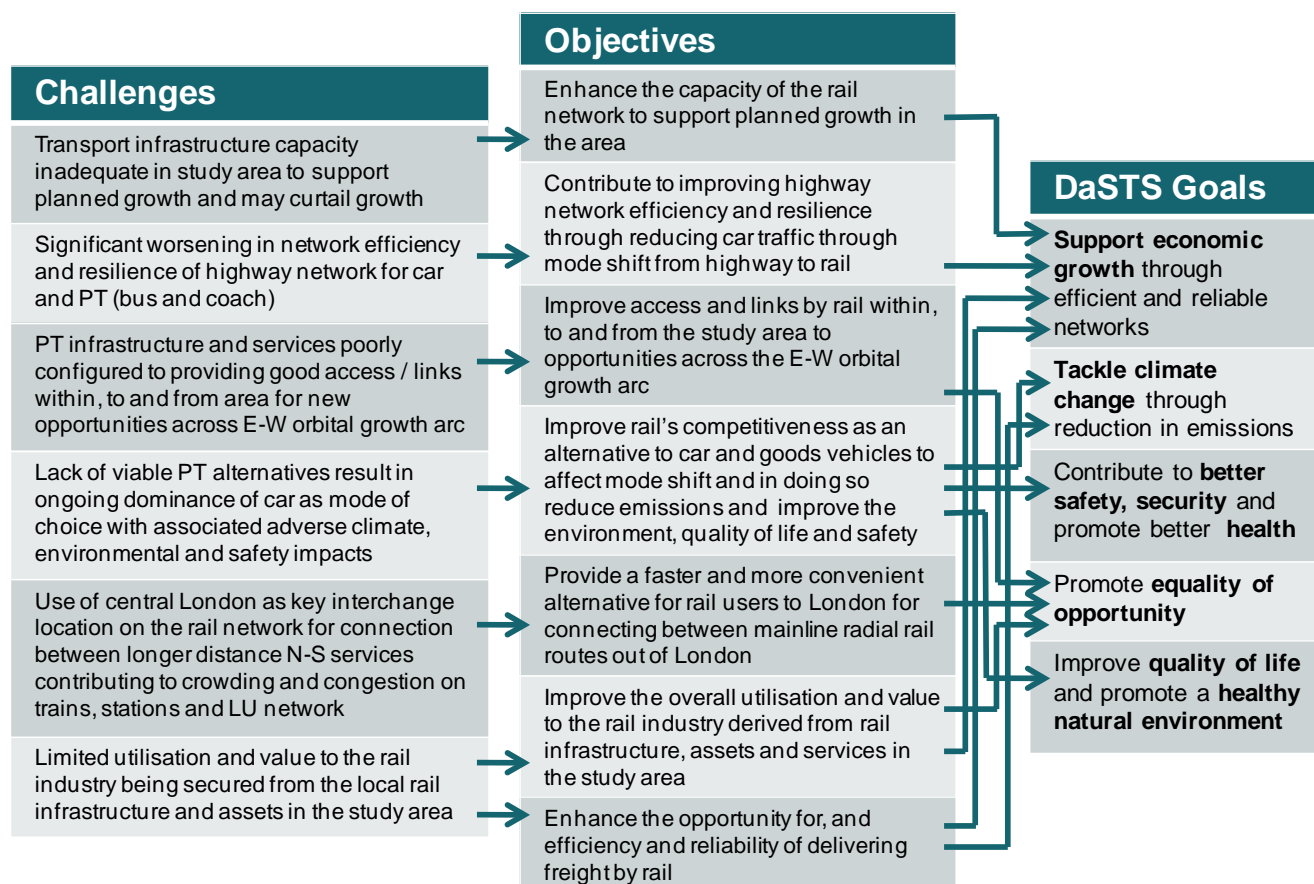
Figure ES.4 – Highway Network Stress in 2026



Challenges, Objectives and meeting DaSTS Goals

A number of key challenges emerge that drive the need for a rail intervention for the area, and from which a number of specific objectives for any such intervention to meet, emerge. These objectives directly relate to mitigating forecast challenges and unlocking opportunities. It is also important that these objectives are consistent with the Government's overall goals for transport as expressed in Delivering a Sustainable Transport System (DaSTS). Figure ES.5 presents the challenges and objectives that have been identified and how they align with the DaSTS goals.

Figure ES.5 – Linkages between Challenges, Objectives and DaSTS Goals



The key DaSTS goals that any rail intervention in this case will aim to contribute to are:

- Supporting economic growth in what is a designated national priority corridor for growth through enhancing the efficiency and utilisation of public transport infrastructure and services;
- Tackling climate change by minimising the potential adverse impacts of that growth by providing a more sustainable means of meeting associated travel demands; and
- Promoting equality of opportunity through improving inter and intra-regional public transport connectivity between areas of population and existing and planned foci for employment and services.

In addition, any rail intervention should also positively contribute to:

- Better safety, security and health by reducing the forecast adverse impact of highway traffic in these areas through a mode shift to rail; and
- Improve quality of life and promote a healthy natural environment by reducing the forecast adverse impact of highway traffic in these areas through a mode shift to rail.

Scheme Development and Descriptions

The GRIP 4 Study

Following completion of the EWR GRIP 3 study in 2008, discussions were held with the DfT and Network Rail to determine the scope for further scheme development.

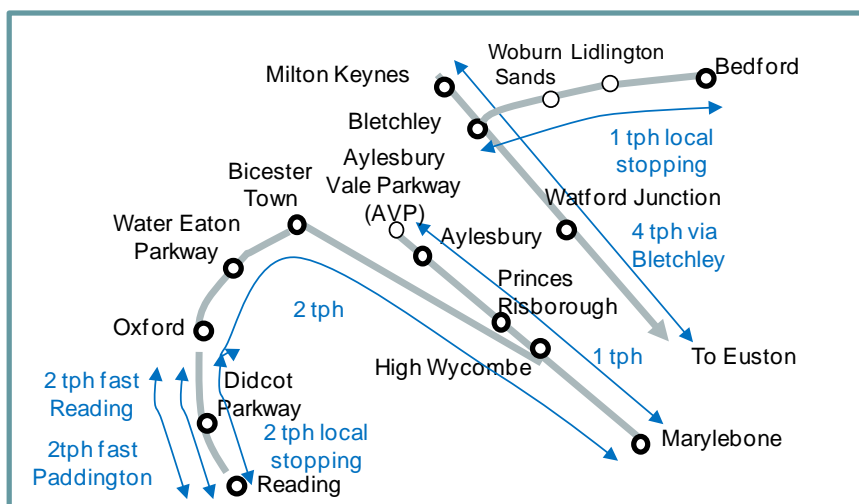
This culminated in the brief for a GRIP 4 level study that reflected a desire on the part of the DfT and NR that the western section of EWR, together with its associated infrastructure, be developed in such a way as to not constrain its potential utilisation and value in the medium to long term as part of the wider national passenger and freight network, while also delivering the Local Rail service operating specification in the shorter term, and integrating with Chiltern Evergreen proposals. Atkins were commissioned to undertake this study in November 2008 with the intention of completing a GRIP 4 EWR design and business case.

The GRIP 4 study established a feasible design to support EWR services and potential wider use of the railway for national passenger and freight services. This study has provided a robust basis for estimating scheme costs and for specifying service operational performance – all of which are key inputs to the process of appraisal for EWR.

The future “without EWR” scenario: the Do Minimum (DM)

The Do Minimum scenario describes the future situation that would exist in the absence of the western section of the EWR scheme and is the scenario against which the future introduction of an EWR scheme is appraised. This is shown graphically in Figure ES.6.

Figure ES.6 –The Do Minimum Rail Network



The following are a selection of the key train services in the EWR corridor that are assumed to be operating in the Do Minimum:

- 2 trains per hour Chiltern Railways Evergreen 3 Oxford - London Marylebone
- 1 train per hour Chiltern Railways Aylesbury Vale Parkway - London Marylebone
- 4 trains per hour London Midland Milton Keynes - London Euston
- 1 train per hour London Midland Bletchley - Bedford all stops
- 2 trains per hour Great Western Oxford - Reading local stopping
- 2 trains per hour Great Western Oxford - Reading fast
- 2 trains per hour Great Western Oxford – London Paddington fast

The Do Minimum also assumes that the following major projects and rail enhancement schemes are in place:

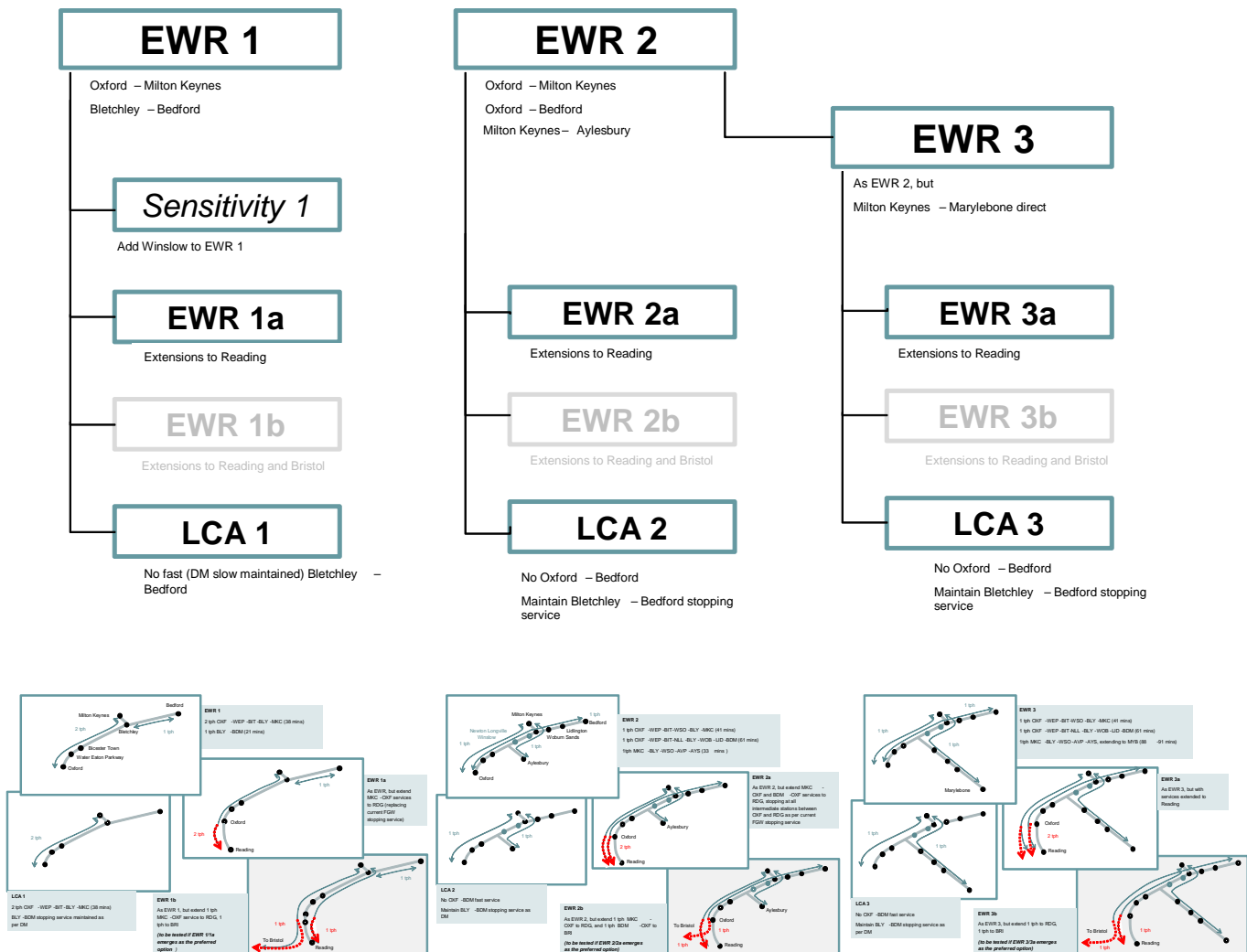
- London Crossrail 1
- Electrification of the Great Western Main Line
- Thameslink Programme

- Reading Station re-modelling
- Oxford Station re-signalling
- Bletchley Station re-modelling

Option identification and assessment

An Option Assessment process was undertaken to determine schemes to be developed and appraised in greater detail in this Outline Business Case. Options developed reflected three approaches to service delivery and associated infrastructure requirements on the EWR alignment. The approaches are shown in Figure ES.7.

Figure ES.7 – EWR Service Options considered in the Option Assessment Process



Note: The figures are for illustrative purposes only. Only a selection of key stations are shown.

The options were assessed using a multi-criteria assessment framework with results presented to, and agreed with the key EWR stakeholders. These results are presented below in Table ES.1.

Table ES.1 – Results of the Option Assessment Process

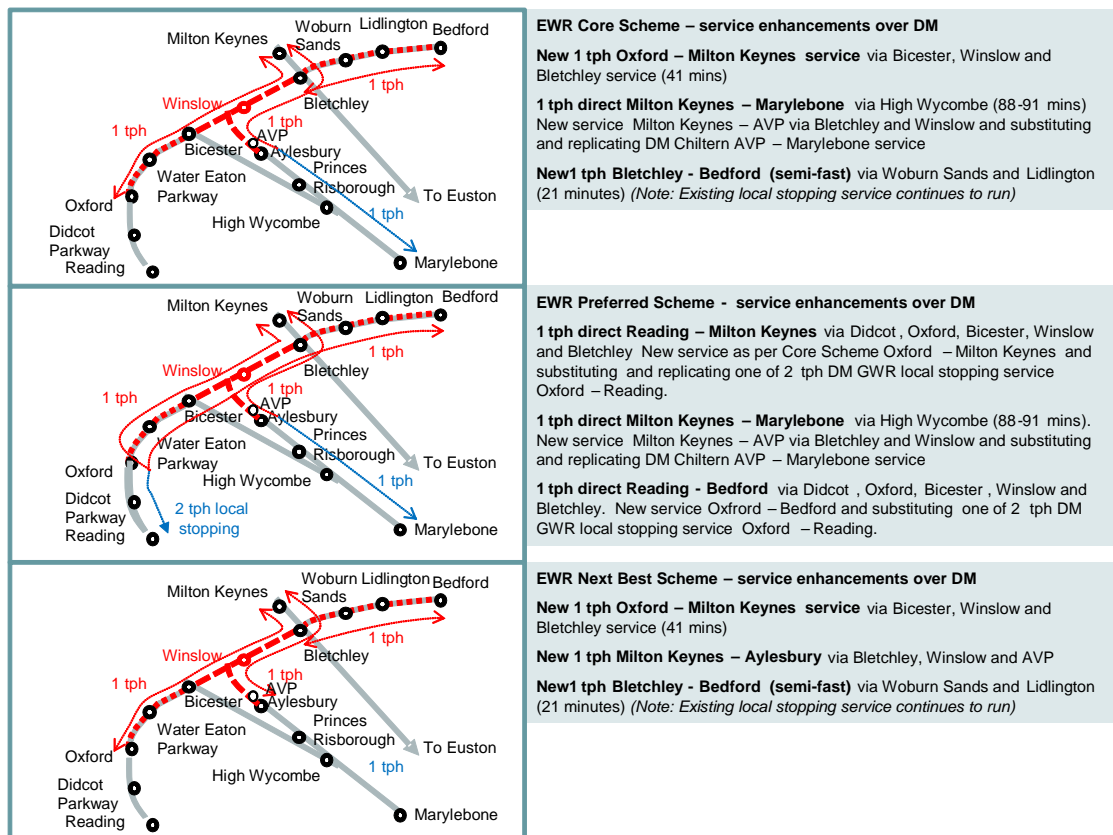
Assessment area	EWR1	EWR1A	LCA1	EWR2	EWR2A	LCA2	EWR3	EWR3A	LCA3
Capital Cost	£167m	£167m	£165m	£239m	£239m	£182m	£227m	£227m	£170m
Additional rail demand (2021 annual)	1.15m	1.37m	1.16m	2.04m	2.30m	1.67m	2.29m	2.55m	2.06m
Car trips removed (2021 annual)	0.53m	0.63m	0.53m	0.93m	1.05m	0.76m	1.05m	1.17m	0.94m
Net Rail Rev Impact (PV)	-£44m	£11m	-£63m	£11m	£115m	£75m	£47m	£217m	£120m
BCR	1.40	1.80	1.37	1.58	2.06	2.00	1.85	2.55	2.54
Strategic Fit	✓	✓	✓	✓✓	✓✓	✓	✓✓	✓✓✓	✓✓
Meeting specified objectives	✓	✓	✓	✓✓	✓✓	✓	✓✓	✓✓✓	✓✓
Meeting funding criteria	✗	✗	✗	✓✓	✓✓	✓✓	✓✓	✓✓✓	✓✓
Dependency risk (score)	5	13	3	5	15	5	11	19	9
Technical feasibility established	Yes	Mostly	Yes	Yes	Mostly	Yes	Yes	Mostly	Yes
Operational risk	Minimal	Potential	Minimal	Minimal	Potential	Minimal	Minimal	Potential	Minimal

The options assessment process identified three options worthy of further consideration and it was agreed that these should be the basis for further scheme refinement and scheme appraisal in the Outline Business Case:

- LCA 3 (or an optimised variant) as the **Core Scheme** and as a potential route to subsequently achieving EWR 3a
- EWR 3a (or an optimised variant) as the **Preferred Scheme** should deliverability and uncertainty issues in the longer-term be resolved
- LCA 2 (or an optimised variant) as the **Next Best Scheme** that would not be reliant on Chiltern service integration / extension – to be treated as the most viable alternative in the Business Case

These three options are shown graphically in Figure ES.8

Figure ES.8 – EWR Service Options to be appraised in Outline Business Case



Note: The figures are for illustrative purposes only. Only a selection of all the stations are shown.

The infrastructure requirements and associated with each scheme are summarised in Table ES.2.

