TYNE AND WEAR
INTEGRATED TRANSPORT AUTHORITY

Department for Transport

Tyne and Wear
Local Sustainable Transport Fund
Large Project Business Case

Addressing the barriers that transport creates to economic growth and accessing employment

Creating Growth, Cutting Carbon

Tyne and Wear Integrated Transport Authority

Local Sustainable Transport Fund large project application

Economic Case

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An Existing Data and Traffic Surveys Report to include:	Attached

Details of the sources, locations (illustrated on a map), methods of collection, dates, days of week, durations, sample factors, estimation of accuracy, etc.	Provided on Data CD
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Details of the pattern and scale of traffic delays and queues.	Provided on Data CD
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Diagrams of existing traffic flows, both in the immediate corridor and other relevant corridors.	Provided on Data CD
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Details of the trip matrix building process, including details of how observed data were factored and merged and how synthetic estimates have been developed and used.	Provided on Data CD
Evidence of the validity of the networks employed, including range checks, link length checks, and route choice evidence.	Provided on Data CD
Details of the segmentation used, including the rationale for that chosen.	Provided on Data CD
Validation of the trip matrices, including estimation of measurement and sample errors.	Provided on Data CD
Details of any 'matrix estimation' techniques used and evidence of the effect of the estimation process on the scale and pattern of the base travel matrices.	Provided on Data CD
Validation of the trip assignment, including comparisons of flows (on links and across screenlines/cordons) and, for road traffic models, turning movements at key junctions.	Provided on Data CD
Journey time validation, including, for road traffic models, checks on queue pattern and magnitudes of delays/queues.	Provided on Data CD
Detail of the assignment convergence.	Provided on Data CD
Present year validation if the model is more than 5 years old.	Provided on Data CD

A diagram of modelled traffic flows, both in the immediate corridor and other relevant corridors.	Provided on Data CD
A Demand Model Report to include:	96
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Details of the segmentation used, including the rationale for that chosen. This should include justification for any segments remaining fixed.	Provided on Data CD

2. Introduction

2.1 This document sets out the Economic Case for the Tyne and Wear Local Sustainable Transport Fund bid. It comprises an appraisal of the economic impacts of the proposed bid, consistent with the principles of WebTAG, and includes evidence on relevant secondary LSTF policy objectives (e.g. physical activity, social inclusion, air quality).

2.2 The Economic Case is one of five elements forming the overall Business Case for the project. The other elements of the Business Case are:

- strategic case;
- commercial case;
- financial case;
- management case.

2.3 The economic case comprises the following sections:

2.3.1 The overall aim of Section 3 of the Economic Case is to provide the cost benefit analysis of the options. This section begins with a summary of the problem, followed by the packages of measures and a summary of the key assumptions made on the effectiveness of the packages of the measures to encourage change in mode choice for the journey to work. This section of the economic case also seeks to clarify the longevity of the impacts and provides the sensitivity testing which has been applied to the cost benefit analysis.

2.3.2 Section 4 of the Economic Case provides the main appraisal methodology and outcomes. The Department for Transport (DfT) recognised that the timeframe for the preparation of the business case is significantly less than would normally be allowed for the preparation of a business case. We have therefore been asked to apply “proportionality” to the assessment and development of the economic case. This section of the report will start with a summary of where we have applied proportionality to the assessment of the economic case and the justification behind these decisions. The remainder of this section of the report will provide the core appraisal of the packages of measures against the Governments objectives for transport of;

- *The Environment Objective*
- *The Safety Objective*
- *The Economy Objective*
- *The Accessibility Objective*
- *The Integration Objective*

2.3.3 Section 5 of the Economic Case provides the Social & Distribution Impact Assessment (SDI). The SDI is broken into 6 distinct stages;

- Stage 0 screening assessment
- Stage 1 Areas Impacted by the assessment
- Stage 2 Identification of Social Groups
- Stage 3 Full Screening
- Stage 4 Core Appraisal and SDI Analysis Matrix
- Stage 5 Collation of SDI Analysis into Matrix

Section 6 of the Economic Case provides the Transport Modelling Technical Note. This includes a summary of the overall approach to modelling, a review of the data and traffic surveys used in the preparation of the transport model, the assignment validation and our approach to demand modelling.

As required by guidance on the preparation of the large project business case, the impacts of the funded Key Component project are include as part of the 'do minimum' position in terms of assessing economic benefits.

3. Cost benefit analysis

3.1. Summary of the Problem

The main objectives of the Local Sustainable Transport Fund are of particular importance to Tyne and Wear because:

- The area suffers from persistently high levels of unemployment and deprivation making *economic growth* a major priority. Congestion on the local road network is identified as a major threat to successful and sustainable economic growth.

- In spite of relatively low car ownership levels, *carbon emissions* from transport are above the national average as a proportion of total emissions. Forecasts for the LTP indicate the area is unlikely to meet transport targets in relation to carbon reduction in the absence of additional action.

The Tyne and Wear City Region comprises a core urban area covering the Tyneside and Wearside conurbations, surrounded by more rural areas. It supports a population of around 1.7 million and an estimated 693,000 jobs. It has a strong local identity and rich heritage (particularly in relation to innovation in transport). The area has also faced the challenge of developing new industries to replace traditional large employers and currently has a heavy reliance on public sector employment. The need to strengthen and broaden the local economy is a key challenge but other major concerns are the requirement to meet carbon reduction targets and tackle high levels of deprivation and poor-health in some areas.
The modal share for Journeys to Work differs significantly in comparison with the rest of England. This is displayed in table 3.1 below.

Table 3.1: Modal Share for Journeys to Work

Mode	North East	Tyne & Wear	England
Car	73%	67%	69%
Motorcycle	<1%	<1%	1%
Bicycle	1%	<1%	3%
Bus	9%	13%	7%
Rail (including light rail)	3%	5%	8%
Walk	13%	12%	11%
Other	1%	<1%	1%

Source: 2001 Census

The modal shares of journeys to work in Table 3.1 are provided at a regional level and for the Tyne & Wear County (that is, excluding those parts of Northumberland and Durham within the journey to work area). In Tyne & Wear the use of the car for commuting is lower than the English average. Also, the use of cycling and rail for

commuting is lower than across England. On the other hand the use of bus for commuting is significantly higher than the English average (which partly reflects the lower proportion by rail) and the percentage of commuter journeys that are walked is slightly higher. Some further relevant findings from the Regional Transport Statistics document are:

- **Bus Use**: 35% of people in the North East used a bus at least once a week in 2006, which is the highest percentage in England other than London. The English average was 28%;

- **Cycle Use**: 11% of people in the North East cycled at least once a week in 2006, which is the lowest of all English regions. The English average was 15%, the North West and Yorkshire & Humber regions both saw 14% of people using a cycle once a week. This is in spite of the nature of much of Tyne and Wear, as a compact urban area, being well suited to cycling;

- **Train Use**: only 1% of people in the North East used a train at least once a week, which is significantly lower than all other English regions. The comparative figures for the North West and Yorkshire & Humber are 6% and 4% respectively, the English average is 7%. It is noted however that this figure for the North East excludes use of the Tyne & Wear Metro, which is significant;

- **Taxi Use**: 12% of people in the North East used a taxi/minicab at least once a week in 2006, which is higher than the English average of 10%. This is lower than in the North West (16%) and Yorkshire & Humber (13%). It does however show the importance of the taxi trade as a mode of transport in the region;

- **Journeys to School**: 56% of journeys to school in the North East are by foot, 27% by car and 14% by bus. The comparative averages for England are 46% for walking, 31% for car and 18% for bus. It is clear that across the region the use of walking as a mode of transport to school is significantly higher than elsewhere in England (56% is the highest of all English regions) and the use of the car is lower. This partly reflects lower car ownership, and also reflects lower journey distances to school. The average school journey length for primary school children in the North East is 1.1 miles, and 2.8 miles for secondary school children. The equivalent English averages are 1.5 miles and 3.1 miles respectively. The primary school average distance is the lowest of all the English regions.

- **Commuting Journey Times**: the average time spent travelling to work in the North East in 2007 was 21 minutes (24 minutes in Tyne & Wear). This is significantly lower than the English average of 27 minutes and the equivalent values for the North West (24 minutes) and the Yorkshire & Humber (25 minutes) regions. 87% of all commuter journeys in the North East are under 40 minutes duration (82% in Tyne & Wear), which is the highest percentage of all English regions and compares with the English average of 76%. Rail journeys in the North East are the longest in terms of time (44 minutes, 47 minutes in Tyne & Wear), whereas bus journeys average 31 minutes (24 minutes in Tyne & Wear) and car journeys average 21 minutes (23 minutes in Tyne & Wear). Cycle trips average 19 minutes and walking trips 11 minutes.

- **Working At Home**: 88% of workers in the North East are not able to work at home even occasionally. This is the highest percentage of all English regions and compares with 81% across England.

In economic terms, Tyne and Wear has a reliance on public administration, healthcare, retail/distribution and manufacturing for its wealth. It has a small banking and finance sector in Newcastle, but this is not as well developed as other larger metropolitan areas. These key sectors have individual transport requirements – retail, distribution and manufacturing are strongly reliant on good transport for business reasons, whereas public administration and healthcare are reliant on transport as a means of assembling a workforce into one place at the start of every working day. Having access to a skilled workforce is therefore crucial to these sectors. These sectoral transport demands are quite different, but equally important to maintaining economic success in Tyne and Wear.

The local economy has seen some success in recent years. But it is fragile as a consequence of the recent economic downturn and retains pockets of deep economic and social deprivation. The employment rate in the North East is the lowest in England at 64.9% with unemployment at 11.6% being the highest; - the rate in the South East is currently 6.3%[1]. It is notable that the estimated rate of 11.6% for the North East is the highest unemployment rate for any region since the 3 month period to June 1996.

In addition the area exhibits poor levels of health - the inactivity rate in the North East is at 26.4% the highest in England[2]. Health levels are a consequence of lifestyles that have developed over many years, and transport can play a limited but nonetheless important, role in addressing these issues by encouraging active travel.

Levels of public sector employment are exceptionally high. The Economic Review of the City-Region recognises public services as one of the *'two substantive specialisms'* in the City-Region. Public services comprise some 122,500 full time equivalent jobs in the City-Region, some 17% of all employment. If health services are included in the total this increases to over 207,000, or 29% of the total, compared with the national average of 20%.

Key Messages / Issues:
The review of evidence led to a list of key messages, which in turn created a priority list of interventions and the overarching theme for the Business Case. This can be found in Annex 2 of the Strategic Case.

The employment sites where we propose to deliver the measures are shown below on Figure 3.1. These encompass the main sites in the priority key employment / development areas as follows:

Within the Northern employment 'hub' (based on the Newcastle and the North economic geography):

- Balliol, Gosforth and Quorum Business Parks
- Cobalt Business Park, Silverlink Retail Estate and Tyne Tunnel Trading Estate

[1] ONS – Regional Labour Market Statistics Bulletin November 2011
[2] ONS – Regional Labour Market Statistics Bulletin November 2011

- Great North Road corridor employment sites
- Newcastle City Centre and Gateshead Quays
- Port of Tyne and Bede Industrial Estate
- South Shields town centre
- Team Valley

Within the Southern axis (based on the City of Sunderland and Washington economic geographies):

- Doxford Park
- City of Sunderland and Washington corridor (A1231, including Sunderland Enterprise Park, Sunderland Royal Hospital, Waterview Park and Pattinson Industrial Estate)

These are the sites for which individual area based packages have been developed. Proposals have also been put forward in relation to further marketing support for local centres, where this will complement major local regeneration initiatives.

Figure 3.1 Location of Employment Sites

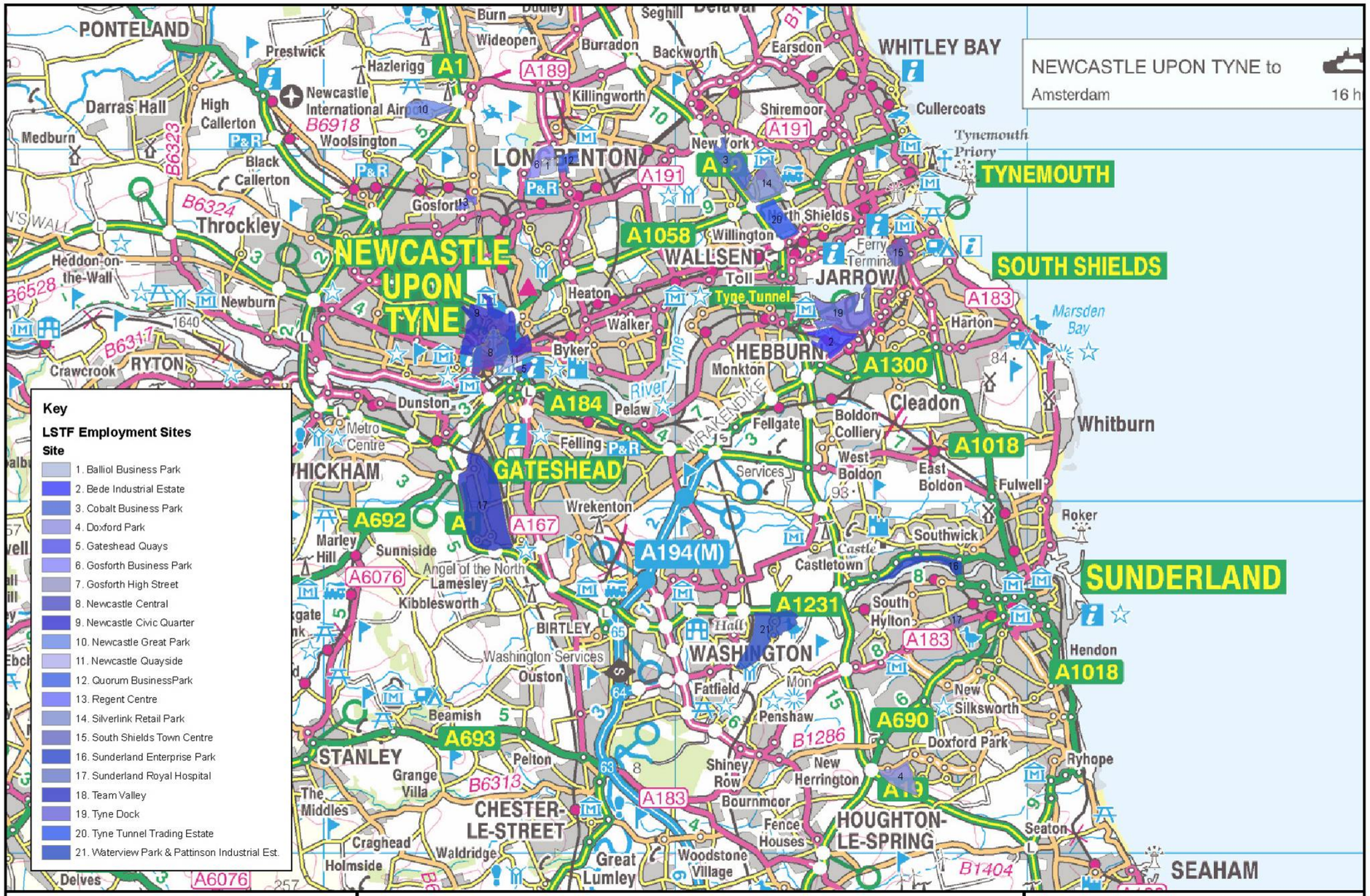


Figure 3.1	LSTF Employment Site Locations

3.2. The Measures

A detailed description of the package proposals is provided in the Strategic Case and accompanying annexes.

3.3. Package of Measures & Estimated Effectiveness of Package of Measures to encourage mode shift.

Following the identification of individual measures and initiatives, packages of measures specific to each employment site have been developed. The aim of the packages of measures was to maximise modal shift for each site. The approach adopted to achieve this was based on appropriate levels of investment, and assessment of propensity to change to sustainable modes of transport.

The Department for Transport's documentation library, local transport knowledge and studies, site specific characteristics, travel planning data, wider local employment and economic sources, supported by census data was used was used as the main tools to identify site specific propensity change.

The full assumptions used to develop the package of measures are found within the Appendix C. The summary table below outlines the package of measures by site and the range of expected mode shift associated with delivering the package of measures.

Table 3.3. Package of measures for each employment site and assumed effectiveness of packages of measures.

