

DEVON COUNTY COUNCIL

**KINGSKERSWELL BYPASS  
REAPPRAISAL**

**SOCIAL BENEFITS AND IMPACT ON  
GROSS DOMESTIC PRODUCT**

OCTOBER 2006

FINAL DRAFT

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## 1 INTRODUCTION

### 1.1 Background

1.1.1 Conventional appraisal as detailed in WebTAG/DMRB assesses the financial implications for individuals and businesses of the transport scheme resulting from changes in travel times, vehicle speeds and travel distances. Using estimates for individuals/businesses value of travel time and distance, a monetary worth can be placed on the transport scheme<sup>1</sup>.

1.1.2 Further impacts on the economy are measured in terms of economic regeneration and development using changes in the number and type of employees in the area caused by new and more efficient development of the region.<sup>2</sup>

1.1.3 Emerging guidance *Transport, Wider Economic Benefits and Impacts on GDP (current revision June 2006)* on scheme appraisal published originally by the Department for Transport (DfT) in late 2005 identified that transport investment can affect the location and pattern of economic activity in a region. A conventional scheme appraisal, as documented in WebTAG and Design Manual for Roads & Bridges (DMRB), does not assess these changes.

1.1.4 The purpose of this report is to identify and where possible quantify these “wider economic impacts” on social welfare and GDP that may be generated as a result of constructing the Kingskerswell Bypass. This work builds on the following reports:

- Kingskerswell Bypass Reappraisal Forecasting and Economics Report, Parsons Brinckerhoff, October 2006; and
- Kingskerswell Bypass Economic Impact Study. SQW/BBP Alliance, February 2002.

1.1.5 The Social Benefits and impact on Gross Domestic Product (GDP) assessed using the emerging guidance from DfT is NOT required in the preparation of a Major Scheme Bid.

### 1.2 Definitions

1.2.1 The new guidance focuses on two areas. These Social and GDP benefits are separate economic measures and CANNOT be combined. Social benefits have a value in monetary terms that can be considered to be paid to individuals and businesses, like travel time savings, whilst GDP is an indicator of national productivity and a measure of growth in the economy that has no physical value to any individual or business.

#### Social Benefits

1.2.2 Some social welfare benefits appear in the conventional scheme appraisal using COBA or TUBA. Social welfare benefits are accrued by individuals and by businesses and appear as travel time and vehicle operating costs in the conventional assessment. The social benefit assessment in this report looks further into the

<sup>1</sup> WebTAG Unit 3.5.4 *Cost Benefit Analysis* and DMRB Vol. 13 *Economic Appraisal of Highway Schemes*

<sup>2</sup> WebTAG Units 2.8 *Wider Economic Impacts*, Units 3.5.8 *The Wider Economic Impacts Sub-Objective*

benefits that the individual/businesses may accrue through improved opportunities in the labour market and competition.

1.2.3 These social welfare benefits are effectively increased earnings for the individual and increased profits for the businesses.

1.2.4 They are an extension of the conventional economic assessment from TUBA/COBA and CAN be added to travel time and vehicle operating cost figures and therefore incorporated into the Present Value Benefit (PVB), Net Present Value (NPV) and Benefit to Cost Ratio (BCR) estimates.

#### Gross Domestic Product (GDP)

1.2.5 GDP is an indicator of the prosperity of the UK economy. The productivity of the economy can be affected by poor transport provision and a transport scheme can make individual/businesses more productive. The potential to increase their earnings means individuals/business are encouraged to work more efficiently and increase output which can consequently increase productivity.

1.2.6 GDP is an index measured in £ per head. This wider assessment calculates the additional production caused by the transport scheme in monetary terms that will be added (or subtracted) to the total annual production in the UK over all industries, services and sectors.

### **1.3 Study Area**

1.3.1 The existing A380 diverges from the A38 trunk road at Telegraph Hill and continues via Kingskerswell to Torquay and Paignton. The route is predominantly dual carriageway with the exception of the sections from Penn Inn Roundabout to Kerswell Gardens and Churscombe Cross to Collaton St. Mary which are single carriageways, see Figure 1.

1.3.2 This economic assessment includes the major conurbations in the immediate hinterland (Paignton, Torquay, Teignmouth, Totnes, and Newton Abbot) and the major wards around Exeter and the East Devon New Community.

### **1.4 Report Outline**

1.4.1 This document describes the processes and the results of the wider economic assessment and consists of the following sections:

- Description of Scheme;
- Wider Economic Impacts; and
- Results Summary.

## 2 DESCRIPTION OF SCHEME

### 2.1 General

2.1.1 As with a conventional economic evaluation using DfT developed software such as TUBA or COBA, the assessment of the wider economic impact benefits (or costs) is based on the net difference between the costs of the Do Minimum (DM) and the Do Something (DS) scenarios.