Table ES.2 – Infrastructure Requirements and Costs for EWR options

	Core	Preferred	Next Best
Infrastructure Works	<ul style="list-style-type: none"> - New bay platform at Bedford Midland Station - New high level platforms at - Bletchley Station & remodelled double junction - New double track railway between Claydon Jc and Bletchley - Double existing single track section between Claydon Jc and Bicester Gavrey Jc - Renew existing single line to 90mph running between Claydon Jc and AVP - Extend Marylebone IECC to control Aylesbury-Bicester-Bletchley - New station at Winslow. New platform at AVP. Upgrades Woburn Sands, Lidlington - Expansion of car park at Water Eaton Parkway sufficient to accommodate additional demand 	<ul style="list-style-type: none"> - New bay platform at Bedford Midland Station - New high level platforms at Bletchley Station & remodelled double junction - New double track railway between Claydon Jc and Bletchley - Double existing single track section between Claydon Jc and Bicester Gavrey Jc - -Double existing single track section between Islip and Bicester MOD - Renew existing single line to 90mph running between Claydon Jc and AVP - Extend Marylebone IECC to control Aylesbury-Bicester-Bletchley - New station at Winslow. New platform at AVP. Upgrade Woburn Sands, Lidlington - Expansion of car park at Water Eaton Parkway sufficient to accommodate additional demand - Assume DMU running under OLE not an issue Oxford-Reading 	<ul style="list-style-type: none"> - New bay platform at Bedford Midland Station - New high level platforms at - Bletchley Station & remodelled double junction - New double track railway between Claydon Jc and Bletchley - Double existing single track section between Claydon Jc and Bicester Gavrey Jc - Renew existing single line to 90mph running between Claydon Jc and AVP - - Double existing single track section between AVP and Aylesbury - Extend Marylebone IECC to control Aylesbury-Bicester-Bletchley - New station at Winslow. New platform at AVP. Upgrade Woburn Sands, Lidlington - Expansion of car park at Water Eaton Parkway sufficient to accommodate additional demand

A key requirement for EWR to be successful (and generate a robust business case) will be that it offers attractive comparative journey time performance to the road based alternatives, in particular the car. As can be seen from the sample of journeys presented in Table ES.3, EWR services associated with the schemes under consideration, present very competitive journey times to those currently achievable by car. It should be noted that car journey times would be expected to worsen over time as a consequence of increased congestion, further improving the relative competitiveness of EWR services. Additionally, it should also be noted that EWR would also facilitate and improve journey times for a number of other journeys associated with other stations it would serve not listed e.g. Bletchley to Bicester Town.

Table ES.3 – Comparison of Example Journey Times between Key Locations

Location A	Location B	Existing Car*	Do Minimum Rail	EWR Core	EWR Preferred
Milton Keynes	Oxford	70 ~ 90 mins	82 mins, 1 tph (via Coventry)	41 mins, 1 tph	
	Bedford	30 ~ 40 mins	54~85 mins, 1 tph	39 mins, 1 tph (1 I/C at Bletchley)	
	Aylesbury	35 ~ 45 mins	(via London)	33 mins, 1 tph	
	High Wycombe	55 ~ 75 mins	(via London)	58 mins, 1 tph	
Bedford	Oxford	100 ~ 130 mins	(via London)	66 ~ 70 mins, 1 tph (1 I/C at Bletchley)	61 mins, 1 tph
	Aylesbury	55 ~ 65 mins	(via London)	58 mins, 1 tph (1 I/C at Bletchley)	
	High Wycombe	65 ~ 85 mins	(via London)	83 mins, 1 tph (1 I/C at Bletchley)	
Winslow	Oxford	50 ~ 60 mins	-	27 mins, 1 tph	27 mins, 2 tph
	Milton Keynes	25 ~ 35 mins	-	14 mins, 2 tph	
	Bedford	45 ~ 55 mins	-	46 mins, 1 tph (1 I/C at Bletchley)	41 mins, 1 tph
	High Wycombe	45 ~ 55 mins	-	44 mins, 1 tph	
	London	100 ~ 130 mins	-	70 ~ 73 mins, 1 tph	

I/C = Interchange

* Car times reflect existing journey time range – future year journey times would be expected to be longer reflecting increases in congestion

Forecasting and Appraisal Results

Demand, Revenue and Transport Economic Benefit Forecasts

A forecasting model was developed that complies with the DfT's requirements for forecasting rail schemes. The outputs of this model provide the key demand, revenue and change in time and distance inputs to the economic appraisal.

Demand Forecasts

Rail demand is forecast to increase by between 1.4 and almost 3 million journeys a year as a result of the implementation of the Preferred scheme. The Core scheme, with its shorter and less frequent services, is forecast to bring between one to two million passengers a year to the rail network. These forecast changes are summarised in Table ES.4

Table ES.4 – Summary of Rail Passenger Demand for the Core and Preferred Schemes

EWR Scheme	Service	Data	2017	2021	2025
Core	Oxford – Milton Keynes Milton Keynes – London Bletchley – Bedford	Rail passenger trips (million)	0.99	1.79	1.94
		<i>Of which transferred from car</i>	<i>0.55</i>	<i>1.02</i>	<i>1.12</i>
		Rail Passenger Kilometres (million)	28.99	85.71	92.42
		<i>Of which removed from highway</i>	<i>13.34</i>	<i>39.43</i>	<i>42.51</i>
Preferred	Reading – Milton Keynes Milton Keynes – London Reading – Bedford	Passenger trips (million)	1.43	2.58	2.77
		<i>Of which transferred from car</i>	<i>0.79</i>	<i>1.47</i>	<i>1.61</i>
		Passenger kilometres (million)	39.77	119.58	128.73
		<i>Of which removed from highway</i>	<i>18.29</i>	<i>55.01</i>	<i>59.22</i>

Table ES.4 shows that a significant proportion of demand is forecast to come from transfer from car and this will be reflected in journey time savings to car users.

Rail Revenue Impacts

Over a 60-year appraisal (operating) period, the Preferred scheme is estimated to generate over £300 million Present Value (PV) in 2002 prices, of revenue, while the Core scheme is estimated to generate over £200 million PV. Table ES.5 presents scheme revenue for sample years and over a 60-year appraisal period (2002 PV), with the discount rate assumed to be 3.5% per annum over the first 30 years and thereafter 3%.

Table ES.5 – Rail revenue (net UK rail) for sample forecasting years and 60-year total (£m)

Option	2017 (undiscounted, 2002 prices)	2021 (undiscounted, 2002 prices)	2025 (undiscounted, 2002 prices)	60-year total (2002 PV)
Core	5.98	11.29	12.71	220
Preferred	8.77	16.47	18.49	321

As shown above, the Preferred scheme is forecast to generate over 40% more revenue than the Core scheme, slightly more than the demand increase. This is because under the Preferred scheme, longer-distance rail travel becomes more attractive with 2 tph operating between Reading, Oxford and Bletchley.

Economic Benefits

Over a 60-year appraisal period, the Preferred scheme is estimated to generate a 2002 PV of over £700 million benefits and the Core over £500 million, out of which journey time savings provide the bulk of the benefits.

While the EWR scheme naturally benefits rail users (travelling to and from work, for leisure or on business) and thereby generates rail journey time savings, the scheme also benefits road users through decongestion, as some of the new rail passengers are diverted from car-based travel. There are a number of benefits associated with modal switch, such as savings on road infrastructure expenditure (from fewer cars using the roads), reduction of accidents (as rail is a safer mode than car), air pollution, carbon emissions and noise (as rail is less polluting and quieter than car traffic).

Table ES.6 presents the key benefits and in line with webTAG requirements, values are 2002 PV over a 60-year appraisal period.

Table ES.6 – Economic benefits over 60-years, 2002 PV, £m

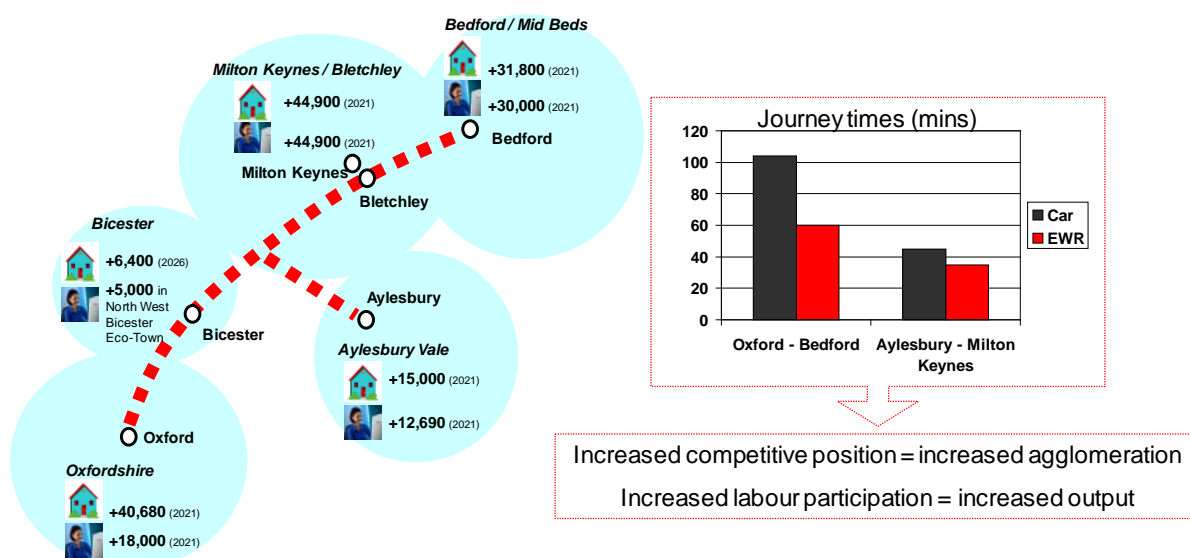
Type	Benefit	Core scheme	Preferred scheme
Journey time	Rail – consumer	168	220
	Rail – business	150	197
	Road – consumer	121	169
	Road – business	73	103
Other	Infrastructure	0.5	0.7
	Accident	3.8	5.3
	Air pollution	0.9	1.3
	Noise	0.3	0.4
	Climate change	1.4	1.9
Total		519	697

With the extension of services under the Preferred scheme, levels of benefits are greater than those forecast to be generated with the Core scheme. This is in line with the additional demand and revenue the Preferred scheme is forecast to bring compared to the Core scheme.