Employment Area	Predicted Effectiveness of Measures								
Gateshead Quays		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	4.0 %	1.0 %	0.5 %	24.1%	6.0%	0.7 %	5.0%	58.7 %
	2015	5.0 %	5.0 %	0.5 %	28.0%	8.0%	0.7 %	7.0%	45.8 %
	2021	5.0 %	5.5 %	0.5 %	28.0%	8.0%	0.7 %	7.0%	45.3 %
Team Valley		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	3.0 %	1.0 %	1.0 %	13.0%	3.0%	2.0 %	13.0%	64.0%
	2015	4.2 %	2.7 %	1.0 %	13.8%	3.0%	2.0 %	14.5%	58.8%
	2021	4.8 %	3.5 %	1.0 %	14.4%	3.0%	2.0 %	14.5%	56.8%

Gosforth Corridor (Gosforth High Street)		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	9.0 %	1.3 %	0.6 %	16.0%	6.9%	1.7 %	8.9%	55.6 %
	2015	10.0 %	3.0 %	0.6 %	19.0%	7.5%	1.7 %	8.9%	49.3 %
	2021	10.0 %	3.0 %	0.6 %	19.0%	7.5%	1.7 %	8.9%	49.3 %
Gosforth Corridor (Great Park)		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	2.0 %	3.0 %	0.0 %	11.0%	2.0%	0.0 %	8.0%	74.0 %
	2015	2.0 %	4.0 %	0.0 %	12.0%	2.0%	0.0 %	11.0%	69.0 %
	2021	2.0 %	4.0 %	0.0 %	12.0%	2.0%	0.0 %	12.0%	68.0 %
Gosforth Corridor (Regent Centre)		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	7.0 %	1.0 %	0.0 %	9.0%	14.0%	0.0 %	19.0%	50.0 %
	2015	7.0 %	2.0 %	0.0 %	11.0%	16.0%	0.0 %	20.0%	44.0 %
	2021	7.0 %	2.0 %	0.0 %	11.0%	16.0%	0.0 %	20.0%	44.0 %
Newcastle City Centre		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	7.0 %	4.0 %	2.0 %	28.0%	18.0%	2.0 %	13.0%	26.0 %
	2015	7.0 %	5.0 %	2.0 %	29.0%	19.0%	2.0 %	13.5%	22.5 %
	2021	7.0 %	5.5 %	2.0 %	29.0%	19.0%	2.0 %	13.5%	22.0 %
Balliol		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	3.7 %	1.9 %	0.0 %	16.0%	19.0%	1.0 %	14.0%	44.4 %
	2015	4.7 %	4.9 %	0.0 %	16.5%	19.5%	1.0 %	14.0%	39.4 %
	2021	7.6 %	5.7 %	0.0 %	16.9%	19.6%	1.0 %	14.0%	35.2 %
Cobalt		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car

	Base	2.0 %	2.0 %	1.0 %	17.0%	7.0%	0.0 %	7.0%	64.0 %
	2015	2.0 %	4.0 %	1.0 %	21.0%	8.0%	0.0 %	8.0%	56.0 %
	2021	2.0 %	5.0 %	1.0 %	22.0%	8.5%	0.0 %	8.0%	53.5 %
Gosforth Business Park		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	7.8 %	1.9 %	0.7 %	12.4%	5.1%	0.8 %	11.1%	60.2 %
	2015	11.7 %	5.7 %	0.7 %	12.8%	5.2%	1.0 %	11.1%	51.8 %
	2021	11.7 %	6.7 %	0.7 %	13.3%	5.7%	1.0 %	14.1%	46.8 %
Quorum		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	3.7 %	1.9 %	0.0 %	16.0%	19.0%	1.0 %	14.0%	44.4 %
	2015	4.7 %	4.9 %	0.0 %	16.5%	19.5%	1.0 %	14.0%	39.4 %
	2021	7.6 %	5.7 %	0.0 %	16.9%	19.6%	1.0 %	14.0%	35.2 %
Silverlink		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	5.1 %	4.2 %	0.8 %	8.4%	1.9%	0.2 %	16.2%	63.2 %
	2015	5.5 %	6.0 %	0.8 %	11.5%	2.0%	0.2 %	16.0%	58.0 %
	2021	6.0 %	6.2 %	0.8 %	13.8%	2.0%	0.2 %	16.0%	55.0 %
Tyne Tunnel Trading Estate		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	11.7 %	4.8 %	1.1 %	10.6%	3.2%	1.5 %	10.4%	56.7 %
	2015	12.0 %	7.0 %	1.1 %	14.1%	3.5%	1.5 %	11.0%	49.8 %
	2021	12.0 %	8.5 %	1.1 %	14.9%	3.5%	1.5 %	11.5%	47.0 %
Bede Industrial Estate		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	11.0 %	3.0 %	1.0 %	13.0%	8.0%	0.0 %	10.0%	54.0 %
	2015	13.0 %	6.0 %	1.0 %	14.0%	9.0%	0.0 %	10.0%	47.0 %

	2021	13.5 %	6.0 %	1.0 %	14.5%	10.0%	0.0 %	10.0%	45.0 %
Port of Tyne		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	11.0 %	3.0 %	1.0 %	13.0%	8.0%	0.0 %	10.0%	54.0 %
	2015	13.0 %	6.0 %	1.0 %	14.0%	9.0%	0.0 %	10.0%	47.0 %
	2021	13.5 %	6.0 %	1.0 %	14.5%	10.0%	0.0 %	10.0%	45.0 %
South Shields		Walk	Cycle	M/Cl	Bus	Metro	Train	Car Share	Car
	Base	10.0 %	2.0 %	1.0 %	19.0%	3.0%	0.0 %	10.0%	55.0 %
	2015	8.0 %	4.0 %	1.0 %	22.0%	5.0%	0.0 %	10.0%	50.0 %
	2021	10.0 %	5.0 %	1.0 %	25.0%	6.0%	0.0 %	10.0%	43.0 %
Doxford Park		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	3.0 %	2.0 %	1.0 %	6.0%	2.0%	0.0 %	7.0%	79.0 %
	2015	3.5 %	2.5 %	1.0 %	7.0%	2.0%	0.0 %	10.0%	74.0 %
	2021	3.5 %	2.5 %	1.0 %	7.0%	2.0%	0.0 %	13.0%	71.0 %
Sunderland Enterprise Park		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	12.0 %	3.0 %	1.0 %	8.0%	3.0%	1.0 %	9.0%	63.0 %
	2015	12.0 %	5.0 %	1.0 %	12.0%	3.0%	1.0 %	12.0%	54.0 %
	2021	12.0 %	5.0 %	1.0 %	15.0%	3.0%	1.0 %	14.0%	49.0 %
Sunderland Royal Hospital		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car
	Base	12.0 %	3.0 %	1.0 %	8.0%	3.0%	1.0 %	5.0%	67.0 %
	2015	12.0 %	5.0 %	1.0 %	13.0%	4.0%	1.0 %	8.0%	56.0 %
	2021	12.0 %	5.0 %	1.0 %	15.0%	4.0%	1.0 %	10.0%	52.0 %
Waterview / Pattinson		Walk	Cycle	M/C	Bus	Metro	Train	Car Share	Car

Business Park	Base	5.0 %	1.0 %	0.6 %	10.0%	0.5%	0.3 %	12.5%	70.1 %
	2015	7.0 %	3.0 %	0.6 %	15.0%	0.5%	0.3 %	13.0%	60.6 %
	2021	7.0 %	3.0 %	0.6 %	18.0%	0.5%	0.3 %	14.0%	56.6 %

3.4. Information on local factors used.

The model has considered background economic growth based on Tempro 6.2, and specific factors are included in the assumptions table, Appendix C. Reductions in employment levels between 2009 business register figures and current day employment levels have been factored to incorporate regional impacts of the Government's Comprehensive Spending Review (CSR). The CSR has impacted each job sector differently therefore and Table 3.4 below summarises the respective job losses by sector.

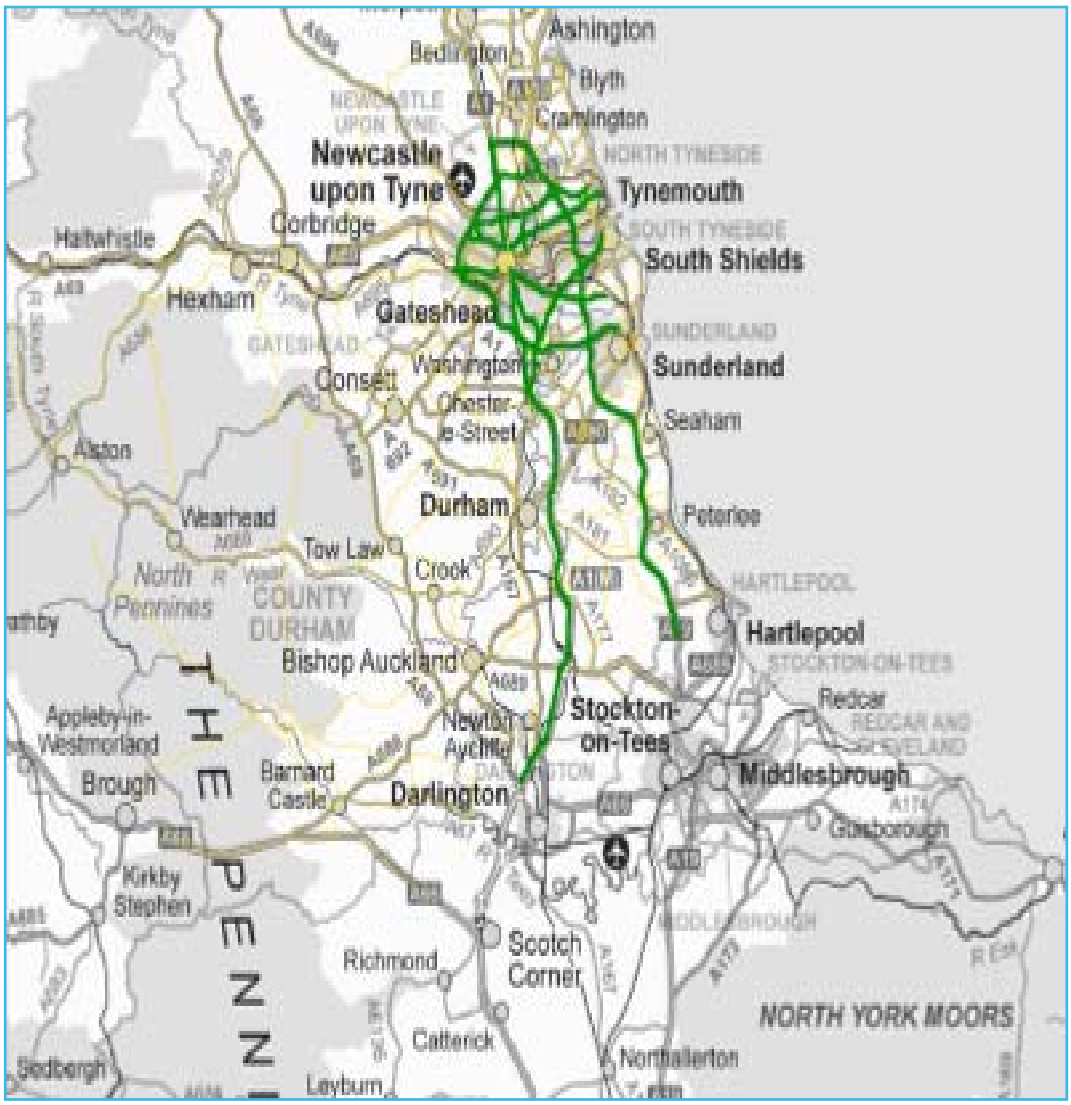
	Managers & Senior Officials	Professional	Associate Professional and Technical	Administrative and Secretarial	Skilled Trades	Personal Service	Sales and Customer Service	Process, Plant and Machine	Elementary	Total
Job Losses (proportion)	10.79%	10.46%	23.21%	29.17%	6.23%	3.75%	4.44%	2.73%	9.22%	35,780

Sourced from "Tyne and Wear City Region – Potential Impact from the Government's Comprehensive Spending Review November 2010" Policy Research Group, St Chad's College, Durham University.

3.5. Extents of the Network Modelled.

The model covers A roads, B roads and Motorways in the Tyne and Wear area. A map showing the extents of the model is shown in Figure 3.5 Detailed desciption of the models extents is given in the Transport Modeling Technical Note.

Figure 3.5. Extents of the Network Modelled



3.6. CBA Full Appraisal Input and Outputs (reference to input and output files).

The cost benefit analysis has been carried out using a spreadsheet model, utilising WebTAG methodology and parameters. Each link in the model is defined in terms of its link length and is given an associated speed-flow curve – COBA speed-flow curves have been used. The model does not include junctions and as a result the speed-flow curves have been adjusted by adding delay equal to flow multiplied by a constant. The constant was derived by comparing modelled journey times, at base model flow levels, with observed journey times. The derivation of the model is described in Chapter 6.

The cost benefit analysis has been carried out for journey time savings, using the speed-flow curves in the spreadsheet model. The appraisal has been carried out over the period 2015 to 2021. The benefits have been determined by comparing Do-Minimum flows and journey times to Do-Something flows and journey times. The

time savings experienced by Do-Something traffic have then been applied to Do-Something traffic flows to derive, using WebTAG values of time, a monetary value for these savings. All figures are in 2002 prices, discounted to 2002 values.

The estimated scheme costs (see Financial Case for details), split by DfT, Local Authority and Private Contributions is summarised below:

Table 3.4 Scheme Cost Summary

Year	DfT Contribution	Local Authority Contribution	Private Contribution	Total
2012	£2,389,125	£806,157	£648,662	£3,843,944
2013	£6,126,913	£2,067,391	£1,663,496	£9,857,799
2014	£6,691,850	£2,258,017	£1,816,880	£10,766,747
2015	£2,954,063	£996,783	£802,047	£4,752,893
Total	£18,161,950	£6,128,348	£4,931,085	£29,221,383

The above estimates have been derived following risk assessment workshops and include for 15% optimism bias.

Converting the above costs to 2002 prices, discounted to 2002 given the following Present Value Costs:

PVC (DfT Contribution) – £9.620M
PVC (Public Money) – £12.866M

3.7. Details of Assumptions about operating costs and commercial viability.

In carrying out the economic appraisal we have not assumed that additional bus services will be viable beyond 2021. In practice this is considered to be a pessimistic assumption and it is hoped that services will be commercially viable in the longer term. At present however, there has been no rigorous assessment of viability and in order to avoid overestimating benefits longer term benefits have not been assessed. At this stage operating costs that will be incurred by local authorities have been included in the overall scheme costs estimates (e.g. for travel plan promotion) but operating costs that would be incurred by the private sector (e.g. bus operators) have not, as no reliable information on this is available. Full details on assumptions used as included in Appendix C.

3.8. Details of the maintenance delay costs/savings.

The measures proposed will, in general have little impact on the highway network, and as a result maintenance delay savings will be negligible. No additional carriageway capacity is created and there will be no opportunity to reduce the impact of future maintenance schemes. These effects have therefore not been assessed.

3.9. Details of any delays during construction.

There are no heavy highways infrastructure measures associated with this bid. There may be limited impacts during the implementation of some of the cycle route

improvements (specifically NCC strategic routes), however any delays are likely to be brief.

3.10. Maintenance and renewal costs.

A large proportion of the proposals consist of softer measures such as travel planning, education, information provision, sustainable travel promotion etc. and will have no maintenance/renewal costs. Those schemes that do involve infrastructure provision will require limited maintenance/renewal – e.g. cycle lanes. In comparison with other costs these are considered to be negligible and have not therefore been included in the appraisal.

3.11. Optimism bias.

An optimism bias uplift of 15% has been applied to the scheme costs – using the guidance provided in the Treasury Green Book. Further details on the derivation of costs and optimism bias are provided in Appendix D.

3.12. Appraisal periods.

The appraisal has been carried out over the 6 year period 2015 to 2021. 2015 has been chosen as this is the year when all of the measures will have been implemented. In reality, funds will be allocated from 2012 onwards and a number of the proposals will be implemented and effective between 2015 and 2021. The benefits over this period have not been assessed and in this respect the economic appraisal results are a conservative estimate. 2021 has been chosen as this represents a reasonable estimate of the period over which benefits can be assumed to continue without significant reductions due to possible reduced levels of funding.

3.13. Longevity of impacts.

The longevity of impacts will, to a large degree, be dependant upon the success of the proposals and longer term funding arrangements. The measures proposed are based on successful approaches that have been implemented already in the region – see section 5 of the Financial Case for details – and this is considered the best case for promoting long term sustainability. Focussing on employment areas will offer opportunities for future developer funding and other funding streams to provide ongoing support for the measures. In addition, the local authority partners are committed to ongoing monitoring with a view to making the case for future funding. Notwithstanding the good prospects for sustaining the forecast impacts however, there is clearly a significant level of uncertainty surrounding future funding. Should specific measures be curtailed or wound down, although there would be significant outputs of lasting benefit, there would be a reduction in ongoing benefits. In order to avoid overestimating overall benefits the appraisal does not include benefits accruing beyond 2021.

3.14. Sensitivity testing

The model assumes a background growth level taken from the TEMPRO software using the NTM growth calculation function.

Because the future years are relatively close, variation in growth forecasts will be relatively minor. The more important variable with regard to sensitivity testing is the success/impact of the various measures proposed. As a result no sensitivity testing was undertaken with respect to background growth forecasts.

The effectiveness of the schemes in terms of modal shift did undergo sensitivity testing. In each case, and for each employment site, 3 estimates of modal shift were made, representing, low, central and high effectiveness. The 3 estimates of modal shift were determined with reference to the DfT's resource library of documents and a number of local schemes/other sources. Greater detail on this process is provided in the table of assumptions. The effects were then modelled independently.

4. Economic case assessment

4.1. Proportionality Assessment

The Department for Transport, through their "LSTF-supplementary guidance for Local Authorities Shortlisted for Large Projects" have advised that due to the tight timescales involved in the preparation of bids, local authorities are encouraged to take a proportionate approach to modelling and appraisal and to place the most effort on those aspects which are most significant to the business case.

Prior to the assessment of the package of measures, this section of the Economic Case will provide the Tyne & Wear approach to proportionality, providing justification for any significant deviations from standard WebTag modelling and appraisal techniques.

A detailed assumption table has been developed which outlines the key assumptions made through the development of the package of measures and the appraisal process. The assumption table provides supplementary and supporting information to the proportionality assessment.

The assumption table is provided within Appendix C of the Economic Case

Table 4.1 below provides the Tyne & Wear approach to proportional appraisal. The proportionality assessment has been broken down by the core appraisal objectives and transport modelling.