### 2.2 Do Minimum Network

2.2.1 The DM network for the traffic modelling assumes the provision of the following highway improvements within the study area:

- Tweenaways Cross Junction;
- Windy Corner Junction; and
- Development Infrastructure in Newton Abbot.

2.2.2 None of the DM highway improvements are in the Kingskerswell area or adjacent to the A380. Consequently, the network suffers severe congestion with very high traffic flows throughout the day, poor conditions for pedestrians and cyclists and the use of unsuitable local roads in and around Kingskerswell as rat-runs to try and avoid the congestion.

### 2.3 Do Something Network

2.3.1 The A380 Kingskerswell Bypass improvement scheme consists of a continuous dual carriageway link from Penn Inn Roundabout, east of Newton Abbot, linking the A380 Hamelin Way and the A3022 Riviera Way near Kerswell Gardens roundabout, see Figure 2. Details of the improvements are listed below:

- Grade separation of Penn Inn Roundabout with a single carriageway flyover;
- On-line dualling from Penn Inn Roundabout to Aller;
- New grade separated junction at Aller;
- Off-line dualling to the west of Kingskerswell from Aller to the existing A380;
- New displaced right turn junction to the west of Kerswell Gardens;
- New signalised junction at Kerswell Gardens; and
- New link adjacent to the A380 between Penn Inn Roundabout and Aller to allow access to Aller Brake Road.

2.3.2 The existing A380 will remain open between Aller and Kerswell Gardens, providing access to Kingskerswell and an alternative route for public transport and slow mode trips.

### 3 WIDER ECONOMIC IMPACTS

#### 3.1 General

3.1.1 This section describes the four social benefits and six GDP effects that can be influenced by a highway scheme. Some of the impacts are derived from a TUBA analysis, whilst others are a combination of other welfare benefits/GDP effects or need to be directly calculated.

3.1.2 The four welfare benefits considered by this assessment are:

- Agglomeration benefits (WB1);
- Increased competition (WB2);
- Imperfect competition (WB3); and
- Exchequer consequences of increased GDP (WB4).

3.1.3 The six GDP measures are:

- More people choosing to work, or fewer people choosing to stop work (GDP1);
- Some people choosing to work longer hours (GDP2);
- Relocation of jobs to higher-productive locations (GDP3);
- Agglomeration (GDP4);
- Imperfect competition (GDP5); and
- Business time savings and reliability (GDP6).

3.1.4 All benefits are calculated over a 60 year appraisal period and reported in 2002 prices.

#### 3.2 WB1 – Agglomeration benefits

3.2.1 The construction of the bypass would reduce the travel costs into the Torbay area from the north encouraging redevelopment and regeneration. This redevelopment and regeneration would lead to new areas of employment being made available for development and the intensification of existing areas.

3.2.2 Businesses can gain benefits from being located close together and a highway scheme can encourage similar businesses and their subsidiaries to operate in the same location. Clustering of businesses allows business to become more productive through increased efficiency and reduced costs as a result of shared knowledge and access to a larger pool of employment. The process of increased productivity in this manner is called Agglomeration.

3.2.3 The calculation of agglomeration effects is dependent on the following factors:

- the time and cost of travel from and within clustered areas with and without the scheme;
- the relocation of employment caused by the scheme;
- the elasticity of productivity with respect to the employment density; and
- the level of output in the agglomerated sectors.

**The Agglomeration Benefits (WB1) are calculated to be £6.2m.**

### 3.3 WB2 – Increased Competition

- 3.3.1 For business to operate at the most efficient levels there needs to be a desire to maximise profits and competition from other businesses in the industry. Where competition, or the threat of competition, is weak business will behave differently. They will still try to maximise profits, but by selling fewer goods at a higher price.
- 3.3.2 Congestion can be seen as a barrier to competition; lowering the cost of travel makes previously remote markets accessible, thereby attracting new firms to enter what was previously a closed market. The congestion on the A380 through Kingskerswell could be considered a barrier to competition in the Torbay area.
- 3.3.3 Businesses already established in Torbay could be considered a closed monopoly as competition from Newton Abbot and Exeter are deterred from entering the market in Torbay as the transport costs are high.
- 3.3.4 Historically though, evidence from previous studies has shown that the effects of increased competition would be small. This is likely to be the case for the Torbay area, as the additional costs from the delay experienced in Kingskerswell would be slight when compared to the total transport costs for providing goods and services to the Torbay area.

**For the purposes of this assessment the Increased Competition Benefits (WB2) has been assumed to be ZERO. This is taken from the recommendations in the Emerging Guidance.**

### 3.4 WB3 – Increased Output in Imperfectly Competitive Markets

- 3.4.1 The introduction of the bypass would reduce the travel costs through the area. Trips travelling through Kingskerswell would divert to the bypass, not only trips from the existing A380, but trips using the local road network as rat-runs. This would lead to a reduction in congestion on the wider network and therefore reduce trip and hence production costs.
- 3.4.2 Economic theory says that in an imperfectly competitive market, this decrease in production costs will lead to lower prices and greater production, and ultimately greater profits. This results in a social benefit to the businesses in the region.