Potential Regional Economic Growth and Development Value Uplift Benefits

Due to the current stage in the development of the business case for EWR, we have not undertaken an in depth (quantified) analysis of the additional benefits that the western section of EWR could bring in terms of supporting regional GVA and supporting agglomeration and increased business outputs. The indicative analysis that has been undertaken and described in this chapter suggests that the western Section of EWR could contribute to the delivery of £86.5M PV of additional GVA, of which around £9M PV might be directly attributable to EWR, and potentially £22M PV (or more) in benefits to business from agglomeration and output improvements. This translates into over £30M PV overall of indicative additional economic growth benefits which could be delivered by EWR. In addition, EWR has the potential to generate very significant development and land / property uplift and release values that cannot be reasonably quantified as they will be determined by prevailing market conditions.

Figure ES.9 – Growth benefits of improved connectivity



National Rail Network Benefits

The western section of EWR will provide an important linkage between four of the country's main rail routes, these are:

- The Great Western Main Line (GWML);
- The Chiltern Main Line (CRML);
- The West Coast Main Line (WCML); and
- The Midland Main Line (MML).

Therefore, in addition to the planned services between:

- Reading to Milton Keynes,
- Reading to Bedford; and
- Milton Keynes to London Marylebone (Via Aylesbury and High Wycombe);

There is also the potential to consider longer distance Cross Country passenger services that could be made direct by running via the western section of EWR.

In addition to the potential for new passenger operations, the linkages between the main lines provides many opportunities for developing new freight routes between the Port of Southampton and destinations in the midlands, north west and north east of England and Scotland.

A preliminary analysis of potential national passenger and freight rail benefits indicates:

- EWR has the potential to increase flexibility in the routings available to cater for demand increases on Cross Country services;
- EWR could provide opportunities to provide new direct services on the NE to SW axis of movement without having to travel through the West Midlands Conurbation;
- Resilience of the rail network could be enhanced by EWR through its provision of an alternative route for NE-SW axis Cross Country services due to engineering works or unplanned incidents;
- EWR can provide additional capacity to the NE-SW route for passenger and freight services by providing a route which avoids the congested West Midlands conurbation
- EWR could potentially provide engineering access to assist with the construction and maintenance of High Speed 2

Furthermore, HS2 enhances the likelihood of the EWR infrastructure being utilised by national rail services and associated benefits being realised. In particular, it will make paths available on the remainder of the network, most notably the WCML and MML, to facilitate the introduction of new Cross Country services by way of example.

Scheme Costs

Robust estimates for scheme capital and operating costs have been prepared based on the GRIP 4 design development and agreed service specifications. A prudent approach to costing has been taken with reasonable allowances for risk included, though the scheme has not been subject to a detailed quantified risk assessment (QRA).

Capital Costs

The capital cost of the EWR schemes reflect the infrastructure works summarised in Table ES.2, The cost of the appraised schemes at 2010 prices has been estimated at:

- £178M for the Core scheme; and

- £211M for the Preferred scheme.

The above estimates are exclusive of any allowance for optimism bias (OB). The design has progressed to a stage close to completion of GRIP 4 and consequently many of the contributory factors driving OB have been mitigated or priced as part of the design. Using the GRIP 3 optimism bias level of 40% as a starting point an OB mitigation analysis has been undertaken and this established an OB level of 23% and this has been adopted in the scheme appraisal.

Operating Costs

Operating costs reflect the service specifications presented in the previous Scheme Descriptions section above with the resulting assumptions on fleet requirements and sources of costs presented in Table ES.7 below.

TableES.7 – Annual Operating Cost Assumptions and Headline Estimates

	Core	Preferred
Rolling Stock	OXF – MKC: CL166, 3 -car BLY – BDM: CL 153, 1 -car MKC – MYB: CL166, 6 -car peak, 3-car off -peak	RDG –MKC: CL166, 3 -car RDG –BDM: CL166, 3 -car MKC –MYB: CL166, 6 -car peak, 3-car off -peak
RS Costs	Leasing, Fuel and maintenance costs based on values from SDG GRIP 3 report uplifted for inflation to 2009/10 prices.	
Staffing	Based upon current average industry salaries + employment costs, pensions etc .	
Access Costs	Fixed Track Access: Based upon ORR Determination for 2009 -14 including access charge supplements. EWR costs based upon an average of FGW, LM and Chiltern FTA costs. Variable Track Access: Taken from ORR's Passenger Variable Track Usage Charge for CP4. Capacity Charges: Taken from ORR's schedule of capacity charges for CP4. Charges for Reading Oxford based upon average cost of Reading – Oxford suburban service groups. Charges for WCML based upon average cost of London Midland's London – Northampton service group.	
Stations	A new station is assumed at Winslow together with platforms and facilities for Bletchley High Level. The annual cost of these has been based upon the average station costs paid by FGW, LM and Chiltern published by the ORR.	

Operating Annual net operating costs (2010 prices), inclusive of fleet costs and accounting for savings due to assumed substitution of services, are estimated at:

- £11.6M for the Core Scheme; and
- £17.8M for the Preferred Scheme.

Headline Economic Appraisal Results

Central Case Results

Over a 60-year appraisal period, and adopting DfT growth assumptions, it is estimated that all the schemes offer high value for money, with BCRs of over 3:1. At the same time, they are likely to have a positive net rail revenue impact (change in UK rail revenue net of changes in operating costs).

Table ES.8 details the key appraisal outputs for the core and preferred schemes that were appraised.

**Table ES.8 – Core and Preferred scheme appraisal results,
60-year appraisal period, £million, 2002 PV (latest WebTAG calculation methodology)**

Element	Core	Preferred
Net rail revenue	33	52
PV of TEE benefits	512	687
Broad Transport Budget	103	108
PV of All Monetised Benefits	508	682
Net Present Value (NPV)	405	574
Benefit Cost Ratio (BCR)	4.94	6.30

Using central case assumptions, both the Core and the Preferred schemes are likely to return positive net rail revenue (rail revenue minus operating costs), in the range of £33 million (2002 PV) for the Core scheme and £52 million for the Preferred. Both options are likely to offer high value-for-money with BCRs of 4.94 for the Core scheme and 6.30 for the Preferred, before 3rd Party funding contributions have even been considered.

Sensitivity Tests around the Central Case

A number of sensitivity test have been carried out with respect to the Core and Preferred schemes and the results are presented in Table ES.9 in the next page.

3rd Party funding reduces the cost to government. If 15% of investment costs can be funded from non-government sources, then the BCRs would improve to over 7. This is one of the most significantly positive sensitivity tests presented. Sensitivity analysis indicates both Preferred and Core schemes offer a robust economic appraisal case to key areas of risk and uncertainty – growth, bus competition, mode transfer and cost escalation.

Phased Implementation

The specification of the Core and Preferred scheme's are compatible and lend themselves to a potentially 2-phased approach to EWR implementation, with the Core scheme being implemented as phase 1, and infrastructure and services then upgraded to deliver the Preferred scheme specification in Phase 2. This has the potential to address and mitigate potential funding and dependency risks issues discussed later.

An economic appraisal has been undertaken assuming delivery of the Core scheme for start of operation in 2017 followed by upgrades to infrastructure, most notably implementation of double track between Islip and Bicester Town. Phase 2 is assumed to be operational in 2025. Capital costs, over and above the Core scheme, are assumed to be incurred in 2023 and 2024 and subject to a 10% premium to reflect the fact that there will be additional costs involved in delivering additional works retrospective of implementing the Core scheme. Rail demand is assumed to grow beyond 2025 but is capped at 2030.

Phased implementation as outlined is forecast to deliver a strong economic case, with a BCR exceeding 6 and better than that for the Core scheme alone and comparable to that for the Preferred scheme implemented in 2017. This is adopting consistent rail growth assumptions for all three schemes.

Table ES.9 – Key outputs from sensitivity tests, 60-year appraisal period, £m, 2002 PV

	Core			Preferred		
	Net Rail revenue	NPV	BCR	Net Rail revenue	NPV	BCR
Central case	33	405	4.94	52	574	6.30
Third Party funding at 15%	33	425	7.93	52	597	11.12
Demand cap @ 2030	48	457	6.23	74	642	8.40
No worsening in road congestion	28	388	4.59	45	549	5.74
Car-abstraction-based benefit @ 50%	33	310	4.01	52	440	5.05
Bus / coach competition	32	402	4.87	51	569	6.18
No planning growth	-27	191	2.17	-31	291	2.52
Combined low case 5%	22	389	4.25	36	551	5.22
Combined low case 10%	11	371	3.70	20	527	4.42
Combined high case 5%	44	421	5.83	68	594	7.78
Combined high case 10%	55	435	6.99	84	613	9.94
Halving business user time benefits	33	587	3.86	52	424	4.92
Gravity Model 20% GJT cut off	67	487	8.15	98	678	11.83
Gravity Model 40% GJT cut off	14	358	3.93	25	506	4.74
40% optimism bias (Capex)	33	386	4.18	52	551	5.22

The Planned Growth Scenario Results

As discussed EWR may help to boost growth, contributing to the delivery of planned housing and employment opportunities, over and above those included under the central case. This highlights a difference between target growth as reflected in regional and local planning policy documents and current DfT transport demand projections that reflect a more cautious perspective. It is considered essential that the business case for the western section of EWR recognises the scope of potential linkages between new developments and the new stations/services provided by EWR. Therefore an alternative planning scenario reflecting planned and target levels of development within 3km of EWR stations was developed. This drew on information secured from the HCA and local planning authorities.