Objective Heading	Sub-Objective	Comments
Environment	Noise	The Noise impacts are likely to be minimal therefore a quantitative assessment has not been carried out. Information on the Noise impacts is limited to the AST.
	Local Air Quality	The Local Air Quality impacts are likely to be minimal therefore a quantitative assessment has not been carried out. Information on the Local Air Quality impacts is limited to the AST.
	Green House Gases	The Green House Gases impacts have been calculated across the network as a whole. We will therefore not be populating an AST summary on a site by site basis.
	Landscape	There were no impacts identified, so information on Landscape is limited to the AST. Landscape issues are site specific so the Landscape sub-objective was assessed on a site by site basis.
	Townscape	There were no impacts identified, so information on Townscape is limited

		to the AST. Townscape issues are site specific so the Townscape sub-objective was assessed on a site by site basis.
	Heritage of Historical Resources	There were no impacts identified, so information on Heritage of Historical Resources is limited to the AST. Heritage of Historical Resources issues are site specific so the Townscape sub-objective was assessed on a site by site basis.
	Biodiversity	There were no impacts identified, so information on Biodiversity is limited to the AST. Biodiversity issues are site specific so the Biodiversity sub-objective was assessed on a site by site basis.
	Water Environment	There were no impacts identified, so information on Water Environment is limited to the AST. Water Environment issues are site specific so the Water Environment sub-objective was assessed on a site by site basis.
	Physical Fitness	Whilst we recognise that the studies have been undertaken which estimate the absenteeism benefits of new walking and cycling facilities however due to the time constraints in preparing the economic case we have not calculated the absenteeism benefits and instead have directed resources towards quantifying the health benefits of walking and cycling. We are also concentrating our quantified analysis on new journeys made by walking and cycling, not increased accessibility or removal of severance issues. In addition we have not developed an origin and destination based transport model for the LSTF economic case. This means that we have not been able to accurately quantify distance travelled by mode. For this we have had to utilise existing census data. This also means that we will not be able to present new cycling and walking trips at above and below 30mins as requested within the physical activities worksheet; This will be

		adapted to only present total numbers and average distances. The health benefits have been presented on a network
	Journey Ambience	Whilst we recognise that the measures we are introducing will have a significant effect on the number of people who choose to walk and cycle, the majority of the initiatives are smarter choices led, without defined infrastructure improvements. In addition whilst infrastructure measures have been included in the package of measures for various sites, no analysis specifically on the use of those routes has been undertaken. Only the effectiveness of the full package of measures has been quantified. This makes quantifying journey ambience benefits problematic. Given the timescales to deliver the Economic Case we have therefore not quantified Journey Ambience benefits.
Safety	Accidents	Vehicles accident savings determined using spreadsheet model including observed accidents. Cycle accidents were assessed separately. WebTAG values and method applied.
	Security	Assessment carried out using WebTAG work sheet.
Economy	Public Accounts	Cost estimates developed including optimism bias. Risk assessment carried out.
	Business Users and Transport Providers	Only journey time benefits assessed – using spreadsheet economic appraisal model. The model adopts WebTAG values and methods. Vehicle operating and tax revenue impacts assumed to be negligible.
	Transport Economic Efficiency for Consumer Users	
	Reliability	Assumed neutral – no detailed assessment carried out.
	Wider Economic Impacts	No assessment of wider economic impacts carried out (agglomeration etc). An assessment of potential employment creation has been made based on sites where congestion will constrain growth and the extent to which the measures remove these constraints.

Accessibility	Access to the Transport System	Impacts of proposal assessed using Accession for public transport and cars. Impacts on cycling and walking assumed negligible.
	Option Values	Not assessed.
	Severance	Negligible impact – neutral.
Integration	Transport Interchange	The Transport Interchange impacts are likely to be minimal and have been assumed on a network-wide basis.
	Land-use Policy	This sub-objective has been included in the Strategic Case and therefore no assessment of land-use policies has been included in this part of the submission.
	Other Government Policies	This sub-objective has been included in the Strategic Case and therefore no assessment of other government policies has been included in this part of the submission.
Transport Modelling		A simplified model has been developed as no suitable detailed model is available. A link only spreadsheet model has been developed – using COBA speed-flows curves. Assignment of trips that switch from car to other modes has been carried out using a simplified VISUM model. The VISUM model was calibrated against journey times. The model outputs link journey times and flows. The modelling is consistent with WebTAG principles. Further details on the modelling process are presented in Chapter 6.

4.2. Assessment of environmental impacts

4.2.1. Noise

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

A detailed quantitative assessment of the noise reductions associated with the LSTF scheme proposals would likely result in a small benefit in monetary terms. These would be in-direct benefits as Noise reduction is not the primary aim of the LSTF proposals.

4.2.2. Local Air Quality

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

A detailed quantitative assessment of the local air quality impacts associated with the LSTF scheme proposals would likely result in a small benefit in monetary terms. Whilst there are several AQMA's in Tyne & Wear for which very small improvements in air quality would be enjoyed, the associated air quality data has not been made available.

The AQMA's in Tyne & Wear are illustrated in figure 4.2.2.

The LSTF proposals will reduce the number of vehicles on the local highway network but the associated change in vehicle speeds are insignificant (less than 20 km/hr change in peak hour speed) in terms of impacting air quality measurements.

Figure 4.4.2: Tyne and Wear AQMA Locations

Figure 4.2.2	Tyne & Wear AQMA Locations	Reproduced from, or based on, Ordnance Survey map material with the permission of the Controller of Her Majesty's Stationery Office. (c) Crown Copyright 2011. Licence number LA100019569 Produced by NJB Scale: NTS Date: 15/12/11

4.2.3. Greenhouse Gases

For the do minimum and do something scenarios we calculated the fuel consumption per vehicle per link, using formula provided with Unit 3.5.6 Values of Time and Operating Costs. This formula enabled us to estimate the average fuel consumption per vehicle, expressed as Litre of Fuel consumed per Kilometre. The formula was applied to the traffic flow forecasts for the do minimum and do something scenarios taken from the spreadsheet model. We also undertook a sensitivity test on the do something scenario based on an optimistic and pessimistic modal shift outcomes.

The fuel consumption per vehicle per link was then converted to an annualised figure for all vehicles for the do minimum and do something scenarios. The assessment period for appraising the carbon reduction was 2015 to 2021. This is consistent with the appraisal of other quantifiable sub-objectives. This approach however underestimates the carbon reduction impact through the programme delivery period.

Total fuel consumption over the assessment period was then converted to tonnes of carbon using the formula provided within Unit 3.5.6. The results of the assessment are summarised within table 4.2.3 below. The detailed changes in carbon between the do minimum and do something scenarios are provided in worksheet 1 Greenhouse Gases – Strategy & Plan Level within Appendix B.

The CO2 reductions have also been calculated using the conversion rate of 14t carbon equates to 44t CO2 based on the relative atomic mass of Carbon as an element and CO2 as a compound.

The conversion workings are provided within the Tyne & Wear LSTF model outputs spreadsheet.

Table 4.2.3 Summary of estimated value of carbon reduction over assessment period 2015-2021.

Scenario	Kt carbon reduced	Kt Co2 Reduced	Value (£)
Pessimistic	8.23	30.18	£ 477,702.70
Medium	10.26	37.62	£ 596,251.59
Optimistic	12.69	46.54	£ 738,288.43

4.2.4. Landscape

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

4.2.5. Townscape

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

4.2.6. Heritage of Historical Resources

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

4.2.7. Biodiversity

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

4.2.8. Water Environment

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

4.3. Physical Fitness

The WebTag unit 3.14.1 Guidance on the appraisal of walking and cycling schemes provides the following methodology for the quantification of the benefit to the population using active modes for any level of activity, not just those achieving a specific threshold. Theses include benefits for

- For any new walk and cycle trips (shifting from mechanised modes) there will be some health benefits to each individual;
- For existing walk and cycle trips, health benefits may change where the following may be impacted by a transport intervention:
- Trip distance (route choice may change based on more direct routing, as an impact of changes to severance);
- where the journey time remains very similar (i.e. no introduction or removal of severance, no changes in travel speeds or route choice, etc.), health benefits will be largely unchanged; and for existing walk and cycle trips,

We have taken a proportionate approach to the quantification of the monetary value of cycling and walking, concentrating on new walking and cycling trips shifting from mechanised modes. This outcome of the package of measures most direct and

significant contribution the package of measures will have to realising a monetary value for walking and cycling.

Table 4.3 below outlines the number of new walking and cycling trips generated through the package of measures the average distance and the monetary value applying the methodology outlined within TAG Unit 3.14.1

Table 4.3 The Monetary Value of New Walking and Cycling Trips (Health).

Mode	Year of Assessment	Benefit Range	Average Distance (KM)	Number of New Trips (Daily)	Value £M
Cycling	2015	Low	5.005	1828	**1.1115**
Cycling	2015	Medium	5.1998	2675	**1.667**
Cycling	2015	High	5.291857	3557	**2.2815**
Cycling	2021	Low	5.04529	3612	**2.3173**
Cycling	2021	Medium	5.031484	4624	**2.8253**
Cycling	2021	High	5.025791	5618	**3.4286**
Walking	2015	Low	2544.198814	597.670064	**0.1845**
Walking	2015	Medium	2542.683293	601.3904547	**0.185**
Walking	2015	High	2541.089239	608.6688583	**0.1879**
Walking	2021	Low	2144.262809	3266.620581	**0.85**
Walking	2021	Medium	2145.038458	3277.491528	**0.8528**
Walking	2021	High	2145.43856	3312.521986	**0.8632**

Given the time constraints in developing the economic case we have used the default values provided in unit 3.14.1 (Guidance on the Appraisal of Walking and Cycling Schemes) for Mean Speed, Relative Risk, Expected deaths in Population, Lives saved in Year Cost of Life. The full workings of this assessment are found within Appendix A.

The Physical Fitness worksheet is provided within Appendix B of the report.

4.4. Journey Ambience

As per table 4.1 the impacts have been classified as Neutral. The rationale behind the assessment score is provided in the AST.

4.5. Assessment of safety impacts and assumed accident rates

The assessment of safety impacts is split into two separate categories – accidents and security.

4.5.1. Accidents

The impact of the various proposals on accidents has been assessed using a spreadsheet model that is consistent with the methodology set out in WebTAG unit 3.4.1. There are two potential impacts that the proposals will have on accidents numbers and costs; a reduction in vehicle accidents due to reduced traffic volumes in

the peak periods; and an increase in cycle accidents due to the increased volume of cycle trips.

Vehicle Accidents

The various measures that are proposed will result in modal shift amongst travel to work trips and as a result will bring about reductions in traffic during peak periods. The assessment of impacts on vehicle accidents has been carried out using output from the spreadsheet traffic model.

The extent of the network assessed is that covered by the spreadsheet model, and is shown in Figure 3.5. The assessment has been carried out over the period 2015 to 2021. All economic results are presented in 2002 prices, discounted to 2002 and figures for accidents costs, GDP growth and other relevant elements are all taken from appropriate WebTAG tables.

In order to determine current accident rates on the network, the accident statistics for the three year period 2008 – 2010 were examined. As the model is a link only model, junction accidents were assigned to the appropriate link based on the OS reference. Accident rates were then determined using estimated AADT flows – 2009 flows were used to ensure that the average accident rate over three years was determined. The accident impacts of the proposals were then determined by applying the observed accidents rates and Do-Minimum/Do-Something flows to each link in the network. The AADT flows were estimated using a factor to convert peak period flows derived from permanent traffic counters across the region. Accidents in future years were estimated using the appropriate accident rate decay value from the COBA Manual.
The results of the accident appraisal are summarised below:

Table 4.5.1 Forecast Vehicle Accident Savings

Low Growth	Forecast Accident Numbers			
	Fatal	Serious	Slight	Total
Do-Minimum	52.3	818.8	6051.9	6,923
Do-Something	51.7	809.8	5985.5	6,847
Savings	0.6	9.0	66.4	75
Medium Growth	Fatal	Serious	Slight	Total
Do-Minimum	52.3	818.8	6051.9	6,923
Do-Something	51.6	807.9	5971.5	6,831
Savings	0.7	10.9	80.4	92
High Growth	Fatal	Serious	Slight	Total
Do-Minimum	52.3	818.8	6051.9	6,923
Do-Something	51.5	805.5	5954.0	6,811
Savings	0.8	13.2	97.9	111

Note – severity splits have been taken from the 2009 Tyne and Wear splits; fatal 0.76%, severe 11.8%, slight 87.4%

Table 4.5.1b Forecast Vehicle Accident Benefits

Scenario	Benefits
Low	£3,791,452
Medium	£4,654,410
High	£5,634,956

Note – above figures are in 2002 prices discounted to a base year of 2002.
From the above tables, it can be seen that, depending upon how successful the various measures are, they are forecast to save between 75 and 111 personal injury accidents over the 6 year evaluation period. In economic terms this represents a benefit of between £3.8M and £5.6M.

Cycling Accidents

The proposals are forecast to result in the following increases in cycling trips:

Table 4.5.1c Forecast Increases in Cycle Trips

		Increased Trips
2015	Low	1828
	Medium	2675
	High	3557
2021	Low	3612
	Medium	4624
	High	5618

In order to estimate the increased number of personal injury accidents involving cyclists we have adopted the methodology set out in WebTAG unit 3.14.1. This assumes that the increase in cycling accidents is not linear (i.e. if cyclists double, accidents double), but is governed by a power function with a coefficient of 0.4. This means that a doubling of cyclists results in a 32% increase in accidents ($2^{0.4}$ = 1.32).

Forecasting future accidents requires an estimate of total cycling trips and cycling accidents. Cycling accidents were obtained from the Tyne and Wear TADU system for the three year period 2008 – 2010 giving an average annual total of 273.3. The Tyne and Wear LTP estimated that in 2005 approximately 1% of all trips in the region were cycling trips. Applying this figure to the estimated total number of trips in the region (estimated in 2005 during development of the Tyne and Wear Transport Model) gives a total number of cycle trips in 2005 of 24,824. This figure has then been factored to 2009 levels assuming 2% growth per annum – taken from LTP monitoring of cycle trips in the region. Using these figures and applying the power function gives the following accidents forecasts.

Table 4.5.1d Forecast Cycling Accident Savings

Low Growth	Forecast Accident Numbers			
	Fatal	Serious	Slight	Total
Do-Minimum	16.0	328.6	1731.3	2,076
Do-Something	16.3	335.0	1764.7	2,116
Savings	-0.3	-6.3	-33.4	-40
Medium Growth	Fatal	Serious	Slight	Total
Do-Minimum	16.0	328.6	1731.3	2,076
Do-Something	16.4	336.9	1774.7	2,128
Savings	-0.4	-8.2	-43.4	-52
High Growth	Fatal	Serious	Slight	Total
Do-Minimum	16.0	328.6	1731.3	2,076
Do-Something	16.5	338.8	1784.7	2,140
Savings	-0.5	-10.1	-53.4	-64

Note – severity splits have been taken from the 2010 Tyne and Wear splits for cyclist accidents; fatal 0.77%, severe 15.8%, slight 83.3%
The economic impact of the above increases in cycling accidents have been determined by applying the average cost of a cycling accident – taken from WebTAG - £44,400 in 2002 prices. It was assumed that Do-Minimum cycling numbers would continue to grow at 2% per annum. Do-Something cyclist numbers were the Do-Minimum numbers plus the forecast increases due to the scheme proposals. Applying these figures and discounting results to 2002 gives the following:

Table 4.5.1e Forecast Cycling Accident Benefits

Scenario	Benefits
Low	-£1,019,529
Medium	-£1,332,525
High	-£1,630,916

From the above tables it can be seen that the proposals are likely to result in an increase in the number of cycling accidents of between 40 and 64, with increased economic costs of between £1M and £1.6M.

The overall accident impacts of the proposals are summarised in the following tables.

Table 4.5.1f Forecast Vehicle and Cycling Accident Savings

Low Growth	Forecast Accident Numbers			
	Fatal	Serious	Slight	Total
Do-Minimum	68.3	1147.4	7783.2	8999
Do-Something	68	1144.8	7750.2	8963
Savings	0.3	2.7	33	35
Medium Growth	Fatal	Serious	Slight	Total
Do-Minimum	68.3	1147.4	7783.2	8999
Do-Something	68	1144.8	7746.2	8959
Savings	0.3	2.7	37	40
High Growth	Fatal	Serious	Slight	Total
Do-Minimum	68.3	1147.4	7783.2	8999
Do-Something	68	1144.3	7738.7	8951
Savings	0.3	3.1	44.5	47

Table 4.5.1g Forecast Vehicle and Cycling Accident Benefits

Scenario	Benefits
Low	£2,771,923
Medium	£3,321,885
High	£4,004,040

The combined impacts of the proposals on accidents are therefore a saving of between 35 and 47 accidents over the 6 year evaluation period giving economic savings of between £2.77M and £4M.

4.5.2. Security

The impact of the proposals on traveller security has been assessed using the guidance set out in WebTAG unit 3.4.2. This sets out a number of security indicators to be considered and the impact of the proposals on these is set out below.

Formal Surveillance: the proposals contain a number of measures that will improve formal surveillance. These include provision of CCTV along major road corridors as part of upgrades to UTMC, and cycle parking will be provided at interchanges where CCTV is present.
Informal Surveillance: there will be minor benefits against this criterion due to greater use of public transport resulting in greater informal surveillance.

Landscaping: the proposals will have no significant impact on this indicator.

Lighting and Visibility: as part of the proposals, well lit cycle routes will be provided to employment sites. Also, cycle hubs will be provided in well lit areas at interchanges and employment sites.

Emergency Call Facilities: the proposals will have no significant impact on this indicator.

Pedestrian and Cycling Facilities: A number of cycling routes will be enhanced to provide well lit and easily visible facilities.

The impacts on the relevant criteria are set out in the Assessment of Security Worksheet in Appendix A. From this it can be seen that the impact of the proposals on security is assessed as Moderate Positive.

4.6. Assessment of economic impacts

The benefits associated with the scheme are assessed using the spreadsheet model. Details of the modelling processed are outlined in Chapter 6 – Transport Modelling Essentially, the reduction in flows on each link associated with the implementation of the scheme is estimated for each link in the spreadsheet model. This reduction is then applied to the flow projected on that link, and speed flow curves are used to calculate the journey time saving on that link.
The journey time savings are then applied to the do minimum flows in order to calculate the economic benefits.
Benefits are calculated from 2015 through 2021, using the methodology outlined in WebTAG.
The Benefit to Cost Ratios (BCRs) have been calculated for Low, Central and High effectiveness scenarios, and the results are given in the Analysis of Monetised Costs and Benefits (AMCB) table in Paragraph 4.14 below.

4.6.1. Reliability

Reliability is a measure of the variability in journey times that drivers are unable to predict. Where a detailed traffic model and suitable data is available, the benefits due to improved reliability can be calculated. This requires information on origin-destination totals, journey distances, journey times and the standard deviation of journey times. The model we have developed is not in sufficient detail to carry out this assessment.

The alternative method for assessing reliability is based on the principle of stress. This applies only to highway links, and is based on the ratio of Annual Average Daily Traffic (AADT) to Congestion Reference Flow. In this case, although the proposals

are forecast to reduce traffic flows on numerous links, the impact on AADT for affected links will be limited (primarily due to flow reductions being spread around many links and applying to peak hours only). As a result the impact on reliability is assessed as neutral.

4.7. Assessment of accessibility impacts

4.7.1 Access to transport system

A proportionate approach has been taken to assessing the accessibility impacts. The impacts are expected to be relatively low, as the schemes are aimed at switching the mode of trips that are already possible on the network.

However, because some public transport measures are identified, these have been assessed quantitatively. The Accession[tm] software has been used to assess the impacts of the public transport measures.