**The Emerging Guidance recommends that the benefits from Increased Output in Imperfectly Competitive Markets are 10% of the business time savings from the conventional TUBA economic assessment. Based on the TUBA output, this equals £34.4m. A summary of the TUBA results is included in Appendix A.**

### 3.5 WB4 – Economic Welfare Benefits arising from Improved Labour Supply

- 3.5.1 The decision as to whether, where and how much a person works is not only dependent on the wages, but also the costs associated with that decision. A person may choose take a lower paid job closer to home rather than a higher paid job with a long commute. Consequently, high commuting costs can lead workers to work less or in less productive (and lower paid) jobs than they otherwise would.
- 3.5.2 For example, a worker residing in Torbay earns £60 per day and has the opportunity to work in Exeter for £72. However, if commuting costs are an extra £6 per day and the inconvenience of working in Exeter (extra commuting, longer hours, etc) is judged as equivalent to £7 per day, the value of the Exeter job is £59 per day (72-6-7=59).

- 3.5.3 The introduction of the Kingskerswell Bypass reduces the travel time and hence the commuting costs to £4. The Exeter job is now worth £61 per day (72-4-7) and the social benefits can be estimated at £1 per day, not £12 per day due to the increased commuting and inconvenience costs.

**The Emerging Guidance recommends that the Economic Welfare Benefits arising from Improved Labour Supply should be estimated as 40% $\times$ GP1 + 30% $\times$ (GP2+GP3). Based on the calculations in this report this figure is £8.1m.**

### 3.6 GDP1 – More people choosing to work

- 3.6.1 Reducing congestion through Kingskerswell would reduce the commuting costs and encourage more people to work as it is now more profitable for them to do so (see WB4). More people working means more goods and services are produced and there would be a beneficial effect on the productivity (GDP) of the economy. Individuals previously not contributing are now adding to the value of production in the UK, thereby increasing the UK economic prosperity indicator, GDP.

- 3.6.2 This is illustrated by the predicted increase in employment in the Teignbridge and Torbay area, where additional jobs are created, not only for those commuting in (along the newly constructed bypass) but also for those existing unemployed or temporarily employed people in Teignbridge and Torbay.

**Following the calculation of More people choosing to work (GDP1) in the Emerging Guidance is £20.6m.**

### 3.7 GDP2 – Some people choosing to work longer hours

- 3.7.1 Reducing the commuting time may encourage individuals to leave work later, knowing they will arrive home at the same time as without the bypass. This would lead to greater earnings and increased productivity. However, congestion through Kingskerswell is not tidal and is consistent in both directions throughout the day. Therefore, it is just as likely that the individuals will adjust their start time so that they start work at the same time, but do not spend as long travelling so leave home later.

- 3.7.2 In reality, the changes in travel time for commuting traffic through Kingskerswell are unlikely to be significant enough to make an impact on GDP.

**The Emerging Guidance recommends that GDP2 is generally considered to be ZERO in the appraisal of wider economic impacts.**

### 3.8 GDP3 – Relocation of job to higher productive locations

- 3.8.1 In addition to moving to new jobs, there is the potential for movement to more productive jobs. If it is assumed that the productivity of an individual can be measured by their earnings, then in the example in WB4, the job in Exeter must be more productive than the job in Torbay (maybe due to agglomeration effects).

**The *Kingskerswell Bypass Economic Impact Study* and the *Regional Spatial Strategy* identify changes in the numbers and types of employment in the study area, but do not distinguish between new and relocated. To prevent double counting it has been assumed that there is ZERO GDP benefit associated with GDP3. This is a worse case scenario.**

### **3.9 GDP4 – Agglomeration Benefits**

- 3.9.1 The effect of agglomeration (clustering of similar and complimentary businesses) is not restricted to the social benefits gained through increased profits of businesses. There is an effect on the productivity of the country as businesses produce more goods and services as they increase in knowledge, become more efficient and have access to a better quality employment pool.

**The Emerging Guidance recommends GDP4 is assumed to be equal to WB1. Based on the calculations in this report GDP4 is equal to £6.2m.**

### **3.10 GDP5 – Imperfect Competition**

- 3.10.1 The benefit to imperfectly competitive markets of reduced congestion is not restricted to the social benefits accrued by the businesses. The reduced costs and increased output undertaken by the businesses as they strive for greater profits results in greater production. Consequently, this increases the productivity of the economy and increases GDP.

**The Emerging Guidance recommends that GDP5 is assumed to be equal to WB3. Based on the calculations in this report GDP5 is equal to £34.4m.**

### **3.11 GDP6 – Business Savings and Reliability**

- 3.11.1 The result of fast and more reliable journeys whilst working can be considered a productivity gain. The time saved from travelling can be used to increase production.