The preferred funding strategy aims to obtain 3rd Party contributions from private developers in respect of those developments which would benefit from the operation of services and potentially new stations on the western section of EWR. This recognises that a key driver for EWR is supporting and encouraging economic growth and developments locally. The extent to which growth might take place out with TEMPRO forecasts is uncertain and the quantum of the 3rd Party contributions is difficult to assess, given the uncertainty surrounding long term development trends and variations between LDFs. In this context, an alternative Planned Growth scenario to the Central Case was also developed to better reflect the potential relationship between the scheme and developing LDFs. This assumes the provision of a further new station at Newton Longville serving a major proposed development nearby. In this Scenario a notional level of 3rd Party contributions towards the cost of EWR has also been assumed to have been secured along the route. The Planned Growth scenario offers an alternative basis for appraisal that better reflects the aims and objectives of the planning authorities for EWR and land-use development along the corridor it is to serve.

The ultimate business case assessment that will be developed through to programme entry in the autumn will reflect a potential range of 3rd Party contributions further informed by discussions with the relevant planning authorities.

In the context of this scenario, a new station at Newton Longville, for which passive provision is assumed under the central case scenario, is assumed to be in place as a new station in addition to Winslow station, from the year of opening in 2017. Comparison of this scenario to the central case headline economic appraisal results reasonably indicates whether the inclusion of a new station at Newton Longville enhances the overall economic case, as it recognises the development driver for its inclusion as part of EWR. Table ES.10 below presents the headline economic appraisal results under this scenario:

Table ES.10 – Key appraisal outputs for EWR under Planned-Growth Scenario including a new station at Newton Longville, 2002 PV, £m

Element	Core	Preferred
Net rail revenue	36	50
PV of TEE benefits	450	616
Broad Transport Budget	59	63
PV of Benefits	447	611
Net Present Value (NPV)	387	548
Benefit Cost Ratio (BCR)	7.51	9.69

Economic impact of the provision of new stations

The majority of benefits in business cases of this type rely significantly on reduction in journey times between locations. Stops between locations will increase journey times and therefore reduce the benefits achievable by EWR as measured by time savings. The amount of change will depend on the number of additional stops and the number of individuals wishing to use the service at those additional stops. At the same time, revenue will either increase or decrease depending on the relative time savings/loss to customers on the route. Also, developer contributions are likely to increase if additional stops are well located in relation to developments, though the cost of providing the stations also needs to be accounted for. This can affect the net cost to government reflected in the BCR calculation.

The relative movement between these factors will influence the BCRs. This will provide a tangible way of understanding the trade-off between fewer stations and faster journey times versus the inclusion of additional stations with increased capital costs and reduced benefits due to slower journey times but with additional 3rd Party contributions

Thus far the specification of the Core and Preferred schemes has in fact assumed one new station, notionally located at Winslow, on the basis that Winslow is already a sizeable settlement that would generate custom for EWR and that a site for a station has been protected for many years, is the subject of a Local Plan allocation and is reserved as part of an existing outline planning permission. During the further development of the business case leading up to programme entry it will be necessary to demonstrate the strength of case for the proposed new stations at Winslow and at Newton Longville.

NATA appraisal against DaSTS goals and assessment against strategic policy and specified objectives for intervention

An overall assessment against the Government's DaSTS goals in keeping with the latest DfT New Approach to Appraisal (NATA) webTAG guidance has been undertaken. This has captured, in addition to the results of economic appraisal, preliminary assessment and analysis with respect to potential environmental, safety, accessibility and social and distributional impacts.

With regards the scheme's overall performance in meeting DaSTS goals, the Preferred scheme is very similar to the Core scheme reflecting the largely common alignment and infrastructure. Areas of difference reflect the Preferred scheme's higher demand, revenue and economic benefit performance noted previously and related benefits in terms of improving connectivity and accessibility. Neither scheme is assessed as generating any significant adverse impacts.

The Appraisal Summary Table (ASTs) for the Core and Preferred schemes are presented at the end of this Executive Summary as Tables ES.15 and ES.16 respectively.

With respect to strategic policy fit and meeting the specified objectives for intervention, both the Core and Preferred schemes may be viewed as performing very well and exhibiting an excellent strategic fit, with the Preferred scheme presenting a particularly strong case in this respect, reflecting the extended regional scope and connectivity it would deliver. Table ES.11 below summarises the assessment of the Core and Preferred schemes against the specific intervention objectives:

Table ES.11 – Assessment of the Core and Preferred Schemes against the Rail Intervention Objectives

Objective	Preferred Scheme	Core Scheme
Enhance the capacity of the rail network to support planned growth	✓✓✓	✓
Contribute to improving highway network efficiency and resilience through reducing car traffic through mode shift from highway to rail	✓✓✓	✓✓
Improve access and links by rail within, to and from the study area to opportunities across the E-W orbital growth arc	✓✓✓	✓✓
Improve rail's competitiveness to affect mode shift and in doing so reduce emissions, improve the environment, quality of life and safety	✓✓✓	✓✓
Provide a faster and more convenient alternative for rail users for connecting between mainline radial rail routes out of London	✓✓✓	✓
Improve the overall utilisation and value to the rail industry derived from rail infrastructure, services and assets	✓✓✓	✓✓
Enhance the opportunity for, and efficiency and reliability of delivering freight by rail	✓✓✓	✓✓

Key: ✖ = Fails to meet objective ✓ = Partially meets objective ✓✓ = Meets objective ✓✓✓ = Best meets objective

Appraisal of Alternatives: the Next Best Scheme

Non rail alternatives have not been considered as these have been subject to previous LTP and Regional Transport Strategy consideration and are currently subject to separate consideration as part of Regional DaSTS studies. There is strong support for the delivery of a rail based intervention in the relevant studies and reports.

As discussed in the Scheme Descriptions section, an option assessment exercise was undertaken that considered a range of possible configurations for rail intervention and identified Core and Preferred schemes. In addition, a Next Best scheme was identified and this is considered the appropriate alternative to consider against the Core scheme in particular.

The Next Best Option largely replicates the Core scheme, but with the service from Milton Keynes terminating at Aylesbury rather than continuing on to High Wycombe and London. While this option avoids any operational integration with Chiltern Railways and therefore introduces less deliverability risk, it does as a consequence involve a higher capital cost reflecting the need for turn-back facilities at Aylesbury, while also failing to provide the direct rail travel opportunities south of Aylesbury afforded by the Core scheme. The estimated capital costs is £191M and the estimated operating annual net operating costs is £8.7M (2010 prices).

Consequently, the scheme will generate lower demand, revenue and benefits compared to the Core scheme. Nevertheless, the scheme still offers positive net rail revenue and a good BCR just exceeding 3.

Examining the scheme's overall performance in meeting DaSTS goals, it is very similar to the Core scheme reflecting the largely common alignment and infrastructure. Areas of difference reflect the scheme's lower demand, revenue and economic benefit performance noted previously. Table ES.17 at the end of the Executive Summary presents the AST for the Next Best scheme.

When assessed against current policy and strategy and rail intervention objectives it is clear that the Next Best scheme does not perform as well as the Core scheme, and is not an attractive alternative overall, though it is a potentially viable and deliverable scheme.

Funding

The availability of funding to enable the implementation of the western section of EWR is currently unclear. Whatever the result of the coming election there is going to be uncertainty regarding the availability of government funding until the completion of a Comprehensive Spending Review (CSR).

The imperative for whoever forms the next government is to reorganise the public sector finances to both reduce the structural deficit and reduce the national debt. This is likely to require reductions in government expenditure over the lifetime of the next parliament (and potentially the one after that as well).

Capital expenditure across all government departments is likely to be closely scrutinised and prioritised based upon the outcomes that the government seeks to achieve.

The Core and Preferred EWR schemes could potentially be in a good position to secure future capital funding even in this funding constrained environment. This is due to the breadth of potential funding sources the scheme can target and the extent to which the associated funding criteria are met:

- The scheme aligns very closely with strategic policy at a national, regional and local level
- The scheme presents a very strong rail industry case that could unlock funding of a commercial nature through the RAB mechanism as well as justifying significant DfT Rail funding, potentially through HLOS for CP5
- EWR can help to support the delivery of jobs and employment within the study area and consequently meet key associated funding criteria, as would the potential contribution the scheme could make to enhancing GVA through wider economic benefits, such as agglomeration

- There are significant societal benefits and the scheme will contribute towards carbon reduction targets and an overall increase in the efficiency of the local transport networks
- The scheme's alignment and service specification provides significant scope to uplift development and land/property value which in turn could be translated into a substantial 3rd Party / local contribution funding stream

Based on the capital cost estimates, adopting a range of possible inflation rates and making an allowance for optimism bias, the outturn funding requirement can be viewed as ranging from £200M to £250M for the Core scheme and £240M to £300M for the Preferred Scheme. This assumes funding is required to support spend in years 2013/14-2016/17, with the bulk being required from 2015/16, by which time the public finances may be in a better position than they are presently.

Delivery

The assessment of the deliverability of appraised EWR schemes suggests that the Core scheme best meets all deliverability areas and potentially provides a sound basis for progression to the Preferred scheme at a later date. Most notably, in the current financial environment, it is the most affordable scheme.