Because the Tyne and Wear area already has excellent public transport, there is not expected to be any change in accessibility to a range of key services. The improvements instead will improve accessibility to specific employment sites. As such, analysis was undertaken to assess the total number of households accessible to these employment sites in a before and after scenario.
The results are outlined below.

	Additional households accessible to site within the following journey time thresholds.		
Site	**30 min**	**20 min**	**10 min**
Silverlink	7113	3043	45
Bede Industrial Estate	500	0	0
Team Valley	17328	330	0
Sunderland Enterprise Park	1517	843	0
Waterview Park	6543	0	0
Royal Sunderland Hospital	9759	367	744

4.7.2 Accessibility by car

Accessibility by car has not been fundamentally changed by the schemes. However, the reduction in delays on the wider network associated with the reduction of traffic resulting from the schemes will have a beneficial impact on the accessibility by car for the entire network.

4.7.3 Accessibility by Walking and Cycling

Walking and cycling accessibility impacts have not been quantified. However, it is expected that the route improvements will bring significant benefit, as routes which in the past would be unlikely to be used, owing to their poor condition, will be much more heavily used. Additionally, the softer measures implemented are likely to bring their own benefits which are not quantified in this appraisal. As such the accessibility benefits are underestimated.

4.7.4 Option Values

Option values are a measure of the value associated with the availability of alternative transport facilities/options that are used unexpectedly. They are related to a person's attitude to uncertainty and how much they value having transport options in the event that their preferred transport option is not available.

The option values aspect has not been considered in detail. However, the public transport improvements bring a slight beneficial impact in terms of Option Values, due to the new bus service introduced running Jarrow – Percy Main – Silverlink – Cobalt – Northumberland Park. Additionally, the Wear Express service 8 will have its frequency improved. The replacing of the 930, 939 and 941 bus services will have a neutral effect.

4.7.5 Severance

Given the time constraints on this appraisal, no formal severance assessment has been undertaken. However, it is foreseen that there will be no additional severance caused by the implementation of the schemes. In some areas, where footpaths or cycle paths are upgraded, the severance will be significantly reduced. However severance is not something that can be quantified within the scope of this appraisal.

4.8. Wider Economic Impacts

Wider economic impacts are defined as those affecting productivity, wider welfare gains, and supporting the regeneration of an area. In order to assess these with confidence, a land use transport interaction model is generally required.

For this assessment we do not have sufficient information or an appropriate model to assess wider economic impacts to the level of detail specified in WebTAG. However it is the case that the proposals will have beneficial impacts in terms of encouraging economic growth (through the relief of congestion hot-spots) and improving accessibility to employment opportunities for people living in areas of relative deprivation.

In the following paragraphs therefore, we consider the current economic situation in the affected area, where congestion will constrain future growth, the impact of the proposals and the potential for job creation as a result of the proposals.

4.9. Regeneration Report

4.9.1. Identified Regeneration Areas

The following areas have been identified by the relevant Local Authority as Regeneration Areas. Maps are included on the following pages:

- **Gateshead**
  - Central Urban Area
- **Newcastle upon Tyne**
  - Benwell & Scotswood
  - Elswick
  - Byker
  - Walker
- **North Tyneside**
  - West Chirton
  - Riverside (Smiths Dock)
  - Howdon
  - Wallsend
- **South Tyneside:**
  - South Shields Riverside / Tyne Dock
  - South Shields Town Centre
- **Sunderland:**
  - Hendon/East End
  - Central Sunderland (Groves, Pallion Ship Yards, Sheepfolds, Vaux, Holmeside, Farringdon Row, Stadium Park, Bonnersfield, Sunniside)
  - Hetton Downs
  - Burdon Lane / Cherryknowles and Chapelgarth

The locations of the Regeneration Areas under consideration within the appraisal are plotted on Figure 4.9.1.

Figure 4.9.1 Locations of the Regeneration Areas under consideration within the appraisal

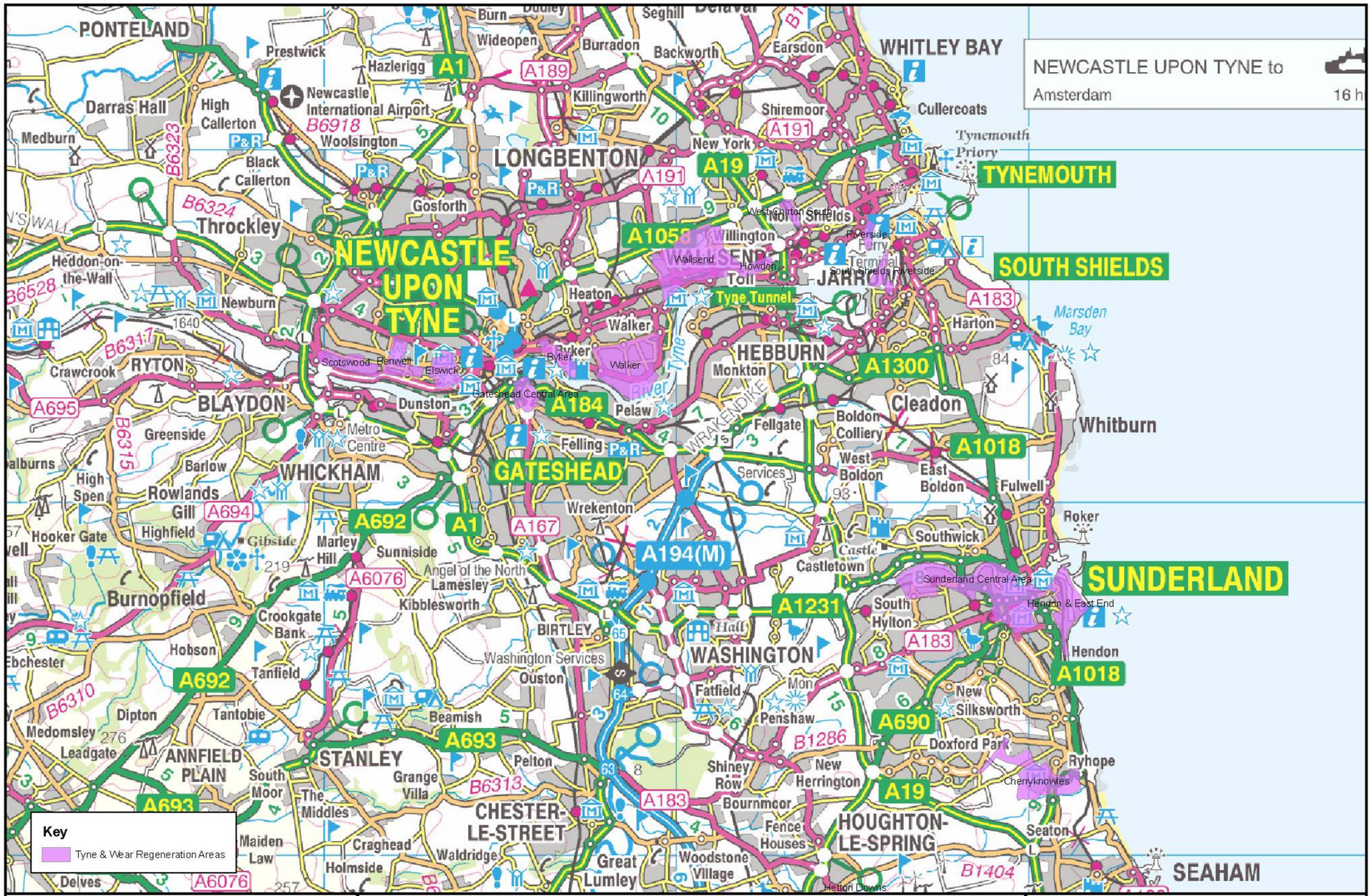


Figure 4.9.1	Tyne & Wear Regeneration Areas

4.9.2. Provide a description of the Regeneration Area's economy and how it is expected to be without intervention:

Gateshead

Central Urban Area

Gateshead Town Centre will form an integral part of a regionally significant NewcastleGateshead urban core whilst retaining its own distinctive identity and character.
Gateshead Council has provided the following details of acute problems within the town centre which regeneration aims at addressing:

- Poor quality physical environment
- Vacant Property
- Poor quality retail and commercial offer
- Limited range of 'town centre' facilities
- Poor connectivity for pedestrians and cyclists
- Through-traffic

The plans for regeneration aim to meet the following objectives:

- Reduction in retail floor space to around 40,000sq. m.
- Provide additional employment opportunities in the town centre
- Introduce a range of housing types including family housing, to meet identified needs

The Council intends that regeneration of the town centre will lead to the creation of "a vibrant town centre through the introduction of mixed use developments".

Newcastle upon Tyne

Benwell & Scotswood

The population of Benwell and Scotswood has decreased significantly over the last 30 years and the area suffers from a high population turnover (over 21% per annum in some areas). There are large areas of poor quality social housing, high levels of unemployment and the area ranks within the most deprived 20% of the country with associated high levels of anti-social behaviour.

Newcastle City Council plans to regenerate the area though large-scale residential regeneration with 2,000 new homes to be built by 2021. Along with this investment is to be made within education, community facilities and transport. Retail provision will also be improved. The area will benefit from a £270m "Bridging Newcastle Gateshead" Joint Core Strategy strategic commission to achieve these improvements. The benefits of this large-scale regeneration are envisaged as being

an increase in employment opportunities with resultant decrease in unemployment, and an increase in educational achievement.

Elswick

Elswick suffers from very high unemployment, concentrations of worklessness, crime and long-term illness. Only 18% of the population are owner-occupiers and most of the area is ranked within the most deprived 10% in the country.

By 2021 the council envisages that over £250m of public and private investment will transform the area into one which offers good quality, well designed and distinctive homes in order to cease out-migration and encourage in-migration. Regeneration in this area aims to increase the percentage of owner-occupation, decrease unemployment and reduce crime and anti-social behaviour whilst bringing about environmental improvements within the area.

Byker

The Byker/ Ouseburn regeneration area comprises Byker Estate (including the Byker Wall), the Shields Road District Centre, the Fossway Development Area, and the Lower Ouseburn Valley. The area suffers from lack of housing choice, vacant sites and buildings, crime and a fear of crime. Environmental renewal is also required in the area.

A ambitious programme of residential and environmental regeneration is proposed. In addition to this commercial and retail provision will be increased bringing economic benefits to the area. Key regeneration proposals include:

- Creation of up to 1,000 new homes by 2021 to be a mixture of owner-occupied and affordable.
- Increase in employment opportunities, in particular in the Fossway Development Area.
- Improved access to employment outside of the area
- Development of retail provision on Shield Road to create the largest shopping centre in the city outside of the city centre

Walker

Walker's population has decreased significantly since 1981. There are few owner-occupiers in the area with the majority of the population living in social rented, small, poor quality flats and terraced houses.

A £550m regeneration programme is proposed for the area which is aimed at making Walker a location of choice by attracting new residents and maintaining existing ones. Specifically, the creation of up to 1,800 mixed tenure homes by 2021 is proposed.

North Tyneside

West Chirton

Chirton Ward has the third highest unemployment rate in the Borough. The West Chirton South site is approximately 30 hectares in size and includes industrial, retail and commercial premises. There are a number of undeveloped and cleared areas and many vacant retail units. A significant proportion of the industrial buildings are in poor condition.

West Chirton South has been identified as being suitable for a mix of uses which include housing, retail, industrial and commercial. Consultation is ongoing until 3rd January. Proposals are aimed at increasing retail floorspace, decreasing vacant premises and decreasing unemployment.

Riverside (Smiths Dock)

Riverside is within the most deprived 20% of English wards. The area suffers from high rates of unemployment and vacant properties

The riverside area has also been identified in North Tyneside's Core Strategy vision as an area to be regenerated. Decline in this area can be attributed to decline in traditional riverside industries such as shipbuilding over the last 30 years.

Riverside has been identified as an area in which there is an opportunity to increase residential provision through regaining the full use of upper floors of existing retail and commercial premises. The riverside will be regenerated with a mixture of residential, leisure, and commercial premises. The Smiths Dock development will result in over 1,300 new residential units. This development aims at addressing the following aims:

- Increase in retail floorspace
- Increase in commercial floorspace
- Decrease in vacant premises
- Decrease in unemployment
- Improved quality and mix of housing provision
- Increase in educational attainment
- Increase in life expectancy

Howdon

Howdon is within the most deprived 20% of English wards, suffering for the effects of multiple deprivation, namely high unemployment, high crime and low standards of living.

Through extensive residential regeneration the mix of housing will improve, allowing for higher levels of owner-occupation and increased economic output. Specific aims of this regeneration are linked to:

- Decreasing unemployment
- Decreasing crime/fear of crime
- Increasing educational attainment
- Increasing percentage of owner-occupation

Wallsend

Wallsend suffers from multiple deprivation and is ranked within the most deprived 20% of English wards. The area suffers from low quality housing stock with the need to increase both housing choice and affordable housing. There is a severe lack of employment opportunity within the area with a large amount of underused and derelict land. This has been largely due to the decline in shipbuilding and other marine engineering. The deterioration of some buildings within the centre of Wallsend adds to a feeling of decline which is felt in the area.

Through residential regeneration and through bringing back into use the large proportion of employment land which is currently underused and/or derelict the area will be regenerated. The attraction of inward investment is seen as particularly important to the sustainable future of Wallsend. Benefits of the proposed regeneration include:

- Decrease in unemployment
- Increase in commercial floorspace
- Increase in residential quality and quantity
- Decrease in underused and/or derelict sites/buildings

South Tyneside

South Shields Riverside / Tyne Dock

South Tyneside Local Strategic Partnership has embraced and embarked upon a comprehensive and ambitious programme of regeneration and neighbourhood renewal initiatives to turn round the fortunes of the borough.

South Tyneside's adopted Regeneration Strategy "Transforming Together" identifies the redevelopment of South Shields waterfront for mixed residential, commercial and leisure uses as a key physical development project to contribute to the regeneration of the Borough. This will create a new, riverside district, adjacent to South Shields town centre. The area currently suffers from high rates of economic inactivity, high Job Seeker allowance rates particularly for 25-49 year olds and very low job density.

The plans for South Shields Riverside / Tyne Dock include a new business centre, Waterfront Park, with cafes restaurants and leisure facilities and five mixed use neighbourhoods comprising 1300 new homes along with additional offices and leisure facilities. This regeneration is aimed at directing creating a total of 2,392 jobs for residents of South Tyneside (of these over 1,000 will be for residents of South Shields). In addition, over 2,000 further jobs will be created for South Tyneside residents due to positive multiplier effects resulting from the increased economic activity.

South Shields Town Centre

South Shields Town Centre Regeneration strategy overlaps with the Riverside regeneration above. The area suffers from multiple deprivation with much of the

regeneration area presiding in the lowest 20% of UK super output areas. Improvements are needed in relation to the retail offer, public transport facilities and public spaces within the town centre.

Plans for regeneration as outlined in the Area Action Plan include office based economic development sites, an increased residential provision, public realm improvements and increased retail provision. Private sector development is being encouraged at several key sites within the town centre which includes the bringing vacant sites back into use.

Sunderland:

Hendon/East End

Historically, Hendon has proved to be a difficult location in which market employment premises and void levels have often been high when compared to other areas of the city. The large housing estates which adjoin the employment areas suffer social deprivation. Back on the Map is a New Deal for Communities programme which endeavours to deliver improvements in the area under the themes of housing and environment, health, community safety, education and employment.

The Back on the Map programme ran from 2001 to 2011 with a budget of £54m. This community led regeneration programme allowed for a board of directors from the local community to make decisions on how funding was allocated in the area.

Central Sunderland (Groves, Pallion Ship Yards, Sheepfolds, Vaux, Holmeside, Farringdon Row, Stadium Park, Bonnersfield, Sunniside)

The City Centre has not enjoyed the levels of B1 office development which other similar sized cities have attracted. Current employment land use includes light and heavy industrial, manufacturing, office and retail.

The Central Sunderland Regeneration Sites were previously under the remit of the Sunderland Area Regeneration Company (Sunderland arc). The regeneration of these areas has now reverted back to Sunderland City Council. Regeneration of the central area focuses on mixed use development in order to achieve the City's vision of becoming a "prosperous city".

Hetton Downs

Hetton Downs is identified in the Private Sector House Condition Survey (2002) as being in an advanced stage of housing decline. Hetton Downs contains some of the worst housing stock in Sunderland with some identified as no longer having a sustainable future. The area suffers from multiple deprivation and is ranked amongst the top 15% of the most deprived wards in the UK.

The proposed population target for Hetton Downs by the end of the plan period is in the range of 6400 – 6600 (an increase of approx 450 people). This will require the provision of 451 new dwellings (a net increase of 141 properties) across the plan area within this period. NB: Scheme currently on hold pending review.

Burdon Lane / Cherryknowles and Chapelgarth

There is potential for growth and enhancement within the area stretching for Doxford through Chapelgarth to Ryhope. The Burdon Lane site is a long standing UDP allocation. The location of the site in relation to the Southern Radial Route allow for it to become a key employment site in the south-east of the city with excellent access to the local and strategic road network.

Plans for regeneration include residential development and employment (B1, B2, B8 use) whilst maintaining the Greenbelt to the south of the site.

4.9.3. Provide a quantified analysis of the employment situation for the residents

The existing employment figures for the regeneration areas have been quantified by overlaying relevant datasets obtained from the ONS and DCLG with all residential postcodes in Tyne & Wear. Using GIS it was possible to disaggregate various information including current occupation, former occupation, residential population, and workforce to household level.

As the regeneration areas identified by the Local Authorities did not reflect any census ward boundaries, disaggregating the data to a household level allows far more precise figures to be quantified.

The breakdown of existing un-employment numbers by previous occupation residing within a regeneration area are summarised in table 4.9.3 below:-

Unemployed (10.4%)	Unskilled	Skilled Manual	White Collar	Managerial & Professional	Total People
Tyne & Wear	18%	18%	29%	35%	20,703
RA	20%	22%	25%	32%	3,195

4.9.4. Estimate how many residents will gain employment from newly accessible existing jobs.

Improvements to accessibility delivered by the LSTF proposals at the various employment sites in Tyne & Wear, and the subsequent reduction in constraints on the local road network will lead to additional local growth in employment. The

increase in employment opportunity and additional resultant jobs have been apportioned across Tyne & Wear and the regeneration areas.