**The Emerging Guidance recommends that GDP6 is equal to the business time saving benefit accrued in the conventional TUBA appraisal. Based on the TUBA calculations GDP6 is equal to £344.4m.**

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## 4 RESULTS SUMMARY

### 4.1 General

4.1.1 Table 2 below summarises the benefits achieved from the Kingskerswell Wider Economic Impact Study and how they relate to a conventional TUBA economic evaluation and GDP.

<b>Welfare Benefits</b>		
<b>Conventional Appraisal</b>		
	Travel Times	584,149
	Vehicle Operating Costs	38,140
	Accidents	47,958
	Sub-Total	670,247
<b>Wider Economic Appraisal</b>		
WB1	Agglomeration Benefits	6,203
WB2	Increased Competition	0
WB3	Increased Output	34,443
WB4	Improved Labour Supply	8,102
	Sub-Total	48,748
<b>Total Welfare Benefits</b>		<b>718,995</b>

<b>GDP Benefits</b>		
<b>Wider Economic Appraisal</b>		
GDP1	Increase Labour Force Participation	20,256
GDP2	People Working Longer Hours	0
GDP3	Moving to More Productive Jobs	0
GDP4	Agglomeration Benefits	6,203
GDP5	Increased Competition	34,443
GDP6	Business Savings	344,431
<b>Total GDP Benefits</b>		<b>405,333</b>