The Preferred scheme currently has significant areas of uncertainty and dependency risk associated with it. Further scheme development would be expected to address some of these issues though programme risk associated with dependency on the delivery of other rail projects remains a major issue.

Table ES.12 below summarises the delivery assessment:

Table ES.12 – Deliverability assessment of appraised EWR schemes

Assessment area	Preferred Scheme	Core Scheme
Affordability	✓	✓✓✓
Meeting funding criteria	✓✓✓	✓✓✓
Dependency risk (score)	19	9
Technical feasibility established	Mostly	Yes
Operational feasibility risk	Significant	Limited
Stakeholder support	✓✓✓	✓✓

With respect to forward programme, there is a realistic prospect of scheme delivery by 2017, though there are a number of major hurdles and stage gates to be negotiated. The key imperative initially is to secure a firm commitment to the scheme within regional (RFA) and DfT Rail (HLOS for CP5) spend programmes for the period 2014/15 and beyond, and this will be subject to approval of a "Programme Entry" business case that needs to be submitted in 2010. Table ES.13 presents the indicative forward programme and stage gate schedule

A number of possible delivery models for EWR have been discussed in the past and there is a need to establish a credible preferred option on which to base future scheme development. An emerging and possibly attractive option appears to be the adoption of a similar delivery model to that applicable to the Evergreen 3 project, though this would require accepting early the engagement with a preferred operator in Chiltern Railways.

Table ES.13 – Indicative High Level Forward Programme & Stage Gates

Programme Item / Stage Gate	Date
Regional DaSTS Stage 1: identifies EWR as a core RFA option to DfT	April 2010
Preferred Delivery Model identified	August 2010
Preliminary Funding Model identified	August 2010
Detailed “Programme Entry” Business Case submitted	Autumn 2010
DaSTS Stage 2 complete and confirms EWR as core RFA scheme	April 2011
RFA allocations for period 2014/15 onwards agreed with DfT	2011
“Programme Entry” secured	2011
EWR Identification in HLOS for CP5	2012
Detailed design to support planning / procurement complete (GRIP 5)	2012
Commence agreed Statutory Approvals / Planning process	2012
Statutory Approvals / Planning process complete	2013
Complete market testing, secure EOIs	2013
Procurement / contract documentation developed	2013
Detailed funding model agreed, including “Local Contribution”	2013
Detailed “Conditional Approval” Business Case submitted	2013
Conditional Funding Approval secured	2013
Issue Invitation to Tender	2013
DfT EWR franchise specification established	2014
Procurement – final contract price / programme agreed	2014
Detailed “Full Approval” Business Case submitted	2014
“Full Approval” secured	2014
Infrastructure contract let	2015
EWR Franchise let	2016
Design, build and commissioning complete	2017
EWR services in operation	2017

Overall Conclusions

The Outline Business Case for EWR presented in this report enables a number of key overall conclusions to be drawn:

- There is a very clear and strong justification for intervention within the corridor the EWR scheme will serve, focussed on contributing to and addressing the key challenges associated with delivering planned housing and employment growth in a sustainable fashion, and opportunities to enhance and better utilise national rail infrastructure. There is a clear rationale for intervention to focus on rail alongside other complimentary interventions to be developed as part of overall regional transport strategies.
- An agreed set of objectives have been identified that are aimed at meeting the key challenges and that have been demonstrated to closely align with the Government's DaSTS goals for transport.
- GRIP 4 design development has provided a sound basis for scheme specification, costing, forecasting and detailed appraisal. A broad range of rail options have been considered and assessed, providing a sound basis for the identification of the Core, Preferred and Next Best EWR schemes subsequently appraised in detail.
- The EWR scheme specifications indicate that EWR should provide a highly competitive alternative to the car that significantly improves public transport connectivity between the centres of Milton Keynes, Bletchley, Oxford, Bedford and Aylesbury and beyond. This is reflected in forecast annual demand of 1.8 and 2.6 million a year in 2021 for the Core and Preferred schemes respectively of which 1.0 and 1.5 million trips respectively would be transfers from car. Demand for EWR will translate into very significant forecast rail revenues of £11.3 and £16.5 million by 2021 (2010 prices).
- Economic benefits have been calculated in a DfT compliant fashion. Over a 60-year appraisal period the Core Scheme is forecast to generate economic a 2002 PV of benefits in excess of £500M with the Preferred Scheme forecast to generate close to £700M. The majority of these benefits are journey time savings to passengers using EWR services and road decongestion journey time benefits to highway users.
- In addition to these benefits, EWR has the potential to deliver sizable additional benefits with respect to contributing to regional economic growth and generating development value uplift, and further national rail passenger (Cross Country) and freight benefits through use of EWR for these purposes. Implementation of HS2 would enhance the potential for such benefits to be realised. These benefits have not been included in the economic appraisal of the EWR schemes and would potentially significantly further enhance the overall economic case.
- Robust estimates for scheme capital and operating costs have been prepared based on the GRIP 4 design development and agreed service specifications. A prudent approach to costing has been taken with reasonable allowances for risk included and optimism bias applied to a level reflecting the current stage of scheme development. The capital cost of the EWR schemes, at 2010 prices excluding optimism bias, is estimated at £178M for the Core scheme, £211M for the Preferred scheme and £191M for the Next Best scheme. Annual net operating costs (2010 prices), inclusive of fleet costs, are estimated at £11.6M, £17.8M and £8.7M for the Core, Preferred and Net Best schemes respectively.
- The Preferred, Core schemes present a very strong economic and financial business case and meet key funding criteria. Both schemes have the potential to deliver very good value for money, presenting benefit to cost ratios significantly exceeding 4, while also generating a sizable positive net UK rail revenue impact.
- Sensitivity tests indicate that both Preferred and Core schemes are robust to key areas of risk and uncertainty – growth, bus competition, mode transfer and cost escalation.
- Phased implementation of EWR, based on implementation of the Core scheme in 2017 followed by an upgrade of infrastructure and introduction of Preferred scheme services in 2025, presents a strong

economic case, with a BCR exceeding 6. The scheme's economic case is better than that for the Core scheme alone and comparable to that for the Preferred scheme, assuming both are operational in 2017. Implementation of EWR in this fashion has the potential to address and mitigate potential affordability and dependency risks issues identified.

- In terms of overall assessment against the DfT's DaSTS goals and assessment against associated challenges, neither the Core or Preferred scheme present any significant adverse impacts with respect to any of the challenges, including environment impact. The primary differentiator is the delivery of economic benefits relative to costs as presented by the economic appraisal.
- With respect to strategic policy fit and meeting the specified objectives for intervention, both the Core and Preferred schemes may be viewed as performing very well and exhibiting an excellent strategic fit, with the Preferred scheme presenting a particularly strong case.
- Appraisal of the Next Best scheme as an alternative to Core and Preferred schemes demonstrates that this scheme delivers significantly poorer economic and financial returns on investment, though it nevertheless would still represent good overall economic value for money with a BCR exceeding 3. The scheme also fails to meet strategic policy objectives or the specified objectives for intervention as successfully as the Core or Preferred schemes.
- A review of funding sources has been undertaken and suggests that EWR has the potential to meet key funding criteria and consequently demonstrate value and secure contributions from a number of sources. This reflects the breadth of and scale of benefits the scheme is forecast to deliver. At this point in time however a clear view on a potential funding package has yet to be determined.
- Based on the capital cost estimates, adopting a range of possible inflation rates and making an allowance for optimism bias, the outturn funding requirement can be viewed as ranging from £200M to £250M for the Core scheme and £240M to £300M for the Preferred Scheme, with funding assumed to be spent in years 2013/14-2016/17.
- An assessment of deliverability of the appraised schemes highlights the challenges that the Preferred scheme in particular poses given its higher cost, lower level of design development and the high level of dependency risk reflecting its reliance on the delivery of other rail proposals still at the planning stage in some cases. These deliverability risks could be significantly mitigated if the scheme is viewed as a potential follow-on EWR phase building on prior implementation of the Core scheme and the appraisal of such a scenario presents a strong case.
- An indicative high level forward programme and stage gate schedule has been prepared and this suggests that delivery of EWR for operation of services in 2017 is possible. However, the programme highlights the need to secure a commitment in forward Government (DfT Rail, CLG) spend programmes in the first instance.
- An initial consideration of delivery models suggests that a number of routes remain for detailed assessment but that a preferred route replicating that adopted for Evergreen 3 may be emerging as a potential preferred option given the emergence of the Core and Preferred schemes as best performing and their need for effective integration with Chiltern Railways operations.

Table ES.14 presents a business case summary for the Core and Preferred schemes. The Appraisal Summary Tables for each are provided at the end of this Executive Summary.