An Accession accessibility assessment was undertaken for Tyne & Wear based on all residential postcodes accessing each of the discrete employment site locations. A threshold of 30 minutes travel time by car and 60 minutes travel time by public Transport was applied. The outputs from this assessment were used to identify which regeneration areas fell within the catchment of each employment site.

Using the accessibility assessment outputs it was possible to match the skill sets of those unemployed in the regeneration areas with the job types being created at each employment site. The breakdown of jobs created by the LSTF proposals by industry / occupation within the regeneration areas are summarised in table 4.9.4 below:-

	Unskilled	Skilled Manual	White Collar	Managerial & Professional	Total People
LSTF Total New Jobs	561	576	941	1116	3195
LSTF Total RA Jobs	31	34	38	49	152

From the table above it is forecast that the proposed LSTF measure will result in the creation of 3195 new jobs. Of these 3195 job, 152 will be accessible from the Regeneration Areas within Tyne and Wear.

4.9.5. Estimate numbers of new jobs expected due to inward investment, and how many of those jobs will go to the residents of the RA.

Several of the regeneration areas include mixed-use and employment land allocations, however at this stage specific numbers of new jobs have not been quantified. The type of employment land developed within a regeneration area will determine the likely catchment of future employees with lower skilled jobs being filled by a more localised workforce, as in the case with Tyne Dock, South Tyneside.

Thus due to the number and level of assumptions needing to be made to estimate the level of inward investment this part of the regeneration assessment has not been undertaken.

4.9.6. Calculate net gain in employment for RA

The regeneration areas within Tyne & Wear will benefit from an additional 152 jobs due to accessibility improvements created by the LSTF scheme proposals.

4.9.7. Estimate any losses in employment among RA residents due to increased competition for existing jobs.

This element of the regeneration assessment has not been undertaken due to time constraints and the complexity of the task. The nature of the network model developed for this assessment is link based, not zonal. This makes it difficult to distribute benefits across a geographic area as the current OD assignment has not been established as only 2001 census data has been sourced.

4.9.8. Calculate the net position.

The net position has not been quantified as only the RA's new jobs have been considered, thus there are no reductions to be considered pertaining to inward investment or increased competition.

4.10. Employment Forecasts

For each of the employment sites targeted, employment forecasts for 2015 and 2021 have been produced. These are based on the current employment levels together with forecasts (supplied by Local Authority planning officers) of the proposed expansion of the individual sites.

For a number of the sites there is no specific expansion proposed and growth in jobs is taken from TEMPRO. In most cases however, there are significant expansion proposals and the total number of new jobs by 2021 is approximately 34,500. Clearly this will have a significant impact in terms of traffic generation. For a number of the sites, the road network in the vicinity of the site is already congested and this congestion is likely to constrain the level of additional development that can be provided. The following table presents employment estimates / forecasts for each employment site, and identifies those where congestion will constrain future development. Whether development of a site is constrained by congestion has been determined with reference to the existing conditions in the vicinity of the employment sites – refer to Annex 5 in the Strategic Case Report.

Table 4.10 Employment Forecasts

Site	Current Employment	2015 Employment	2021 Employment	Growth Constrained
Gateshead Quays	2000	2041	9041	Yes
Team Valley	23422	23666	27166	Yes
Gosforth Corridor (Gosforth High Street)	1090	1102	1126	No
Gosforth Corridor (Great Park)	1453	1483	1516	No
Gosforth Corridor (Regent Centre)	4362	4407	4505	Yes
Newcastle City Centre	78062	78874	80625	Yes
Balliol	2955	2986	3052	No
Cobalt	9506	9605	15537	No
Gosforth Business	3000	3031	3131	No

Park				
Quorum	4545	4592	6592	Yes
Silverlink	4238	4282	4377	No
Tyne Tunnel Trading Estate	1758	1776	5613	Yes
Bede Industrial Estate	2572	2624	3277	No
Port of Tyne	1714	1749	2185	No
South Shields	9543	9738	13428	No
Doxford Park	8401	8488	9688	Yes
Sunderland Enterprise Park	3400	3469	4069	Yes
Sunderland Royal Hospital	5267	5322	5440	No
Waterview / Pattinson Business Park	6700	6837	8137	No

For the sites where future development is constrained by congestion, the total forecast increase in jobs is 1,363 in 2015 and 21,349 in 2021.

For sites where future development will be constrained by congestion, then the proposals will allow a proportion of the future development to take place with the proportion depending on the volume of traffic removed due to the proposals.

The extent to which additional development is facilitated – in terms of the number of new jobs – at each site can be determined from the reduction in car trips achieved at each site. Combining the car trip reduction with the forecast mode share at each site will give an estimate of the number of jobs associated with the new development. This is done by using the estimate of car trips removed in 2015 due to the proposals, determining the revised mode share for non car trips and using this to determine the number of non car trips associated with the car trips. The sum of car and non car trips is therefore an estimate of the number of new jobs that can be created without adding to congestion. Using this method, and assuming the medium assumptions for the success of the proposed measures, gives the following results:

Table 4.10b Employment Forecasts

	Potential Job Creation	Proportion of Trips Constrained	Forecast Job Creation
Gateshead Quays	303	60%	182
Team Valley	1299	90%	1169
Gosforth Corridor (Regent Centre)	281	75%	211
Newcastle City Centre	3143	50%	1571
Quorum	242	60%	145
Tyne Tunnel Trading Estate	132	90%	119
Doxford Park	446	80%	357
Sunderland Enterprise Park	344	75%	258

The areas of constrained growth are plotted on Figure 4.10

Figure 4.10 Areas of Constrained Growth.

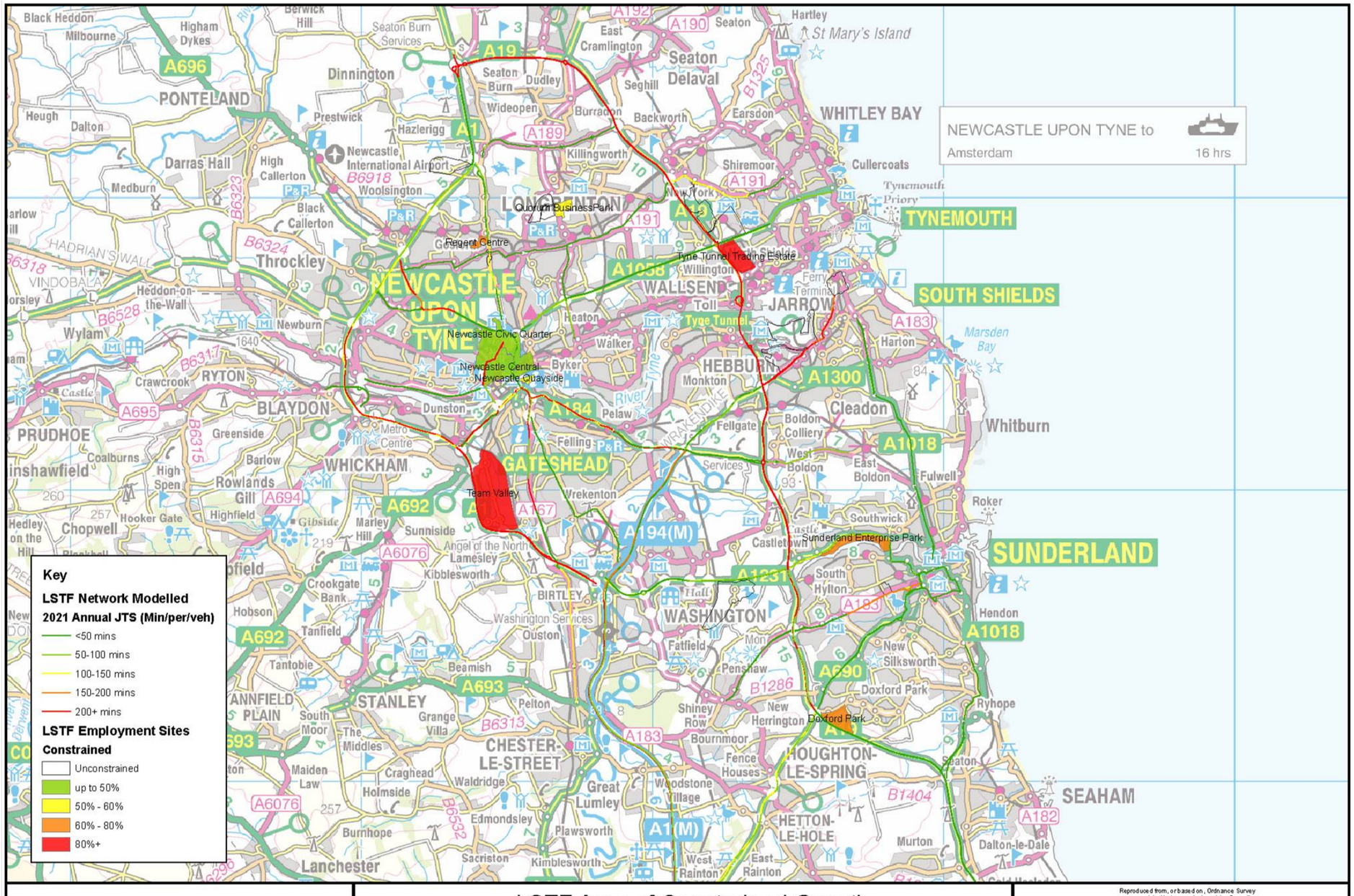


Figure 4.10	LSTF Area of Constrained Growth

The proportion of trips generated by new development that is constrained by existing congestion has been estimated using the assignment model to estimate the proportion of generated trips that would pass through the congested sections of the network.

The above table shows a total of 4,012 jobs created by developments that are directly facilitated by the proposals. If the high mode switch assumptions are used, then the forecast number of jobs created is 5,778.

The proposed measures will allow all of the proposed development up to 2015 to be implemented at sites where congestion would otherwise constrain development. It will also allow approximately 27% of proposed development up to 2021.

In addition to directly freeing up capacity that can facilitate development at the identified sites, the proposals will have additional benefits due to reductions in journey times across the network. Although not quantifiable in terms of the impact on employment, this will reduce costs for businesses across the region. It will also reduce/delay the requirement to improve junctions across the network as traffic flows increase.

4.11. Assessment of integration impacts

Transport Interchange improvements can be seen through the implementation of cycle hire facilities at employment sites and improved cycle storage at metro stations. This can be seen to encourage more interchange users by allowing greater connectivity between employment sites and the affected metro stations.

The affected users are more likely to be due to a modal shift from walkers to cyclists than from other means; however there is the potential for a **slight increase** in users gained from a modal shift from car drivers/passengers to public transport and cycle methods due to the availability of improved cycle provision.

The table below indicates the forecast increase in transport interchange users based on the cycle infrastructure improvements at interchanges and cycle hire facilities:

	2015			2021		
	Low	**Med**	**High**	**Low**	**Med**	**High**
Gosforth Corridor (Great Park)	12	15	18	13	15	18
Newcastle City Centre	478	789	1100	983	1209	1436
Balliol	72	90	107	93	116	139
Cobalt	168	192	216	421	466	511
Gosforth Business Park	87	115	143	127	150	174
Quorum	110	138	165	200	251	301
Silverlink	48	77	107	66	88	109
Tyne Tunnel Trading Estate	28	39	50	165	208	250
Sunderland Enterprise Park	54	69	85	63	81	99
Sunderland Royal Hospital	97	106	115	102	109	118
Total Forecast Increase in	**1154**	**1630**	**2106**	**2233**	**2693**	**3155**

Transport Interchange users						

In the above, only those employment sites which will benefit from measures allowing for a forecast increase in Transport Interchange users are displayed. The overall impact of the proposed measures on transport interchanges within the network is a slight positive benefit due to the improved integration of metro and cycle modes.

4.12 Land Use Policies

The Land Use Policies Sub-Objective has been assessed within the Strategic Case.

4.13 Other Government Policies

The Other Government Policies Sub-Objective has been assessed within the Strategic Case.

4.14 Appraisal summary table

The Appraisal Summary Table for the package bid is attached. Individual appraisal information for those elements for which AST assessments have been carried out on a site by site basis is available upon request. These include:

- landscape;
- townscape;
- heritage of historic resources;
- biodiversity;
- water environment;
- security.
-

4.14. Appraisal Summary Table (AST)

Appraisal Summary Table
Scheme: LSTF
Date: November 2011 **Option: Full package**, Tyne & Wear.

Option		Description	Problems	Present Value of Costs to Public Accounts £m
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
ENVIRONMENT	**Noise**	There will be small reductions in vehicle trips and associated road traffic noise on many local distributor roads. The roads included in the model represent the most congested corridors within the Tyne & Wear network and therefore the percentage change is insignificant.	N/A	Slight Beneficial
	Local Air Quality	There will be small reductions in vehicle trips and associated local air quality on many local distributor roads. The roads included in the model represent the most congested corridors within the Tyne & Wear network and therefore the percentage change is insignificant. The impact on AQMA's in Tyne & Wear will also be insignificant.	N/A	Slight Beneficial
	Greenhouse Gases	The reduction in Greenhouse Gases has been calculated over the entire network and a net positive benefit forecast		£0.48m - £0.74m
	Landscape	Individual site assessments have been undertaken. There are no overall impacts on Landscape across all employment sites.		Neutral
	Townscape	Individual site assessments have been undertaken. There are no overall impacts on Townscape across all employment sites.		Neutral
	Heritage of Historic Resources	Individual site assessments have been undertaken. The potential for the measures to impact upon the built heritage at any of the employment sites is not significant.		Neutral
	Biodiversity	The impact upon biodiversity as a consequence of the proposed measures across all sites is expected to be minimal.		Neutral
	Water Environment	The measures proposed are not considered to increase the risk of flooding at any of the employment sites assessed.		Neutral
	Physical Fitness	This has been assessed over the entire network. The measures proposed have been shown to have a positive impact upon physical fitness through the encouragement of cycle and walking trips.		£3.18m - £4.29
	Journey Ambience	This has been assessed over the entire network. Whilst journey ambience may be improved by the measures proposed, the nature of the measure does not result in a quantifiable benefit due to lack of infrastructure improvements involved.		Neutral
SAFETY	**Accidents**	Considering the network as a whole, the number of accidents has been forecast as reducing. The net reduction in accidents is seen from the increase in cycle accidents		£2.77m - £4m

		which results from the additional cycles using the network compared to the decrease in peak time vehicle users. The overall reduction in vehicle numbers forecast outweighs the increase in cycle accidents forecast.		
	Security	The implementation of the proposed measures will not alter any security levels across the employment areas. The measures have no specific security objectives but measures to improve bus shelters may improve bus users' sense of safety while waiting for buses at individual sites.		Neutral
ECONOMY	**Public Accounts**	The Public Accounts cost has been calculated over the entire network		£12.87m
	Transport Economic Efficiency: Business Users & Transport Providers	Benefits in terms of transport economic efficiency for business users and transport providers have been assessed over the entire network with the proposed measures resulting in a positive net benefit.		£7.11m - £11.08m
	Transport Economic Efficiency: Consumers	Benefits in terms of transport economic efficiency consumers have been assessed over the entire network with the proposed measures resulting in a positive net benefit.		£6.7m - £11.44m
	Reliability	Due to the proportionality approach adopted and the uncertainty involved in forecasting reliability of traffic modes based on the data provided the this sub-objective has been assessed as resulting in a neutral net impact		Neutral
	Wider Economic Impacts	Wider economic impacts have been quantified in terms of in-direct job creation through the reduction of congestion and removal of site development constraints.	4,012 indirect jobs created due to constraints removed/reduced	Beneficial
ACCESSIBILITY	**Option Values**	New bus routes proposed as part of the list of measures will result in improved modal choice. Option values have been assessed over the entire network and as such the benefit above has been proportioned accordingly		Slight Benefit
	Severance	Proposals to improve links for pedestrian, cyclists and bus users will serve as a direct improvement to reduce severance or reduce public transport travel times at several employment sites.		Slight Benefit
	Access to the Transport System	Various benefits can be seen in terms of access to the transport system resulting from the measures proposed. Due to the soft measures approach adopted benefits over the entire network are not quantifiable although cycle and pedestrian improvements are likely.		Slight Benefit
INTEGRATION	**Transport Interchange**	Measures to improve cycle storage at interchanges along with cycle hire schemes will serve to increase the integration of modes at transport interchanges		Beneficial
	Land-Use Policy	This sub-objective has been included in the Strategic Case		N/A
	Other Government Policies	This sub-objective has been included in the Strategic Case		N/A

4.15. Transport Economic Efficiency (TEE) table

Tee tables have been produced reflecting the efficiency of the High, Central and Low effectiveness of measures. The tables are given below.