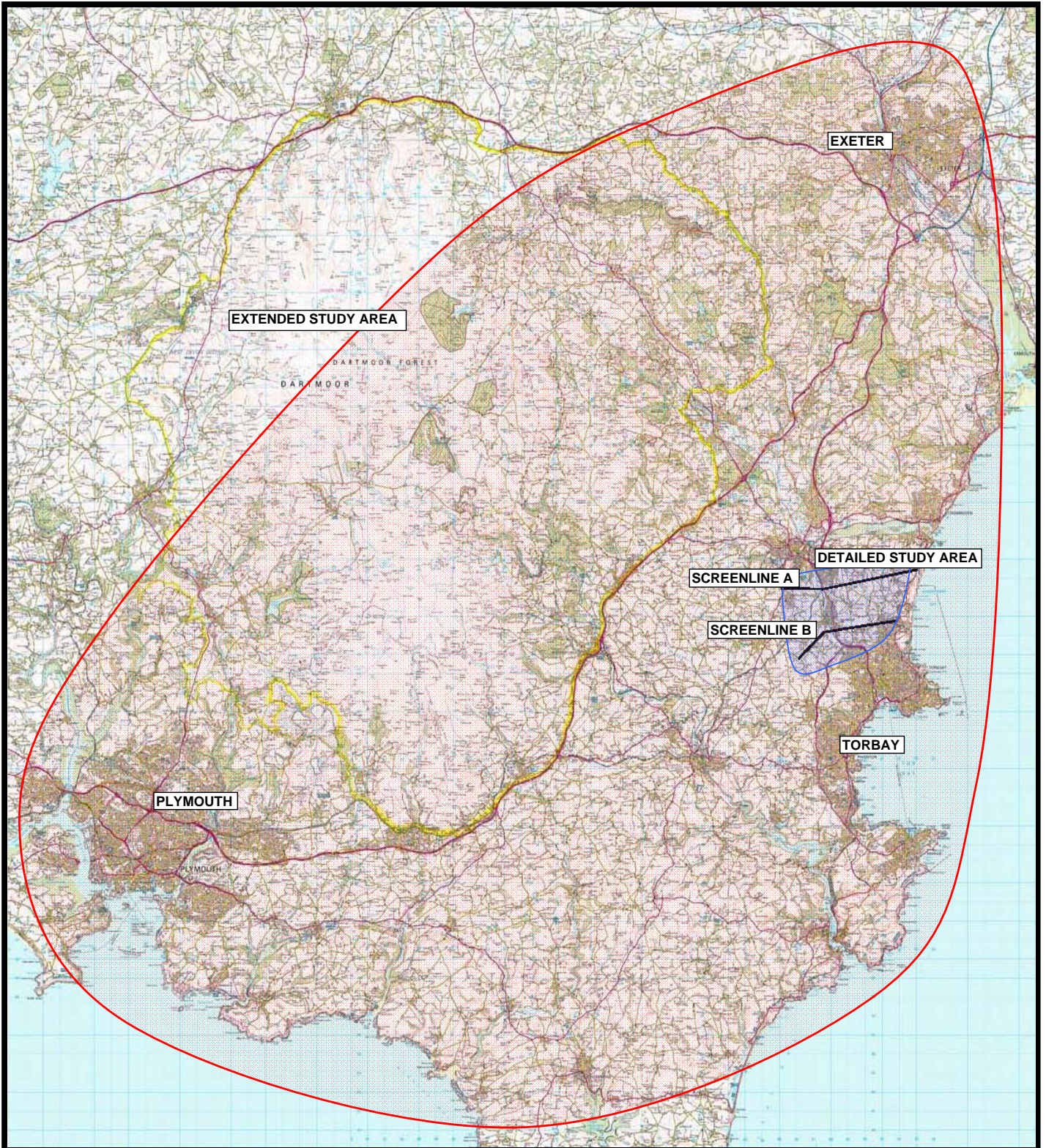
*(Values are in 2002 £'000s)*

**Table 2: Summary Table**

4.1.2 The welfare benefits increase by £48.7m (+7.3%) over the 60 year appraisal period. The impact on GDP is an additional £405.3m of production over 60 years; this is equivalent to an annual additional production of goods and services in the UK economy of 11.3p per person.

**FIGURES**

**DRAFT**



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CLIENT/PROJECT

**Devon County Council  
Kingskerswell Bypass Reappraisal**

TITLE

**Study Area**

DATE

**October 2006**

SCALE

**Not To Scale**

PRODUCED BY

**ZP**

CHECKED

**KM**

APPROVED

**IB**

**Figure 1**

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**APPENDICES**

**DRAFT**

Appendix A.txt

INPUT\_SUMMARY

Run name Ki ngskerswell Bypass  
 DM scheme Do Mi ni mum  
 DS scheme Do Somethi ng

Economic parameter file G: \HEX\43406-43719\43444\TRAFFI C\ECONOMI CS  
 2006\TUBA\ECONOMI C PARAMETER FI LES\STD\_ECONOMI CS\_1. 61. TXT  
 Scheme parameter file G: \HEX\43406-43719\43444\TRAFFI C\ECONOMI CS  
 2006\TUBA\ECONOMI C PARAMETER FI LES\KK\_2006\_WI THOUT\_BUSES\_ALL\_PERI ODS. TXT

First year of scheme costs 2005  
 First Appraisal Year 2016  
 Last Appraisal Year 2075  
 Modelled years 2016 2026

Time period Total hours  
 AM peak 293  
 PM peak 260  
 Inter-peak 2817  
 Total 3370

Note: All monetary values are in 2002 market prices. All monetary values discounted to 2002 unless otherwise stated.

DM\_SCHEME\_COSTS

Do minimum scheme costs. Undiscounted £000s

Mode	Year	Prep.	Superv.	Constr.	Land
Mai nt.	Oper.	Grant/Sub.	Dev. _Cont		
Road	2005	0	0	0	0
Road	2006	0	0	0	0
Road	2007	0	0	0	0
Road	2008	0	0	0	0
Road	2009	0	0	0	0
Road	2010	0	0	0	0
Road	2011	0	0	0	0
Road	2012	0	0	0	0
Road	2013	0	0	0	0
Road	2014	0	0	0	0
Road	2015	0	0	0	0
Road	2016	0	0	0	0
Bus	2005	0	0	0	0
Bus	2006	0	0	0	0
Bus	2007	0	0	0	0
Bus	2008	0	0	0	0
Bus	2009	0	0	0	0
Bus	2010	0	0	0	0
Bus	2011	0	0	0	0

Appendix A.txt

Bus	0	2012	0	0	0	0	0	0
Bus	0	2013	0	0	0	0	0	0
Bus	0	2014	0	0	0	0	0	0
Bus	0	2015	0	0	0	0	0	0
Bus	0	2016	0	0	0	0	0	0

DS\_SCHEME\_COSTS

Mode	Year	Do something	scheme costs.	Undiscounted	£000s			
Maint.	Oper.			Prep.	Superv.	Constr.	Land	
				Grant/Sub.	Dev. Cont			
Road	2005	0	0	0	0	0	0	0
Road	2006	0	0	0	0	0	0	0
Road	2007	0	0	0	0	0	0	0
Road	2008	0	0	0	0	0	0	0
Road	2009	0	0	0	0	0	0	0
Road	2010	0	0	0	0	0	0	0
Road	2011	0	0	0	0	0	0	0
Road	2012	0	0	0	0	0	0	0
Road	2013	0	0	0	0	0	0	0
Road	2014	0	0	0	0	19913	9488	0
Road	2015	0	0	0	0	39826	0	0
Road	2016	0	0	0	0	19913	0	0
Bus	2005	0	0	0	0	0	0	0
Bus	2006	0	0	0	0	0	0	0
Bus	2007	0	0	0	0	0	0	0
Bus	2008	0	0	0	0	0	0	0
Bus	2009	0	0	0	0	0	0	0
Bus	2010	0	0	0	0	0	0	0
Bus	2011	0	0	0	0	0	0	0
Bus	2012	0	0	0	0	0	0	0
Bus	2013	0	0	0	0	0	0	0
Bus	2014	0	0	0	0	0	0	0
Bus	2015	0	0	0	0	0	0	0
Bus	2016	0	0	0	0	0	0	0

PRESENT\_VALUE\_COSTS

Scheme investment and operating costs (i.e. excluding grant/subsidy, developer contributions and delays) and differences. £000s.