Table ES.14 – EWR Scheme Business Case Summary

Business Case Aspect	Core Scheme	Preferred Scheme
Capital Cost (@ 2010 prices)	£178m	£211m
Indicative Level of Outturn Funding Required (assumed to be in years 2015-2017)	£200m-£250m	£240m-£300m
Net Annual Operating Cost (@ 2010 prices)	£11.6m	£17.8m
Additional rail demand (2021 annual forecast)	1.79m	2.58m
Car trips removed (2021 annual forecast)	1.02m	1.47m
All monetised economic benefits (2002 prices PV – discounted over 60 year operating period)	£508m	£682m
Net Rail Rev Impact – revenue minus operating costs (2002 prices PV – discounted over 60 year operating period)	£32m	£51m
BCR* (*cost to Government – assumes EWR schemes are 100% Government funded)	4.94	6.30
Strategic Fit – against National, Regional and Local Policies	✓✓	✓✓✓
Meeting specified objectives that address identified challenges	✓✓	✓✓✓
Meeting funding criteria	✓✓✓	✓✓✓
Dependency risk (score) – reliance on other projects	9	19
Technical feasibility established – design confidence	Yes	Mostly
Operational feasibility risk – confidence on delivery of specified timetable and interfaces with other services	Limited	Significant
Stakeholder support – reflecting Stakeholder engagement	✓✓✓	✓✓✓

Next Steps

In order to progress EWR, and in particular address requirements to secure the necessary Government commitment to make delivery of the scheme possible, a number of tasks need to be progressed:

- Respond to DfT/stakeholder responses and any requests for further analysis
- Design development – establish the performance and cost implications of minimising single track operation on the scheme
- Address a number of key areas to secure “Programme Entry”
 - Strategic Case – update to reflect any revisions to transport policy and goals, and planned growth and development following abolition of Regional Spatial Strategies
 - Value for Money (VfM) Case – update forecasting and appraisal as necessary to reflect revised views on growth / development, more detailed design, operational and timetable analysis and any associated cost and benefit implications
 - Financial and Funding Case
 - Undertake a detailed quantified risk analysis and update cost estimates and estimates of outturn funding requirement accordingly
 - Establish a likely funding model supported by the key stakeholders, including establishing current potential for 3rd Party and local contributions
 - Delivery Case
 - Establish the preferred management and delivery model for the scheme and develop an initial detailed project plan to scheme delivery
 - Identify the preferred statutory powers and planning process to be pursued with respect to EWR
 - Commercial Case – establish a preferred procurement and contractual model for the scheme
 - Secure a view on public support for the scheme
- Ongoing lobbying / maximising stakeholder and political support

It is anticipated that completing these tasks will facilitate delivery of a comprehensive “Programme Entry” submission to the DfT later this year.

Appraisal Summary Tables

Tables ES.15, ES.16 and ES.17 provide the Appraisal Summary Tables for the Core, Preferred and Next Best options respectively.

Table ES.15 – AST for the Core scheme

Appraisal Summary Table		Description: New and upgraded rail infrastructure, including new station at Winslow, facilitating introduction of new services between Milton Keynes, Oxford, Bedford, Bletchley and Aylesbury. New 1 tph direct services between Milton Keynes and Oxford and Bedford and Bletchley - assumed extension of Chiltern services between Marylebone to Aylesbury to Milton Keynes. Bedford - Milton Keynes journey via enhanced interchange at Bletchley.		Date & Contact: 02/06/2010
GOAL	CHALLENGE	KEY POINTS	METRICS	ASSESSMENT
TACKLE CLIMATE CHANGE	Reduce greenhouse gas emissions	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres and thereby decrease in carbon emissions. The additional carbon emissions resulting from the new rail services are considered negligible.		PVB £1.4M
SUPPORT ECONOMIC GROWTH	Improve reliability	Modal shift from private car to rail will result in a decrease in the traffic volumes during peak periods reducing reduced congestion and improve journey reliability.	Not formally quantified	Beneficial
	Improve connectivity	The provision of the East West Rail will improve connectivity by providing an alternate route for east to west movements. Also improving the re routing of inter city commuting in the area reducing the need for interchanging at London Stations - significant TEE benefits generated.	TEE benefits	PVB £508M
	Support the delivery of housing	The East West Rail proposal will provide an additional link across the area and thereby support proposed growth in housing in Milton Keynes and the surrounding area.	Not formally quantified	Beneficial
	Enhance resilience	The western section of EWR will enhance the overall level of resilience within the national rail network. It provides an alternative route for NE-SW axis Cross Country services and provides an important diversionary route for freight services.	Not formally quantified	Beneficial
PROMOTE EQUALITY OF OPPORTUNITY	Wider (economic) impacts	The EWR proposal will contribute to wider economic impacts by improving access to forecasted employment growth areas. A combination of agglomeration and increased outputs will have an overall beneficial effect.	Not formally quantified	Beneficial
	Improve accessibility	The EWR will promote access to households with limited access to a car and other forms of public transport. Reflected in TEE benefits.	TEE benefits	See "Improve connectivity" Beneficial
	Improve affordability	The provision of the rail proposal will provide a competitive alternative to travel from all road modes. The savings on time and actual cost will improve affordability in the area.		Beneficial
	Reduce severance	The EWR proposal uses existing lines and does not increase severance. The impact is therefore neutral.		Neutral
IMPROVE QUALITY OF LIFE & PROMOTE A HEALTHY NATURAL ENVIRONMENT	Enhance regeneration	No major designated regeneration areas through expanding the public transport network facilitating access to housing and jobs for pockets of deprivation that do exist.		Neutral
	Reduce regional economic imbalance	The route passes through areas of lower economic activity. Connecting these areas to the strong economic centres of Oxford, Milton Keynes and Bedford will improve the economic balance of the region.		Moderate Beneficial
	Reduce exposure to noise	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres reducing the impact of noise along these corridors. There will be some increases in noise locally as a result of construction and operation of the line.		PVB £0.3M
	Minimise impact on biodiversity	There is no identified biodiversity problems for construction within the scheme boundary but further investigation is required especially as the scheme is close to four SSSI locations.		Neutral
BETTER SAFETY, SECURITY & HEALTH	Minimise impact on the water environment	The impact on the water environment has been considered in the Atkins September 2009 report and the potential impact on the water environment can be reasonably mitigated by applying appropriate mitigation measures.		Neutral
	Minimise impact on heritage	There is no direct impact on the construction of EWR on heritage sites. Further investigation is required to see whether they are affected by dust or vibration from construction.		Neutral
	Minimise impact on landscape	As the proposal utilises an existing rail alignment there are not considered to be any landscape impacts. It is anticipated that any impact due to the new stations can be mitigated in the design process.		Slight Beneficial
	Improve experience of travel	It is anticipated that there will be a significant improvement in the experience of travel for those people shifting mode from car to rail.		Beneficial
IMPACT ON PUBLIC ACCOUNTS	Improve the urban environment	The construction of the new stations is predicted to enhance and improve the urban environment.	Not formally quantified	Beneficial
	Improve access to leisure	The EWR will promote access to leisure activities in the major centres of Oxford, Milton Keynes and Bedford for age groups dependent on public transport. It will also provide access to the country side for the residents of the larger Cities in safety		Beneficial
	Reduce the risk of death or injury	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres and thereby an improvement in safety		PVB £3.8M
	Improve health through physical activity	There will be an improvement to health through physical activity as a result of walk and cycle trips to access the services and through improved access to the countryside from the larger urban centres.	Not formally quantified	Slight Beneficial
IMPACT ON PUBLIC ACCOUNTS	Reduce air quality health costs	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres but this is unlikely to be enough on any specific corridor to show any significant improvement in air quality health benefits. The impact of the new rail services is considered negligible.		PVB £0.9M
	Reduce vulnerability to terrorism	The EWR has no benefits or dis-benefits to reducing vulnerability to terrorism.		Not assessed
	Reduce crime	The EWR proposal will improve security at existing stations.		Slight Beneficial
	Broad transport budget			PVB £1.03M
IMPACT ON PUBLIC ACCOUNTS	Wider public finance impacts		Net Rail revenue = 351 Rail user benefits = 318 Road Decongestion Benefits = 194 Infrastructure Benefits = 0.5 Indirect Taxation = 10	Total TEE PVB = 508 (Inclusive of all above) TEE, indirect tax, air quality, Greenhouse gases, Noise and Safety BCR = 4.94 NPV = 405
	All monetised values in 2002 prices and values.	Business and consumer users experience travel time benefits resulting from the reduced journey times provided by the East - West Rail. Transport providers experience ongoing operating costs which are more than offset by increased revenue resulting from additional trips using the East - West Rail.		