Economic Efficiency of the Transport System (TEE) - High

Non-business: Commuting	**ALL MODES**		**ROAD**	**BUS and COACH**	**RAIL**	**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**	**Passengers**	**Passengers**	
Travel time	£ 4,756,559.40		£ 4,630,256.92	£ 126,302.48		
Vehicle operating costs	£ -		£ -	£ -	£ -	£ -
User charges	£ -		£ -	£ -	£ -	£ -
During Construction & Maintenance	£ -		£ -	£ -	£ -	£ -
NET NON-BUSINESS BENEFITS: COMMUTING	£ 4,756,559.40	*(1a)*				

Non-business: Other	**ALL MODES**		**ROAD**		**BUS and COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**		**Passengers**	**Passengers**		
Travel time	£ 5,676,690.79		£ 5,090,768.19		£ 585,922.60	£ -		£ -
Vehicle operating costs			£ -					£ -
User charges			£ -	£ -	£ -	£ -	£ -	£ -
During Construction & Maintenance			£ -	£ -	£ -	£ -	£ -	£ -
NET NON-BUSINESS BENEFITS: OTHER	£ 5,676,690.79	*(1b)*						

Business								
User benefits			**Goods Vehicles**	**Business Cars & LGVs**	**Passengers**	**Freight**	**Passengers**	
Travel time	£ 11,069,272.48		£1,826,556.15	£ 9,216,884.47	£ 25,831.86	£ -	£ -	£ -
Vehicle operating costs			£ -	£ -	£ -	£ -	£ -	£ -
User charges			£ -	£ -	£ -	£ -	£ -	£ -
During Construction & Maintenance			£ -	£ -	£ -	£ -	£ -	£ -
Subtotal	£11,069,272.48	*(2)*						
Private sector provider impacts						**Freight**	**Passengers**	
Revenue								
Operating costs								
Investment costs								
Grant/subsidy								
Subtotal		*(3)*						
Other business impacts								
Developer contributions		*(4)*						
NET BUSINESS IMPACT		*(5) = (2) + (3) + (4)*						

TOTAL		
Present Value of Transport Economic Efficiency Benefits (TEE)	£ 21,502,522.67	*(6) = (1a) + (1b) + (5)*

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2002 prices and values

Economic Efficiency of the Transport System (TEE) - Medium

Non-business: Commuting	**ALL MODES**		**ROAD**		**BUS and COACH**	**RAIL**	**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**		**Passengers**	**Passengers**	
Travel time	£ 3,835,924.41		£ 3,734,067.86		£ 101,856.55		
Vehicle operating costs	£ -		£ -		£ -	£ -	£ -
User charges	£ -		£ -		£ -	£ -	£ -
During Construction & Maintenance	£ -		£ -		£ -	£ -	£ -
NET NON-BUSINESS BENEFITS: COMMUTING	£3,835,924.41	*(1a)*					

Non-business: Other	**ALL MODES**		**ROAD**		**BUS and COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**		**Passengers**	**Passengers**		
Travel time	£ 4,577,963.81		£ 4,105,446.89		£ 472,516.92	£ -		£ -
Vehicle operating costs			£ -					£ -
User charges			£ -	£ -	£ -	£ -	£ -	£ -
During Construction & Maintenance			£ -	£ -	£ -	£ -	£ -	£ -
NET NON-BUSINESS BENEFITS: OTHER	£ 4,577,963.81	*(1b)*						

Business								
User benefits			**Goods Vehicles**	**Business Cars & LGVs**	**Passengers**	**Freight**	**Passengers**	
Travel time	£ 8,928,811.98		£ 1,473,355.77	£7,434,619.44	£ 20,836.77	£ -	£ -	£ -
Vehicle operating costs			£ -	£ -	£ -	£ -	£ -	£ -
User charges			£ -	£ -	£ -	£ -	£ -	£ -
During Construction & Maintenance			£ -	£ -	£ -	£ -	£ -	£ -
Subtotal	£ 8,928,811.98	*(2)*						
Private sector provider impacts						**Freight**	**Passengers**	
Revenue								
Operating costs								
Investment costs								
Grant/subsidy								
Subtotal		*(3)*						
Other business impacts								
Developer contributions		*(4)*						
NET BUSINESS IMPACT		*(5) = (2) + (3) + (4)*						

TOTAL		
Present Value of Transport Economic Efficiency Benefits (TEE)	£17,342,700.20	*(6) = (1a) + (1b) + (5)*

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2002 prices and values

Economic Efficiency of the Transport System (TEE) - Low

Non-business: Commuting	**ALL MODES**		**ROAD**	**BUS and COACH**	**RAIL**	**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**	**Passengers**	**Passengers**	
Travel time	£ 3,055,137.10		£ 2,974,013.04	£ 81,124.05		
Vehicle operating costs	£ -		£ -	£ -	£ -	£ -
User charges	£ -		£ -	£ -	£ -	£ -
During Construction & Maintenance	£ -		£ -	£ -	£ -	£ -
NET NON-BUSINESS BENEFITS: COMMUTING	£ 3,055,137.10	*(1a)*				

Non-business: Other	**ALL MODES**		**ROAD**		**BUS and COACH**	**RAIL**		**OTHER**
User benefits	**TOTAL**		**Private Cars and LGVs**		**Passengers**	**Passengers**		
Travel time	£ 3,646,137.29		£ 3,269,799.33		£ 376,337.96	£ -		£ -
Vehicle operating costs			£ -					£ -
User charges			£ -	£ -	£ -	£ -	£ -	£ -
During Construction & Maintenance			£ -	£ -	£ -	£ -	£ -	£ -
NET NON-BUSINESS BENEFITS: OTHER	£3,646,137.29	*(1b)*						

Business								
User benefits			**Goods Vehicles**	**Business Cars & LGVs**	**Passengers**	**Freight**	**Passengers**	
Travel time	£ 7,113,948.59		£ 1,173,882.62	£5,923,464.47	£16,601.50	£ -	£ -	£ -
Vehicle operating costs			£ -	£ -	£ -	£ -	£ -	£ -
User charges			£ -	£ -	£ -	£ -	£ -	£ -
During Construction & Maintenance			£ -	£ -	£ -	£ -	£ -	£ -
Subtotal	£7,113,948.59	*(2)*						
Private sector provider impacts						**Freight**	**Passengers**	
Revenue								
Operating costs								
Investment costs								
Grant/subsidy								
Subtotal		*(3)*						
Other business impacts								
Developer contributions		*(4)*						
NET BUSINESS IMPACT		*(5) = (2) + (3) + (4)*						
TOTAL								

Present Value of Transport Economic Efficiency Benefits (TEE)	£ 13,815,222.98	*(6) = (1a) + (1b) + (5)*

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2002 prices and values

4.16. Analysis of monetised costs and benefits (AMCB) table

AMCB tables have been prepared considering all public funding, as well as only considering DfT funding. These have been produced for High, Central and Low effectiveness of measures. The tables are given below.

Noise	£ -	*(12)*
Local Air Quality	£ -	*(13)*
Greenhouse Gases	£ 738,288.43	*(14)*
Physical Fitness	£ 24,100,784.79	*(15)*
Accidents	£ 4,004,040.00	*(16)*
Economic Efficiency: Consumer Users (Commuting)	£ 4,756,559.40	*(1a)*
Economic Efficiency: Consumer Users (Other)	£ 5,676,690.79	*(1b)*
Economic Efficiency: Business Users and Providers	£ 11,069,272.48	*(5)*
Wider Public Finances (Indirect Taxation Revenues)		*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Option Values	£ -	*(17)*
Present Value of Benefits (see notes) (PVB)	£ 50,345,635.90	*(PVB) = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + (17) - (11)*
Broad Transport Budget	£ 10,615,384.79	*(10)*
Present Value of Costs (see notes) (PVC)	£ 9,619,836.41	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	£ 40,725,799.49	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	5.23	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. 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.

Table 4.16.1 - AMCB Table - DfT Funding, High Scenario

Noise	£ -	*(12)*
Local Air Quality	£ -	*(13)*
Greenhouse Gases	£ 596,251.59	*(14)*
Physical Fitness	£ 19,779,913.12	*(15)*
Accidents	£ 3,321,885.00	*(16)*
Economic Efficiency: Consumer Users (Commuting)	£ 3,835,924.42	*(1a)*
Economic Efficiency: Consumer Users (Other)	£ 4,577,963.81	*(1b)*
Economic Efficiency: Business Users and Providers	£ 8,928,811.98	*(5)*
Wider Public Finances (Indirect Taxation Revenues)		*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Option Values	£ -	*(17)*
Present Value of Benefits (see notes) (PVB)	£ 41,040,749.92	*(PVB) = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + (17) - (11)*
Broad Transport Budget	£ 10,615,384.79	*(10)*
Present Value of Costs (see notes) (PVC)	£ 9,619,836.41	*(PVC) = (10)*

OVERALL IMPACTS

Net Present Value (NPV)	£ 31,420,913.51	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	4.27	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. 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.

Table 4.16.2 - AMCB Table - DfT Funding, Central Scenario

Noise	£ -	*(12)*
Local Air Quality	£ -	*(13)*
Greenhouse Gases	£ 477,702.70	*(14)*
Physical Fitness	£ 16,044,140.57	*(15)*
Accidents	£ 2,771,923.00	*(16)*
Economic Efficiency: Consumer Users (Commuting)	£ 3,055,137.10	*(1a)*
Economic Efficiency: Consumer Users (Other)	£ 3,646,137.29	*(1b)*
Economic Efficiency: Business Users and Providers	£ 7,113,948.59	*(5)*
Wider Public Finances (Indirect Taxation Revenues)		*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Option Values	£ -	*(17)*
Present Value of Benefits (see notes) (PVB)	£ 33,108,989.24	*(PVB) = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + (17) - (11)*
Broad Transport Budget	£ 10,615,384.79	*(10)*
Present Value of Costs (see notes) (PVC)	£ 9,619,836.41	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	£ 23,489,152.84	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	3.44	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. 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.

Table 4.16.3 - AMCB Table - DfT Funding, Low Scenario

Noise	£ -	*(12)*
Local Air Quality	£ -	*(13)*
Greenhouse Gases	£ 738,288.43	*(14)*
Physical Fitness	£ 24,100,784.79	*(15)*
Accidents	£ 4,004,040.00	*(16)*
Economic Efficiency: Consumer Users (Commuting)	£ 4,756,559.40	*(1a)*
Economic Efficiency: Consumer Users (Other)	£ 5,676,690.79	*(1b)*
Economic Efficiency: Business Users and Providers	£ 11,069,272.48	*(5)*
Wider Public Finances (Indirect Taxation Revenues)		*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Option Values	£ -	*(17)*
Present Value of Benefits (see notes) (PVB)	£ 50,345,635.90	*(PVB) = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + (17) - (11)*
Broad Transport Budget	£ 14,197,312.58	*(10)*
Present Value of Costs (see notes) (PVC)	£ 12,865,838.32	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	£ 37,479,797.58	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	3.91	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. 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.

Table 4.16.4 - AMCB Table - All Funding, High Scenario

Noise	£ -	*(12)*
Local Air Quality	£ -	*(13)*
Greenhouse Gases	£ 596,251.59	*(14)*
Physical Fitness	£ 19,779,913.12	*(15)*
Accidents	£ 3,321,885.00	*(16)*
Economic Efficiency: Consumer Users (Commuting)	£ 3,835,924.42	*(1a)*
Economic Efficiency: Consumer Users (Other)	£ 4,577,963.81	*(1b)*
Economic Efficiency: Business Users and Providers	£ 8,928,811.98	*(5)*
Wider Public Finances (Indirect Taxation Revenues)		*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Option Values	£ -	*(17)*
Present Value of Benefits (see notes) (PVB)	£ 41,040,749.92	*(PVB) = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + (17) - (11)*
Broad Transport Budget	£ 14,197,312.58	*(10)*
Present Value of Costs (see notes) (PVC)	£ 12,865,838.32	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	£ 28,174,911.60	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	3.19	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. 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.

Table 4.16.5 - AMCB Table - All Funding, Central Scenario

Noise	£ -	*(12)*
Local Air Quality	£ -	*(13)*
Greenhouse Gases	£ 839,025.68	*(14)*
Physical Fitness	£ 16,044,140.57	*(15)*
Accidents	£ 2,771,923.00	*(16)*
Economic Efficiency: Consumer Users (Commuting)	£ 3,055,137.10	*(1a)*
Economic Efficiency: Consumer Users (Other)	£ 3,646,137.29	*(1b)*
Economic Efficiency: Business Users and Providers	£ 7,113,948.59	*(5)*
Wider Public Finances (Indirect Taxation Revenues)		*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Option Values	£ -	*(17)*
Present Value of Benefits (see notes) (PVB)	£ 33,470,312.23	*(PVB) = (12) + (13) + (14) + (15) + (16) + (1a) + (1b) + (5) + (17) - (11)*
Broad Transport Budget	£ 14,197,312.58	*(10)*
Present Value of Costs (see notes) (PVC)	£ 12,865,838.32	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	£ 20,604,473.91	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	2.60	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. 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.

Table 4.16.6 - AMCB Table - All Funding, Low Scenario

4.17. Public accounts (PA) table

	ALL MODES		ROAD	BUS and COACH	RAIL	OTHER
Local Government Funding	**TOTAL**		**INFRASTRUCTURE**			
Revenue	0					
Operating Costs	0					
Investment Costs	0					
Developer and Other Contributions	£ 2,611,846.80					
Grant/Subsidy Payments	£ 3,246,001.91					
NET IMPACT	£ 3,246,001.91	*(7)*				
Central Government Funding: Transport						
Revenue	£ -					
Operating costs	£ -					
Investment Costs	£ 9,619,836.41					
Developer and Other Contributions	£ -					
Grant/Subsidy Payments	=					
NET IMPACT	£ 9,619,836.41	*(8)*				
Central Government Funding: Non-Transport						
Indirect Tax Revenues	£ -	*(9)*				
TOTALS						
Broad Transport Budget	£ 12,865,838.32	*(10) = (7) + (8)*				
Wider Public Finances	£ -	*(11) = (9)*				

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers.

All entries are discounted present values in 2002 prices and values.

5.0. Social and distributional impacts

Introduction

5.1. Stage 0 - Initial Screening.

ASSESSMENT OF SOCIAL AND DISTRIBUTIONAL IMPACTS (SDIs) OF TRANSPORT INTERVENTIONS
Pro-forma for reporting conclusions of first screening stage (Step 0)

LSTF initiative name & LA: Tyne & Wear ITA

Brief description of initiative:

Initiative objectives:

Impact **(Consider each separately)**	**Is social/distributional impact relevant to stated scheme objectives?** *(If yes, provide details)*	**Could scheme lead to impact on low income and/or vulnerable groups?** *(Provide details)*	**Can potential negative impacts be eliminated through design or mitigation?** *(Provide details)*	**Are potential impacts, where presumed, likely to be 'significant and concentrated'?** *(Provide details)*	**Next steps: what further screening (Step 1 to 3), or full SDI analysis (Step 1 to 5) is necessary and/or proportionate to potential impact?** *(Provide rationale for proposal)*
User Benefits	User benefits are directly relevant to the stated objectives of the package of measures. The objective of the package of measures is to increase the proportion of journeys to work undertaken by sustainable modes. A direct impact of delivering this objective is the removal of car trips form the network. The result is a removal of traffic congestion and a net journey time benefit	Through improved accessibility and initiatives centred around helping people back to work low income groups could disproportionately, positively benefit from the initiatives. Low cost travel modes such as cycle and public transport increasingly support wider	The objectives of the package of measures are to increase the proportion of journeys to work by sustainable modes. A direct impact of delivering this objective is the removal of car trips	User benefit impacts are likely to significant for all users of the network. It is predicted that the net decrease in cars on the network by 2015 could be 3596, 5068 & 7353 for the low, medium and high predictions respectively.	As per the previous comment, the user benefits, whilst significant will not be concentrated. On this basis we undertake further screening (Step 1 to 3) for user benefits

	in peak periods for all motorised traffic. It is predicted that the net decrease in cars on the network by 2015 could be 3596, 5068 & 7353 for the low, medium and high predictions respectively. It is predicted that the net decrease in cars on the network by 2021 could be 6586, 9278 & 11,152 for the low, medium and high predictions respectively. The delivery of cycling and bus and pedestrian infrastructure at strategic locations will provide further user benefits for these modes. Low income groups are likely to have lower car ownership and less disposable income. These groups are therefore more likely to benefit from walking cycling and Public Transport Initiatives.	travel opportunity for low income groups.	form the network. The result is a removal of traffic congestion and a net journey time benefit in peak periods for all motorised traffic. The result is positive user benefits for all modes	It is predicted that the net decrease in cars on the network by 2021 could be 6586, 9278 & 11,152 for the low, medium and high predictions respectively. Whilst significant, the benefits will be spread over a wider local network and not concentrated	
Noise	Improving Noise Nuisance is not a direct objective of the package of measures.	The objective of the package of measures is to increase the proportion of journeys to work undertaken by sustainable modes. A direct impact of delivering this objective is the removal of car trips form the network. The result is a removal of traffic levels and therefore a net decrease noise generated by motorised traffic. It is predicted that the net decrease in cars on the network by 2015 could be 3596, 5068 & 7353 for the low, medium and high predictions respectively.	As previous column, as the impacts fall outside of school learning times there are no impact on vulnerable groups and therefore no need for mitigation.	As previous column, as the impacts fall outside of school learning times there are no impact on vulnerable groups and therefore the impact is neither significant nor concentrated.	No further screening required.