Mode	Year	DM_scheme_costs	DS_scheme_costs	Difference
------	------	-----------------	-----------------	------------

Appendix A.txt

Road	2005	0	0	0
Road	2006	0	0	0
Road	2007	0	0	0
Road	2008	0	0	0
Road	2009	0	0	0
Road	2010	0	0	0
Road	2011	0	0	0
Road	2012	0	0	0
Road	2013	0	0	0
Road	2014	0	19457	19457
Road	2015	0	25465	25465
Road	2016	0	12302	12302
Bus	2005	0	0	0
Bus	2006	0	0	0
Bus	2007	0	0	0
Bus	2008	0	0	0
Bus	2009	0	0	0
Bus	2010	0	0	0
Bus	2011	0	0	0
Bus	2012	0	0	0
Bus	2013	0	0	0
Bus	2014	0	0	0
Bus	2015	0	0	0
Bus	2016	0	0	0
Road	Total	0	57224	57224
Bus	Total	0	0	0

DM&DS\_USER\_COSTS

Total value of user costs, DM and DS. £000s.

Mode	Year	DMtot_time	DMtot_charge	DMtot_fuel	DMtot_nonfuel
Road	2016	870510	0	226291	213834
		868473	227471	214990	
Road	2026	774342	0	161677	159297
		767052	161424	159246	
Bus	2016	0	0	0	0
		0	0	0	0
Bus	2026	0	0	0	0
		0	0	0	0

FUEL\_CONSUMPTION

Total fuel consumption, DM and DS. kilolitres.

Submode	Year	Do minimum		Do something	
		petrol	di esel	petrol	di esel
Car	2016	252292	94892	253336	95322
Car	2026	232861	105454	232675	105428
LGV Persona	2016	0	14016	0	14078
LGV Persona	2026	0	14325	0	14333
LGV Freight	2016	0	79382	0	79789
LGV Freight	2026	0	81273	0	81303
OGV1	2016	0	20199	0	20514
OGV1	2026	0	25138	0	24853
OGV2	2016	0	18630	0	18858
OGV2	2026	0	23434	0	23146
Bus	2016	0	0	0	0
Bus	2026	0	0	0	0
All	2016	252292	227119	253336	228561
All	2026	232861	249625	232675	249063
Car	Total	13773082	6141957	13768721	6143007
LGV Persona	Total	0	857800	0	858568
LGV Freight	Total	0	4866001	0	4869842
OGV1	Total	0	1481116	0	1467332
OGV2	Total	0	1379632	0	1365155
Bus	Total	0	0	0	0
All	Total	13773082	14726505	13768721	14703904

MODE

User benefits and changes in revenues by mode, all years. £000s.

Mode Operator_Rev	Year	Appendix_A.txt		Vehicle_Operating_Cost	
		User Indirect Taxes	User_Charges Time PT_fares_(pri	Fuel	Non_fuel
Road	2016	14050	0	910	-195
Road	2017	13970	0	902	-125
Road	2018	13889	0	894	-59
Road	2019	13806	0	885	2
Road	2020	13723	0	875	59
Road	2021	13639	0	865	113
Road	2022	13506	0	854	162
Road	2023	13373	0	843	209
Road	2024	13240	0	831	251
Road	2025	13107	0	819	291
Road	2026	12974	0	807	328
Road	2027	12700	0	777	317
Road	2028	12431	0	748	306
Road	2029	12169	0	720	296
Road	2030	11912	0	693	286
Road	2031	11660	0	667	276
Road	2032	11459	0	644	267
Road	2033	11262	0	623	258
Road	2034	11069	0	602	249
Road	2035	10903	0	584	242
Road	2036	10740	0	567	235
Road	2037	10591	0	551	228
Road	2038	10443	0	535	221
Road	2039	10298	0	519	215
Road	2040	10154	0	504	209
Road	2041	10013	0	489	202
Road	2042	9873	0	475	197
Road	2043	9736	0	461	191
Road	2044	9600	0	448	185
Road	2045	9467	0	435	180
Road	2046	9335	0	422	175
Road	2047	9205	0	410	170