Table ES.16 - AST for the Preferred scheme

Appraisal Summary Table		Description: New and upgraded rail infrastructure, including new station at Winslow, facilitating introduction of new services between Reading, Milton Keynes, Oxford, Bedford, Bletchley and Aylesbury - provides services between Milton Keynes and Bedford to Reading via Oxford (1 tph). Assumes extension of Chiltern service (1 tph) between Marylebone to Aylesbury to Milton Keynes. Bedford - Milton Keynes journey via enhanced interchange at Bletchley.		Date & Contact: 02/06/2010	
GOAL	CHALLENGE	KEY POINTS	METRICS	ASSESSMENT	
TACKLE CLIMATE CHANGE SUPPORT ECONOMIC GROWTH	Reduce greenhouse gas emissions	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres and thereby decrease in carbon emissions. The additional carbon emissions resulting from the new rail services are considered negligible.	Not formally quantified	PVB £1.9m	
	Improve reliability	Modal shift from private car to rail will result in a decrease in the traffic volumes during peak periods reducing congestion and improve journey reliability.		Beneficial	
	Improve connectivity	The provision of the East West Rail will improve connectivity by providing an alternate route for east to west movements. Also improving the re routing of inter city commuting in the area reducing the need for interchanging at London Stations - significant TEE benefits generated.	TEE benefits	PVB £662M	
	Support the delivery of housing	The East West Rail proposal will provide an additional link across the area and thereby support proposed growth in housing in Milton Keynes and the surrounding area.	Not formally quantified	Beneficial	
PROMOTE EQUALITY OF OPPORTUNITY	Enhance resilience	The western section of EWR will enhance the overall level of resilience within the national rail network. It provides an alternative route for NE-SW axis Cross Country services and provides an important diversionary route for freight services.	Not formally quantified	Beneficial	
	Wider (economic) impacts	The EWR proposal will contribute to wider economic impacts by improving access to forecasted employment growth areas. A combination of agglomeration and increased outputs will have an overall beneficial effect.	Not formally quantified	Beneficial	
	Improve accessibility	The EWR will promote access to households with limited access to a car and other forms of public transport.	TEE benefits	See "improve connectivity"	
	Improve affordability	The provision of the rail proposal will provide a competitive alternative to travel from all road modes. The savings on time and actual cost will improve affordability in the area.		Beneficial	
IMPROVE QUALITY OF LIFE & PROMOTE A HEALTHY NATURAL ENVIRONMENT	Reduce severance	The EWR proposal uses existing lines and does not increase severance. The impact is therefore neutral.		Neutral	
	Enhance regeneration	No major designated regeneration areas though expanding the public transport network facilitating access to housing and jobs for pockets of deprivation that do exist.		Neutral	
	Reduce regional economic imbalance	The route passes through areas of lower economic activity. Connecting these areas to the strong economic centres of Oxford, Milton Keynes and Bedford will improve the economic balance of the region.		Moderate Beneficial	
	Reduce exposure to noise	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres reducing the impact of noise along these corridors. There will be some increases in noise locally as a result of construction and operation of the line.		PVB £0.4m	
BETTER SAFETY, SECURITY & HEALTH	Minimise impact on biodiversity	There is no identified biodiversity problems for construction within the scheme boundary but further investigation is required especially as the scheme is close to four SSSI locations.		Neutral	
	Minimise impact on the water environment	The impact on the water environment has been considered in the Atkins September 2009 report and the potential impact on the water environment can be reasonably mitigated by applying appropriate mitigation measures.		Neutral	
	Minimise impact on heritage	There is no direct impact on the construction of EWR on heritage sites. Further investigation is required to see whether they are affected by dust or vibration from construction.		Neutral	
	Minimise impact on landscape	As the proposal utilises an existing rail alignment there are not considered to be any landscape impacts. It is anticipated that any impact due to the new stations can be mitigated in the design process.		Slight Beneficial	
IMPACT ON PUBLIC ACCOUNTS	Improve experience of travel	It is anticipated that there will be a significant improvement in the experience of travel for those people shifting mode from car to rail.		Beneficial	
	Improve the urban environment	The construction of the new stations is predicted to enhance and improve the urban environment.		Beneficial	
	Improve access to leisure	The EWR will promote access to leisure activities in the major centres of Oxford, Milton Keynes and Bedford for age groups dependant on public transport. It will also provide access to the country side for the residents of the larger Cities	Not formally quantified	Beneficial	
	Reduce the risk of death or injury	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres and thereby an improvement in safety		PVB £5.3M	
IMPACT ON PUBLIC ACCOUNTS	Improve health through physical activity	There will be an improvement to health through physical activity as a result of walk and cycle trips to access the services and through improved access to the countryside from the larger urban centres.	Not formally quantified	Slight Beneficial	
	Reduce air quality health costs	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres but this is unlikely to be enough on any specific corridor to show any significant improvement in air quality health benefits. The impact of the new rail services is considered negligible.		PVB £1.3m	
	Reduce vulnerability to terrorism	The EWR has no benefits or dis-benefits to reducing vulnerability to terrorism.		Not assessed	
	Reduce crime	The EWR proposal will improve security at existing stations.		Slight Beneficial	
Broad transport budget				PVC £108M	
Wider public finance impacts				Total TEE PVB = 682	
				Not Rail revenue = 52 Rail user benefits = 416 Road Disaggregation Benefits = 277 Infrastructure Benefits = 27 Indirect Taxation = 15 TEE, indirect taxation, air quality, Greenhouse gases, Noise and Safety BCR = 6.30 NPV = 574	

All monetised values in 2002 prices and values.

Table ES.17 – AST for the Next Best scheme

Appraisal Summary Table		Option: EWR Next Best Description: New and upgraded rail infrastructure, including new station at Winslow, facilitating introduction of new services between Milton Keynes, Oxford, Bedford, Bletchley and Aylesbury. New 1 tph direct services between Milton Keynes and Oxford and Bedford and Bletchley, Milton Keynes and Aylesbury. Bedford - Milton Keynes journey via enhanced interchange at Bletchley.		Date & Contact: 02/06/2010
GOAL TACKLE CLIMATE CHANGE	CHALLENGE	KEY POINTS	METRICS	ASSESSMENT
SUPPORT ECONOMIC GROWTH	Reduce greenhouse gas emissions	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres and thereby decrease in carbon emissions. The additional carbon emissions resulting from the new rail services are considered negligible.	Not formally quantified	PVB £1.0M Beneficial
	Improve reliability	Modal shift from private car to rail will result in a decrease in the traffic volumes during peak periods reducing reduced congestion and improve journey reliability.		
	Improve connectivity	The provision of the East West Rail will improve connectivity by providing an alternate route for east to west movements. Also improving the re routing of inter city commuting in the area reducing the need for interchanging at London Stations - significant TEE benefits generated.	TEE benefits	PVB £400M Beneficial
	Support the delivery of housing	The East West Rail proposal will provide an additional link across the area and thereby support proposed growth in housing in Milton Keynes and the surrounding area.	Not formally quantified	Beneficial
PROMOTE EQUALITY OF OPPORTUNITY	Enhance resilience	The western section of EWR will enhance the overall level of resilience within the national rail network. It provides an alternative route for NE-SW axis Cross Country services and provides an important diversionary route for freight services.	Not formally quantified	Beneficial
	Wider (economic) impacts	The EWR proposal will contribute to wider economic impacts by improving access to forecasted employment growth areas. A combination of agglomeration and increased outputs will have an overall beneficial effect.	Not formally quantified	Beneficial
	Improve accessibility	The EWR will promote access to households with limited access to a car and other forms of public transport. Reflected in TEE benefits.	TEE benefits	See 'improve connectivity' Beneficial
	Improve affordability	The provision of the rail proposal will provide a competitive alternative to travel from all road modes. The savings on time and actual cost will improve affordability in the area.		Beneficial
IMPROVE QUALITY OF LIFE & PROMOTE A HEALTHY NATURAL ENVIRONMENT	Reduce severance	The EWR proposal uses existing lines and does not increase severance. The impact is therefore neutral.		Neutral
	Enhance regeneration	No major designated regeneration area through expanding the public transport network facilitating access to housing and jobs for pockets of deprivation that do exist.		Neutral
	Reduce regional economic imbalance	The route passes through areas of lower economic activity. Connecting these areas to the strong economic centres of Oxford, Milton Keynes and Bedford will improve the economic balance of the region.		Moderate Beneficial
	Reduce exposure to noise	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres reducing the impact of noise along these corridors. There will be some increases in noise locally as a result of construction and operation of the line.	PVB £0.2M	
BETTER SAFETY, SECURITY & HEALTH	Minimise impact on biodiversity	There is no identified biodiversity problems for construction within the scheme boundary but further investigation is required especially as the scheme is close to four SSSI locations.		Neutral
	Minimise impact on the water environment	The impact on the water environment has been considered in the Atkins September 2009 report and the potential impact on the water environment can be reasonably mitigated by applying appropriate mitigation measures.		Neutral
	Minimise impact on heritage	There is no direct impact on the construction of EWR on heritage sites. Further investigation is required to see whether they are affected by dust or vibration from construction.		Neutral
	Minimise impact on landscape	As the proposal utilises an existing rail alignment there are not considered to be any landscape impacts. It is anticipated that any impact due to the new stations can be mitigated in the design process.		Slight Beneficial
IMPACT ON PUBLIC ACCOUNTS	Improve experience of travel	It is anticipated that there will be a significant improvement in the experience of travel for those people shifting mode from car to rail.		Beneficial
	Improve the urban environment	The construction of the new stations is predicted to enhance and improve the urban environment.		Beneficial
	Improve access to leisure	The EWR will promote access to leisure activities in the major centres of Oxford, Milton Keynes and Bedford for age groups dependant on public transport. It will also provide access to the countryside for the residents of the larger Cities.	Not formally quantified	Beneficial
	Reduce the risk of death or injury	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres and thereby an improvement in safety. There will be an improvement to health through physical activity as a result of walk and cycle trips to access the services and through improved access to the countryside from the larger urban centres.		PVB £2.7M Slight Beneficial
	Reduce air quality/health costs	Modal shift from private car to rail will result in a decrease in the overall vehicle kilometres but this is unlikely to be enough on any specific corridor to show any significant improvement in air quality health benefits. The impact of the new rail services is considered negligible.		PVB £0.7M
	Reduce vulnerability to terrorism	The EWR has no benefits or dis-benefits to reducing vulnerability to terrorism.		Not assessed
	Reduce crime	The EWR proposal will improve security at existing stations.		Slight Beneficial
	Broad transport budget			
	Wider public finance impacts	Business and consumer users experience travel time benefits resulting from the reduced journey times provided by the East - West Rail. Transport providers experience ongoing operating costs which are more than offset by increased revenue resulting from additional trips using the East - West Rail.	Net Rail revenue = 17 Rail user benefits = 262 Road Decongestion Benefits = 140 Infrastructure Benefits = 0.4 Indirect Taxation = 7 Total TEE PVB = 402 (inclusive of all above) TEE, indirect taxation, air quality, Greenhouse gases, Noise and Safety BCR = 3.10 NPV = 271	PVB £129M

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