		It is predicted that the net decrease in cars on the network by 2021 could be 6586, 9278 & 11,152 for the low, medium and high predictions respectively. The net decrease in noise on the network corridors is insignificant It is recognised that the only clearly established evidence of a social impact is the impact of noise on children's concentrating when learning. However the package of measures is focussed on increasing the number of journeys to work by sustainable modes. Most journeys to work fall outside of traditional school learning times and therefore there will be no significant impact on vulnerable groups.			
Air Quality	Improving Air Quality is not a direct objective of the package of measures.	The objective of the package of measures is to increase the proportion of journeys to work undertaken by sustainable modes. A direct impact of delivering this objective is the removal of car trips form the network. The result is a reduction in traffic levels and therefore a net improvement in air quality. It is predicted that the net decrease in cars on the	The objectives of the package of measures are to increase the proportion of journeys to work by sustainable modes. A direct impact of delivering this objective is the removal of car trips form the network. The result is a removal of traffic congestion and subsequently a net increase in air quality	It is predicted that the net decrease in cars on the network by 2015 could be 3596, 5068 & 7353 for the low, medium and high predictions respectively. It is predicted that the net decrease in cars on the network by 2021 could be 6586, 9278 & 11,152 for the low, medium and high predictions respectively. The benefits are generally spread across the network	Further analysis on the concentration and significance of impacts on social groups. This is difficult to quantify at this stage and therefore it is recommended that the impacts of Air Quality on social groups be analysed to further screening (Step 1 to 3).

		network by 2015 could be 3596, 5068 & 7353 for the low, medium and high predictions respectively. It is predicted that the net decrease in cars on the network by 2021 could be 6586, 9278 & 11,152 for the low, medium and high predictions respectively.	Therefore there are no negative air quality impacts to quantify.	including within existing AQMA's. The AQMA's have been designated due to vehicle based airborne pollutants.	
Accidents	Reducing accidents is not a direct objective of the package of measures.	The objective of the package of measures is to increase the proportion of journeys to work undertaken by sustainable modes. A direct impact of delivering this objective is the removal of car trips form the network. The result is a removal of traffic levels and therefore a net improvement in air quality. It is predicted that the net decrease in cars on the network by 2015 could be 3596, 5068 & 7353 for the low, medium and high predictions respectively. It is predicted that the net decrease in cars on the network by 2021 could be 6586, 9278 & 11,152 for the low, medium and high predictions respectively. This will result in a net decrease in accidents for motorised vehicles. There will however be an increase in cycling	Cycling initiatives such as adult cycle training are included within the package of measures. This should improve cycle safety and awareness, particularly for in-experienced cyclist. This should mitigate some of the increase in cycle accidents likely to occur. The infrastructure projects proposed involve the installation of Toucan Crossing. This should further mitigate increased accidents involving cyclists. The key components aspect of the bid concentrates on reducing the impact on congestion from the journey to school, by increasing sustainable travel to school. Education and Awareness training form a part of the key components bid which	General accidents reductions due to removal of vehicles are not likely to be concentrated but spread out across the network. However, there could be concentrations of cycling accidents associated with those sites which demonstrated the greatest propensity to shift to cycling trips. Cycling often a more viable option to low income groups, due to the relatively low costs of maintaining a cycle. The risk therefore is a concentration of cycling accidents in low income families.	Further analysis on the concentration and significance of impacts on social groups will be difficult to quantify at this stage. Therefore it is recommended that the impacts of accidents on social groups be analysed to further screening (Step 1 to 3) only. Some accident impacts are likely to extend beyond the modelled highway network extents considered as part of this assessment.

		accidents. As up to 5618 new cycle trips will be placed on the network. The removal of congestion at peak periods will increase the average speed on links. Ordinarily this could increase the accident rate, however the modelling outputs show that average speed increase on links are low and will therefore have a negligible impact on accident rates.	should mitigate Child Accidents. "School Safety Zones" were also a part of the key components bid. These will further mitigate child accidents.		
Security	Improving security is not a direct objective of the package of measures.	The objective of the package of measures is to increase the proportion of journeys to work undertaken by sustainable modes. A direct impact of delivering this objective is the removal of car trips form the network. The result is a removal of traffic levels and therefore a net improvement in air quality. It is predicted that the net increase in cycling on the network by 2015 could be 1828, 2675 & 3557 for the low, medium and high predictions respectively. It is predicted that the net increase in cycling on the network by 2021 could be 3612, 4624 & 5618 for the low, medium and high predictions respectively.	Cycling initiatives such as adult cycle training are included within the package of measures. This should improve security for cyclist and awareness, of risks particularly for cyclist in vulnerable groups. This should mitigate some of the perceived security risks of cycling. New cycling routes will be designed with personal security in mind to mitigate risk.	The new cycling journeys will be for journeys to work. The majority of journeys to work will be in peak periods. For much of the year journeys will be undertaken in light conditions so personal security risks are minimised. In addition these trips will be undertaken in peak periods so there will be a high level of natural surveillance, reducing both perceived and actual personal security risks. This case is further strengthened by the type of cycling trips generated. Journeys to work are considered to be "utility trips" by this we mean the purpose of the activity is to access employment, where as for leisure trips the purpose of the activity is to cycle for pleasure. Unless there are significant barriers to do so are utility cyclists will use the most direct routes. These are generally	Due to the low likelihood of risk, low concentration and significance and the mitigation measures in place, it is recommended that no further assessment be carried out in relation to security.

				on-or parallel to major traffic routes. These will have good natural surveillance and reduce personal security risks. It is therefore assumed that the impact will be neither significant nor concentrated.	
Severance	Improving specific severance issues are not a direct objective of the package of measures.	Severance issues most often affect those without access to a car. The package of measures improves access to the cycle network and also makes some routes more "cycle friendly". There are however no direct severance benefits or dis-benefits.	There are no negative impacts.	There are no direct severance impacts.	Due to the neutral direct severance impacts we recommend no further analysis be undertaken.
Accessibility	Improving accessibility to jobs is a key objective of the package of measures. This objective will be achieved through the provision of greater travel choices for the journey to work.	The package of measures is concentrated on improving access to sustainable transport modes for the journey to work. Low income groups statistically have lower car ownership and are such more heavily reliant on sustainable transport modes. Improving access to sustainable transport modes is likely to give a disproportionately positive benefit to low income groups.	There are no negative accessibility impacts associated with delivering the package of measures.	Accessibility benefits are likely to be spatially dispersed however a number of the initiatives such around the 'Getting People Back tTo Work' themeas will be concentrated in areas of low income and high unemployment that fall within cycling distance of major employment centres.	Due to the nature of the transport model developed (link based) it is very difficult to identify where specific improvements occur beyond the links themselves. Whilst it is acknowledged that accessibility benefits will exist and that these will likely occur in areas of high deprivation, further detailed and meaningful analysis is not possible at this stage.
Affordability	Affordability is not a direct objective of the package of measures. However increasing sustainable journeys to work is. A number of the packages of measures seek to encourage sustainable journeys by making them more affordable ..	The initiatives mentioned in the previous column are directed at low income groups.	There are no increases in transport costs for any of the initiatives. The initiatives mentioned in the previous columns	The initiatives will be concentrated in areas with low incomes; however the overall level of outcome will be small in comparison to some of the other packages	Due to the nature of the transport model developed (link based) it is very difficult to identify where specific improvements occur

			are directed at making sustainable transport for journeys to work more affordable for low income groups.	of measures.	beyond the links themselves. Whilst it is acknowledged that affordability benefits will exist and that these will likely occur in areas of high deprivation, further detailed and meaningful analysis is not possible at this stage.

5.2. Stages 1 and 2 - Areas Impacted by the Intervention and Identification of Social Groups.

Table 5.1 above has highlighted several impacts that require more detailed analysis to be undertaken to ascertain the social and distributional impacts.

User Benefits

The journey time benefits associated with the proposed packages of measures have been quantified on a link by link basis based on the extents of the Strategic Road Network (SRN) and local congestion corridors within Tyne & Wear. The transport model developed is link based and as such does not output specific origin-destination based economic benefits as a zone structure has not been applied. This makes undertaking spatially based assessments difficult to quantify, in particular due to the multi-modal and highly accessible nature of Tyne & Wear transport network.

Given the lack of suitable spatially related user benefits a more simplified analysis has been undertaken based on individual residents proximity to the links on the network that benefit from the greatest reductions in journey times.

It has not been possible to acquire suitably disaggregated and current income distribution data to overlay with the locations of the user benefits. As an alternative 2007 Indices of Multiple Deprivations (IMD) data at Census Lower Super Output Area (LSOA) geographic level have been applied.

Figure 5.2.1 below shows the LSOA's for Tyne & Wear coloured according to national rank overlaid with the user journey time benefits by link for the transport model extents. This highlights that the links with greatest journey time reductions occur on the SRN (A1 and A19) northbound and southbound and on several arterial routes into Gateshead, Newcastle, South Shields, and Sunderland centres. The user benefits on the SRN are greatest at the River Tyne crossings which coincide with the most deprived areas of Tyne & Wear which are situated along the River's Tyne and Wear.

Accidents

The nature of the transport model developed does not allow for locations specific benefits to be identified, instead only network wide changes on modes and flows have been quantified.

It is likely that due to the large increase in cycling trips likely to occur across the network the area of influence for changes in accidents is likely to exceed the modelled network. However as cycle route enhancement plans have been identified in limited detail at this stage the analysis has been restricted to accidents occurring on modelled links only. These accidents have been overlaid with LSOA level population data (by age group) included as figures 5.2.2, 5.2.3, and 5.2.4 below.

However information has been provided by TADU (Tyne & Wear Accident Dissemination Unit) which illustrates age related trends in accidents occurring in the area. Table 4.2.1 highlights these trends.

Table 4.2.1: All Road Users Casualties by Age Group and Severity 2010

	0-15					16-24				
	Fatal	Serious	KSI	Slight	Total	Fatal	Serious	KSI	Slight	Total
Pedestrians	1	39	40	123	163	0	1	16	89	90
Pedal Cyclists	1	17	18	55	73	0	2	2	43	45
Two-Wheeled Motor Veh. Rider	0	2	2	0	2	3	6	17	48	57
Two-Wheeled Motor Veh. Passengers	0	1	1	0	1	0	4	0	3	7
Car and Taxi Drivers	0	0	0	0	0	1	6	8	328	335
Car and Taxi Passengers	1	7	8	104	112	1	7	18	277	285
PSV Drivers	0	0	0	2	2	0	7	0	1	8
PSV Passengers	0	0	0	25	25	0	8	2	25	33
Other Drivers	0	0	0	0	0	0	9	0	10	19
Other Passengers	0	0	0	2	2	1	11	0	11	23
Total	3	66	69	311	380	6	61	63	835	902

	25-59					60+				
	Fatal	Serious	KSI	Slight	Total	Fatal	Serious	KSI	Slight	Total
Pedestrians	0	27	27	117	144	2	26	28	45	73
Pedal Cyclists	1	21	22	112	134	0	1	1	6	7
Two-Wheeled Motor Veh. Rider	5	31	36	78	114	0	0	0	4	4
Two-Wheeled Motor Veh. Passengers	0	1	1	4	5	0	0	0	0	0
Car and Taxi Drivers	0	29	29	1023	1052	1	7	8	130	138
Car and Taxi Passengers	2	19	21	288	309	0	10	10	61	71
PSV Drivers	0	0	0	27	27	0	0	0	0	0
PSV Passengers	0	3	3	112	115	0	13	13	107	120
Other Drivers	0	7	7	90	97	0	2	2	7	9
Other Passengers	0	1	1	30	31	0	0	0	2	2
Total	8	139	147	1881	2028	3	59	62	362	424

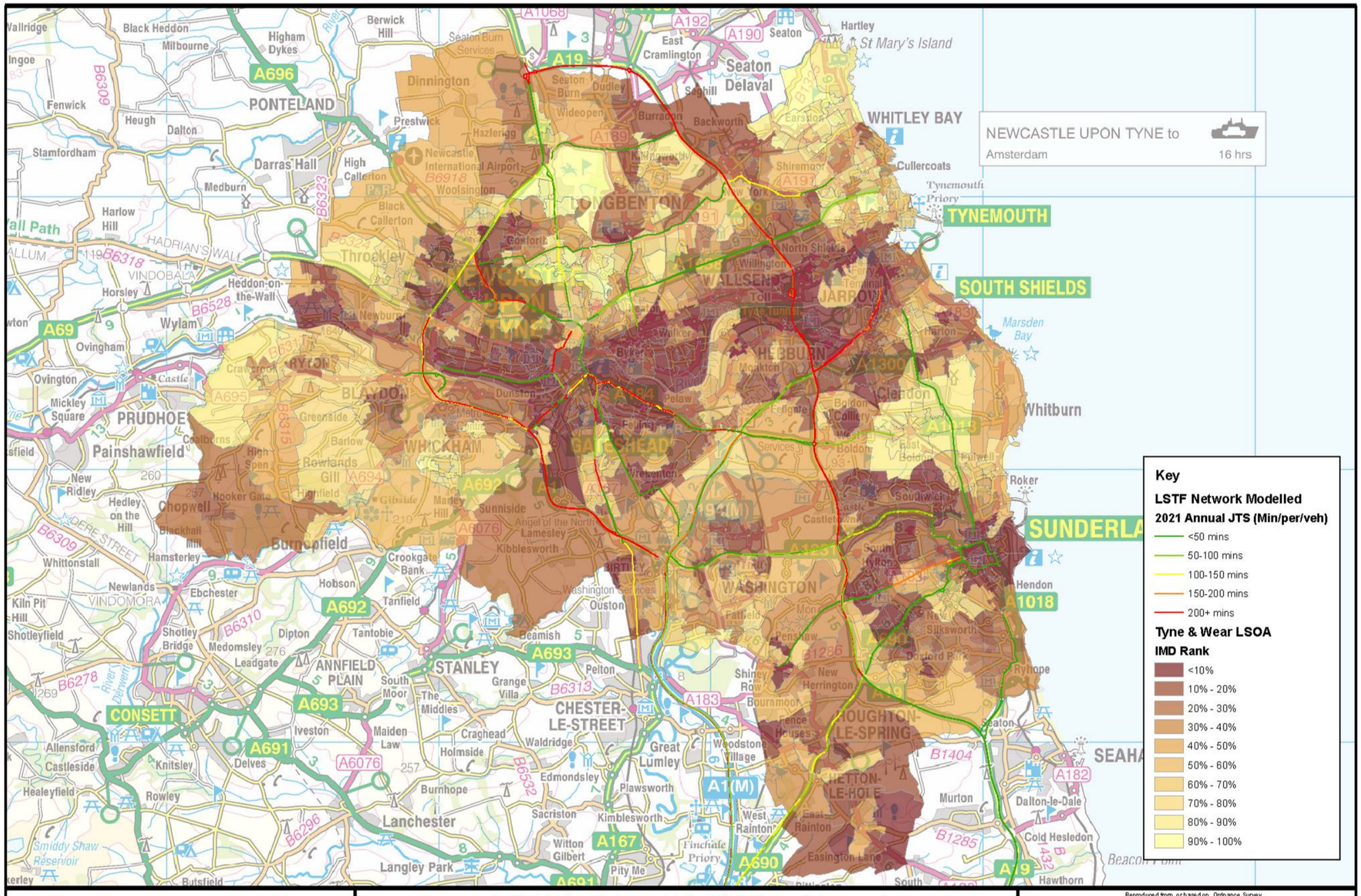


Figure 5.2.1	LSTF Social and Distributional Impacts User Benefits (JTS) by IMD Rank

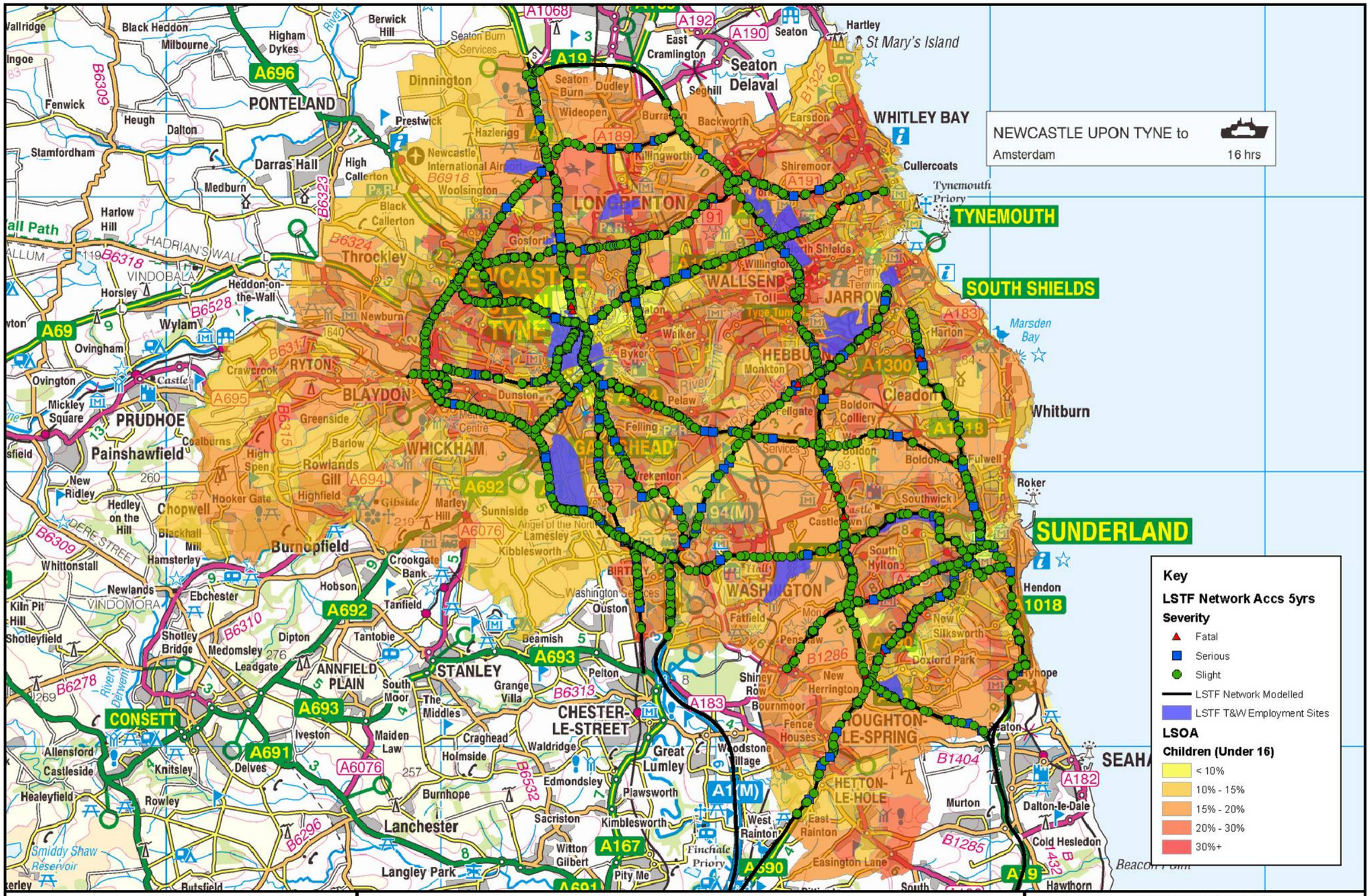


Figure 5.2.2

LSTF Social and Distributional Impacts
Accidents by Severity against Population (Children)