Appendix x\_A. txt

Road	0	2048	9077	0	398	165
Road	0	2049	8951	0	386	160
Road	0	2050	8827	0	375	155
Road	0	2051	8704	0	364	151
Road	0	2052	8571	0	353	146
Road	0	2053	8441	0	343	142
Road	0	2054	8312	0	333	138
Road	0	2055	8185	0	323	134
Road	0	2056	8060	0	314	130
Road	0	2057	7937	0	305	126
Road	0	2058	7816	0	296	122
Road	0	2059	7697	0	287	119
Road	0	2060	7580	0	279	115
Road	0	2061	7464	0	271	112
Road	0	2062	7361	0	263	109
Road	0	2063	7260	0	255	106
Road	0	2064	7160	0	248	103
Road	0	2065	7061	0	241	100
Road	0	2066	6964	0	234	97
Road	0	2067	6868	0	227	94
Road	0	2068	6773	0	220	91
Road	0	2069	6680	0	214	88
Road	0	2070	6588	0	208	86
Road	0	2071	6497	0	202	83
Road	0	2072	6408	0	196	81
Road	0	2073	6320	0	190	79
Road	0	2074	6233	0	184	76
Road	0	2075	6147	0	179	74
Bus	0	2016	0	0	0	0
Bus	0	2017	0	0	0	0
Bus	0	2018	0	0	0	0
Bus	0	2019	0	0	0	0
Bus	0	2020	0	0	0	0
Bus	0	2021	0	0	0	0

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Bus	0	2022	0	0	0	0	0
Bus	0	2023	0	0	0	0	0
Bus	0	2024	0	0	0	0	0
Bus	0	2025	0	0	0	0	0
Bus	0	2026	0	0	0	0	0
Bus	0	2027	0	0	0	0	0
Bus	0	2028	0	0	0	0	0
Bus	0	2029	0	0	0	0	0
Bus	0	2030	0	0	0	0	0
Bus	0	2031	0	0	0	0	0
Bus	0	2032	0	0	0	0	0
Bus	0	2033	0	0	0	0	0
Bus	0	2034	0	0	0	0	0
Bus	0	2035	0	0	0	0	0
Bus	0	2036	0	0	0	0	0
Bus	0	2037	0	0	0	0	0
Bus	0	2038	0	0	0	0	0
Bus	0	2039	0	0	0	0	0
Bus	0	2040	0	0	0	0	0
Bus	0	2041	0	0	0	0	0
Bus	0	2042	0	0	0	0	0
Bus	0	2043	0	0	0	0	0
Bus	0	2044	0	0	0	0	0
Bus	0	2045	0	0	0	0	0
Bus	0	2046	0	0	0	0	0
Bus	0	2047	0	0	0	0	0
Bus	0	2048	0	0	0	0	0
Bus	0	2049	0	0	0	0	0
Bus	0	2050	0	0	0	0	0
Bus	0	2051	0	0	0	0	0
Bus	0	2052	0	0	0	0	0
Bus	0	2053	0	0	0	0	0
Bus	0	2054	0	0	0	0	0
Bus	0	2055	0	0	0	0	0

Appendix A.txt

Bus	0	2056	0	0	0	0	0
Bus	0	2057	0	0	0	0	0
Bus	0	2058	0	0	0	0	0
Bus	0	2059	0	0	0	0	0
Bus	0	2060	0	0	0	0	0
Bus	0	2061	0	0	0	0	0
Bus	0	2062	0	0	0	0	0
Bus	0	2063	0	0	0	0	0
Bus	0	2064	0	0	0	0	0
Bus	0	2065	0	0	0	0	0
Bus	0	2066	0	0	0	0	0
Bus	0	2067	0	0	0	0	0
Bus	0	2068	0	0	0	0	0
Bus	0	2069	0	0	0	0	0
Bus	0	2070	0	0	0	0	0
Bus	0	2071	0	0	0	0	0
Bus	0	2072	0	0	0	0	0
Bus	0	2073	0	0	0	0	0
Bus	0	2074	0	0	0	0	0
Bus	0	2075	0	0	0	0	0
Road	0	Total	584240	0	29041	9119	
Bus	0	-1639					
Bus	0	Total	0	0	0	0	0

SUBMODE

User benefits and changes in revenues by submode/vehicle type, modelled years and total. £000s.

Submode	Year	User	User_Charges	Vehicle_Operating_Cost	
Operator_Rev	Indirect	Time	PT_fares_(pri	Fuel	Non_fuel
PT_fares_(pri	Taxes				
Car	2016	12262	0	557	-360
Car	2026	11095	0	535	138
LGV	2016	112	0	8	-25
LGV	2026	90	0	12	-5
LGV	2016	1554	0	66	120
LGV	2026	1496	0	91	104
OGV1	2016	81	0	144	38
OGV1	2026	200	0	84	48

Appendix A. txt

OGV2	0	2016	81	40	0	135	33
OGV2	0	2026	-72	93	0	85	42
Bus	0	2016	0	0	0	0	0
Bus	0	2026	0	0	0	0	0
All	0	2016	844	14050	0	910	-195
All	0	2026	-189	12974	0	807	328
Car	0	Total	735	498339	0	18885	2468
LGV	Persona	Total	156	4012	0	421	-266
LGV	Freight	Total	943	69017	0	3112	3802
OGV1	0	Total	-1644	8578	0	3299	1651
OGV2	0	Total	-1828	4012	0	3288	1463
Bus	0	Total	0	0	0	0	0
All	0	Total	-1638	583958	0	29006	9118

PERSON\_TYPES

User benefits and changes in revenues by person type, modelled years and total. £000s.

Person_type	Year	User	User_Charges	Vehicle_Operating_Cost	
Operator_Rev	Indirect	Time	PT_fares_(pri	Fuel	Non_fuel
PT_fares_(pri	Taxes				
All	2016	14050	0	910	-195
All	0	844			
All	2026	12974	0	807	328
All	0	-189			
All	Total	583958	0	29006	9118
All	0	-1638			

PURPOSE

User benefits and changes in revenues by trip purpose, modelled years and total. £000s.

Purpose	Year	User	User_Charges	Vehicle_Operating_Cost	
Operator_Rev	Indirect	Time	PT_fares_(pri	Fuel	Non_fuel
PT_fares_(pri	Taxes				
Business	2016	7814	0	448	480
Business	0	436			
Business	2026	7479	0	359	430
Business	0	-145			
Commuting	2016	1448	0	131	-184
Commuting	0	106			
Commuting	2026	1536	0	128	-19
Commuting	0	-21			
Other	2016	4788	0	331	-491
Other	0	302			
Other	2026	3959	0	319	-83
Other	0	-23			
Business	Total	344431	0	13226	15622
Business	0	-2297			
Commuting	Total	66031	0	4530	-1513
Commuting	0	-110			
Other	Total	173750	0	11277	-4994
Other	0	769			

PERIOD

Appendix A.txt

User benefits and changes in revenues by time period, modelled years and total. £000s.

Period	Year	User Time	User_Charges	Vehicle_Operating_Cost	
Operator_Rev	Indirect			Fuel	Non_fuel
PT_fares_(pri	Taxes				
AM peak	2016	2782	0	192	-65
0	88				
AM peak	2026	4085	0	222	144
0	-98				
PM peak	2016	2323	0	230	2
0	4				
PM peak	2026	2283	0	159	56
0	-63				
Inter-peak	2016	8944	0	488	-132
0	752				
Inter-peak	2026	6606	0	425	128
0	-28				
AM peak	Total	175959	0	7729	4113
0	-2589				
PM peak	Total	101679	0	5986	1719
0	-1921				
Inter-peak	Total	306584	0	15321	3287
0	2871				

Economy: Economic Efficiency of the Transport System(TEE)

Consumers	Bus	ALL MODES	Road
User benefits		TOTAL	
Travel Time	0	239717	239717
Vehicle operating costs	0	9296	9296
User charges	0	0	0
During Construction & Maintenance	0	-256	-256
NET CONSUMER BENEFITS	0	248757	248757
Business			
User benefits			
Personal	Freight		Personal
Travel Time	0	344431	262823
0	0		81608
Vehicle operating costs	0	28844	12232
0	0		16612
User charges	0	0	0
0	0		0
During Construction & Maintenance	0	-128	-64
0	0		-64
Subtotal	0	373147	274991
0	0		98156
Private Sector Provider Impacts			
Revenue		0	0
0			
Operating costs		0	0
0			
Investment costs		0	0
0			
Grant/subsidy		0	0
0			
Subtotal		0	0
0			

Other business Impacts

Developer contributions	0	0
NET BUSINESS IMPACT	373147	

## TOTAL

Present Value of Transport Economic Efficiency Benefits (PVB)	621904
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Note: Benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

## Public Accounts

	ALL MODES TOTAL	Road	Bus
Local Government Funding			
Revenue	0	0	0
Operating costs	0	0	0
Investment costs	57224	57224	0
Developer Contributions	0	0	0
Grant/Subsidy Payments	0	0	0
NET IMPACT	57224	57224	0

## Central Government Funding

Revenue	0	0	0
Operating costs	0	0	0
Investment costs	0	0	0
Developer Contributions	0	0	0
Grant/Subsidy Payments	0	0	0
Indirect Tax Revenues	1639	1639	0
NET IMPACT	1639	1639	0

## TOTAL

TOTAL Present Value of Costs (PVC)	58863
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Note: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

## Analysis of Monetised Costs and Benefits

## Non-Exchequer Impacts

Consumer User Benefits	248757
Business User Benefits	373147
Private Sector Provider Impacts	0
Other Business Impacts	0

Accident Benefits Not assessed by TUBA

Net present Value of Benefits (PVB)	621904
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Local Government Funding	57224
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Central Government Funding	1639
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Net present Value Costs (PVC)	58863
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## Overall Impact

Net present Value (NPV)	563041
Benefit to Cost Ratio (BCR)	10.565

## Appraisal Period

2016 to 2075

Note: There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.