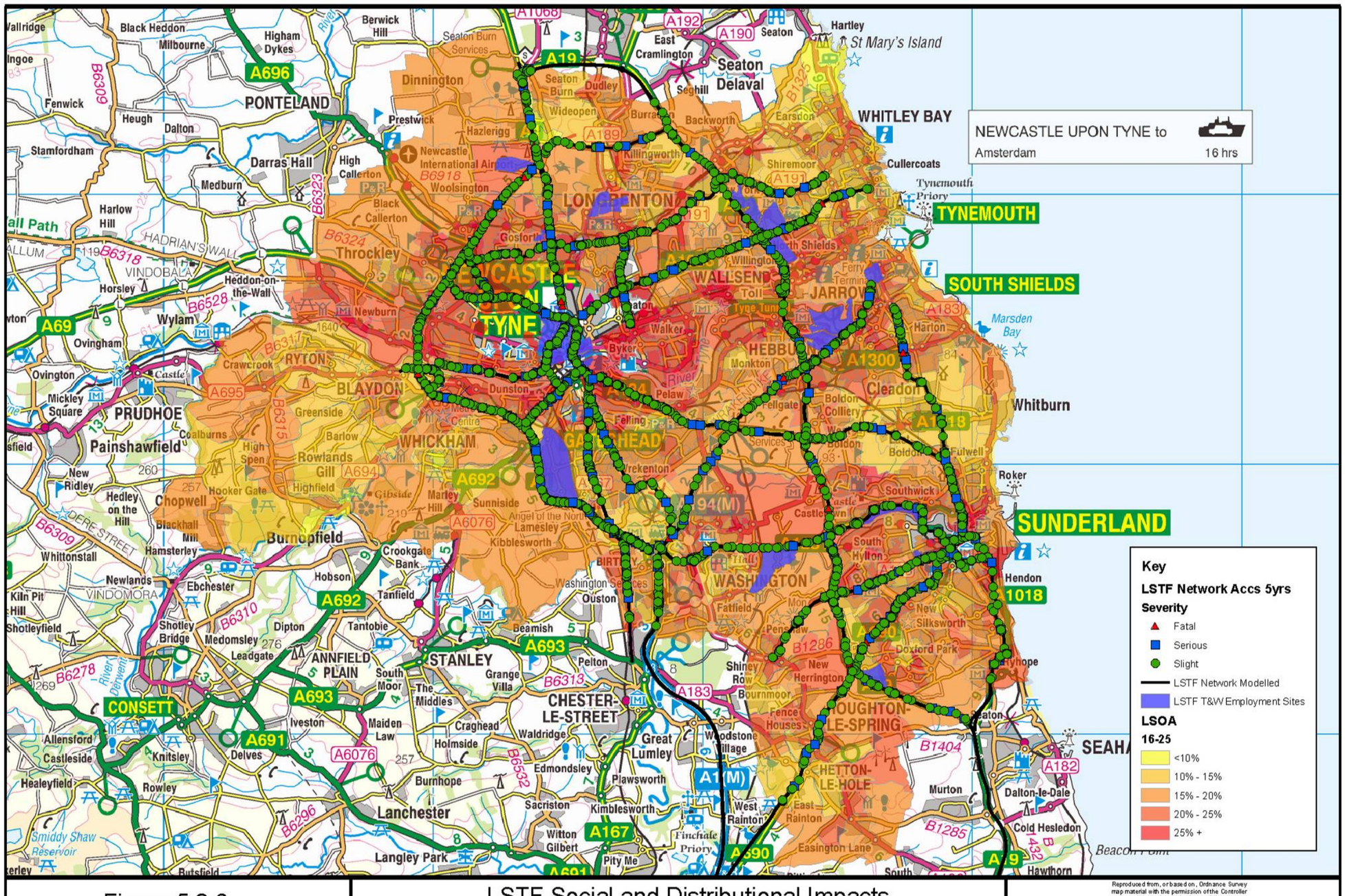


Figure 5.2.3 LSTF Social and Distributional Impacts
Accidents by Severity against Population (16-25)

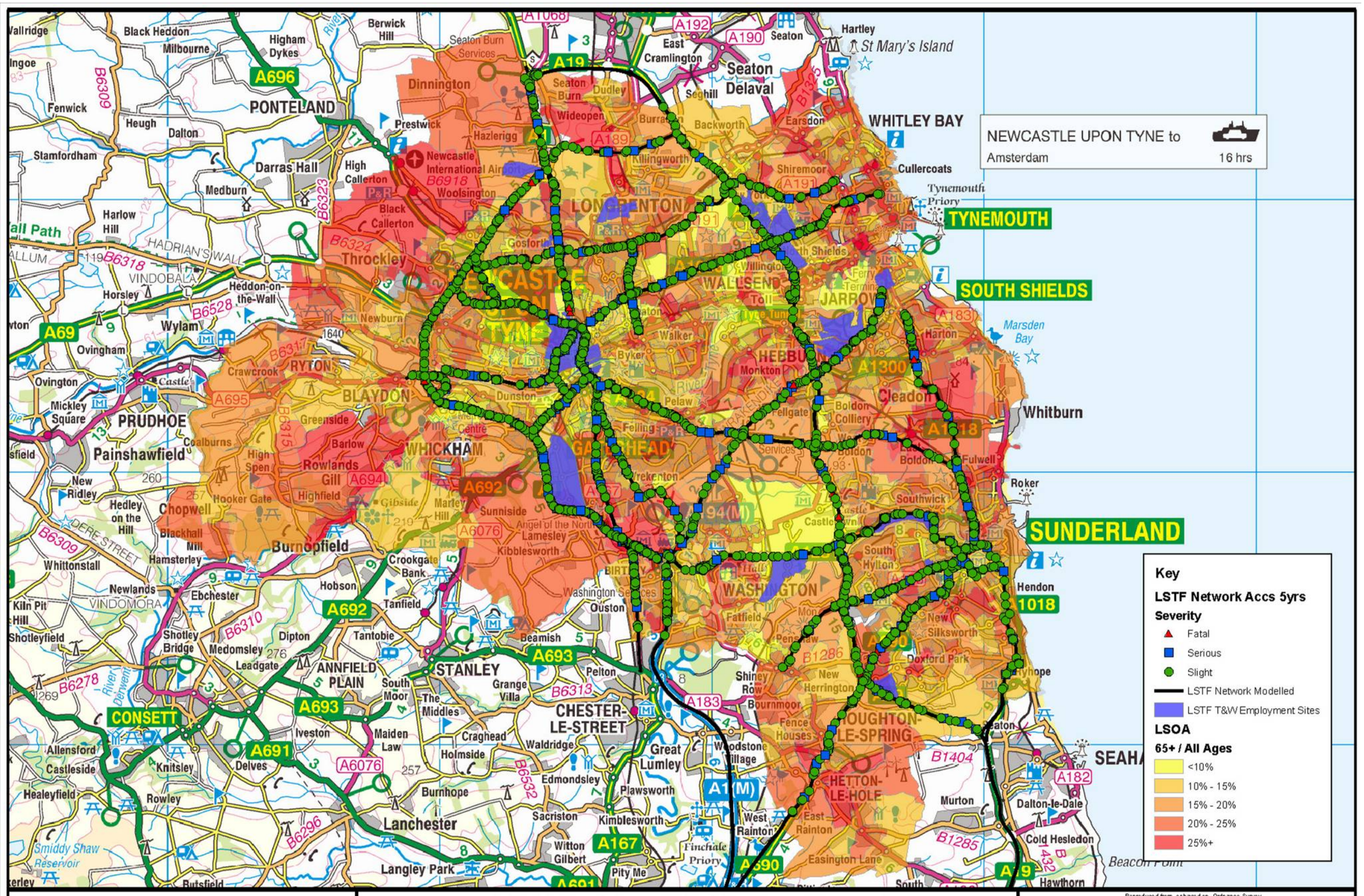


Figure 5.2.4 LSTF Social and Distributional Impacts
Accidents by Severity against Population (70+)

5.3. Stage 3 – Full Screening.

Due to the difficulty in disseminating link based benefits to specific origin zones/households further analysis is unlikely to result in meaningful social and distributional impacts being quantified. It is therefore recommend that full screening of SDI changes is not undertaken.

6. Transport Modelling

6.1. Introduction

6.1.1. The LSTF

The Local Sustainable Transport Fund aims to help build strong local economies and address the urgent challenges of climate change in the UK. It reflects the Government's core objectives of supporting economic growth by improving the links that move goods and people and meeting its commitment to reducing greenhouse gas emissions.

The Tyne & Wear Local Authorities have identified a variety of measures geared to supporting jobs and business through effectively tackling the problems of congestion, improving the reliability and predictability of journey times, enabling economic investment, revitalising town centres and enhancing access to employment. They will aim to bring about changes in patterns of travel behaviour and greater use of more sustainable modes of transport.

The Fund provides the opportunity to take an integrated approach to meeting local challenges and to delivering additional wider social, environmental, health and safety benefits for local communities. The Tyne & Wear Local Authorities, working with their partners, have identified solutions to meet the economic and environmental challenges faced in the region.

6.1.2 Tyne & Wear Proposals

The proposals identified can be split into three broad categories:

- Measures targeted at defined employment areas, encouraging use of sustainable transport modes and improving accessibility;
- Measures not specifically targeted at employment areas, which will have an impact over a wider area and encourage greater use of sustainable transport modes; and
- Measures targeted at getting people back to work.

6.1.3 Guidance

The LSTF guidance stipulates that an appraisal to WebTAG guidelines of the proposals is to be carried out. Whilst suggesting that available transport models should be used, it does allow for the use of spreadsheet models. The guidance also stresses the importance of proportionality in the preparation of the bid.

The remainder of this report outlines the approach taken to the modelling of the LSTF schemes.

6.2. Modelling Approach

The LSTF guidance stipulates that an appraisal to WebTAG guidelines of the proposals is to be carried out. Whilst suggesting that available transport models should be used, it does allow for the use of spreadsheet models.

In Tyne & Wear there is an available transport model – the TPM model. This covers the study area and is a multi modal model incorporating highway supply, public transport supply, and a demand model – all using CUBE. Previously, the model was accepted by the DfT as being acceptable for use in assessing "softer" transport planning measures such as would be found in Travel Plans and are proposed in the LSTF. This, however, was prior to the review of multi modal models on behalf of the DfT that concluded that the TPM was not fit for purpose. Since that review, additional work has been carried out on the model and it has been certified as meeting DfT WebTAG/DMRB criteria. It could in theory therefore be used for assessing for the LSTF proposals.

There are however a number of difficulties in using the TPM to assess LSTF proposals:

- Model Type – the TPM is a strategic model that was developed primarily to assess large transport proposals and/or transport strategies. The majority of LSTF proposals are targeted at specific employment areas and will be relatively local in their impacts. A significant number of trips affected will be short distance (e.g. cycle trips). For many of the employment areas, the zones are relatively large and as a result a number of the trips we are interested in will be internal trips within a single zone. This means that the zoning structure will need to be amended to assess many of the LSTF proposals.
- Zoning – as well as being too large for our purposes, a number of the zones are not homogenous in terms of trips types – i.e. they combine various trip purposes. Whilst this does not prevent modelling of the impact of measures on journey to work trips, it adds a level detail and complication.
- Model Period – the TPM does not model network peak hours, it models the average flow over each three hour peak period. This means that the congestion in the "AM Peak" will be an underestimate of the actual congestion in the true AM Peak (as is the case for the PM peak). As we are interested in journey to work trips during peak periods, this is a significant difficulty.

Given the above issues it has been decided to adopt an alternative approach to carrying out the modelling.

6.3. Model Description and Development

6.3.1. General approach and Structure

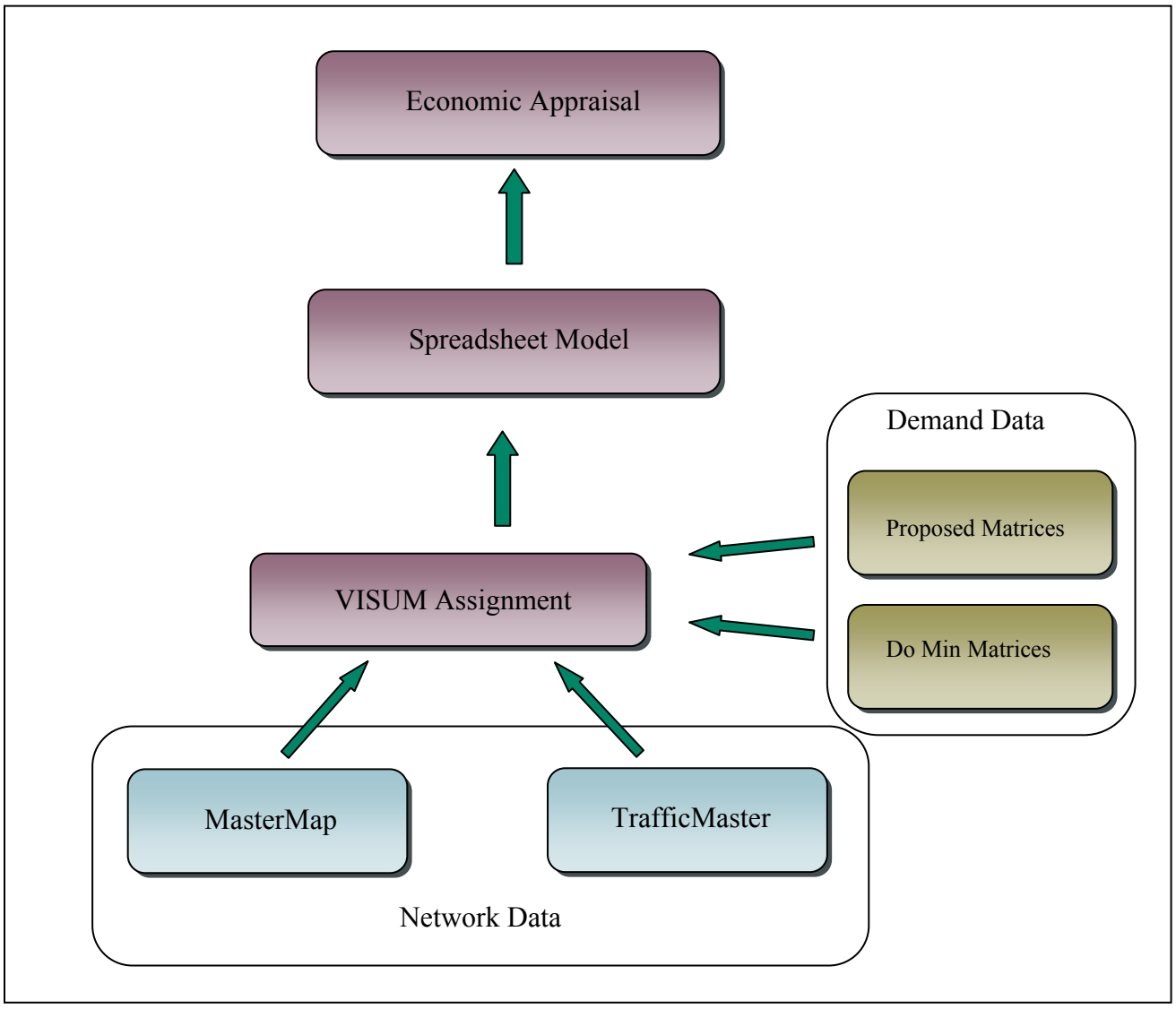
The modelling approach adopts a 2 stage methodology, comprising a VISUM assignment model which feeds into a spreadsheet model which will be used to calculate journey time savings.

The VISUM model will be used to determine the routes used by car trips that will switch to alternative modes due to the LSTF proposals. The reductions in flow determined by the VISUM model will then be used to amend flows in the spreadsheet model which will then determine the resulting reductions in journey times for the links in the model.

There is no assignment-simulation iteration invoked in the model.

A diagrammatic representation of the modelling structure is presented below:

Modelling Flow Chart

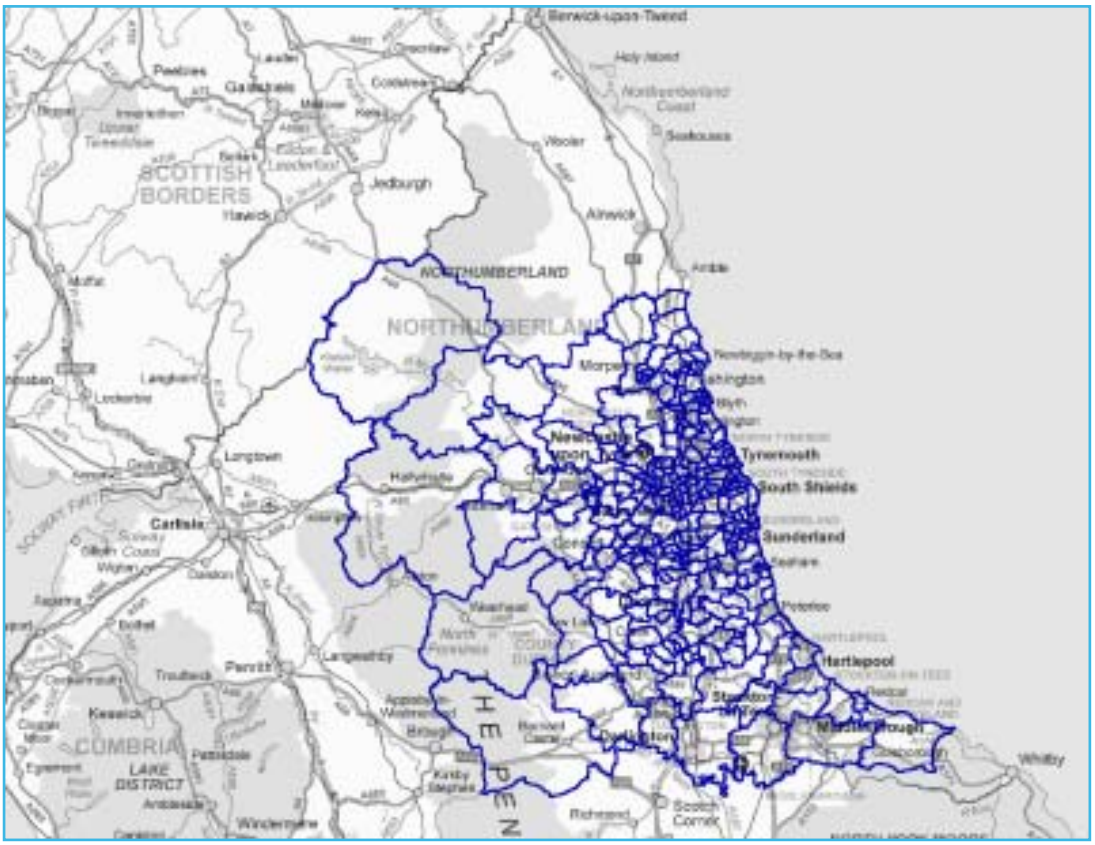


6.4. VISUM Model

6.4.1 Purpose

The purpose of the VISUM model is to assign the trips associated with the employment sites. The VISUM model is also used for assignment in the process of estimating the effects of schemes in the do minimum scenario.

VISUM Model Zone Extents



6.4.2. Zonal Structure

The zonal structure of the VISUM model is based upon the 2001 census wards. This provides a convenient way to summarise demographic information, as well as providing a suitably fine zonal structure for the assignment model. This zonal structure is particularly convenient for the implementation of the census journey to work data.

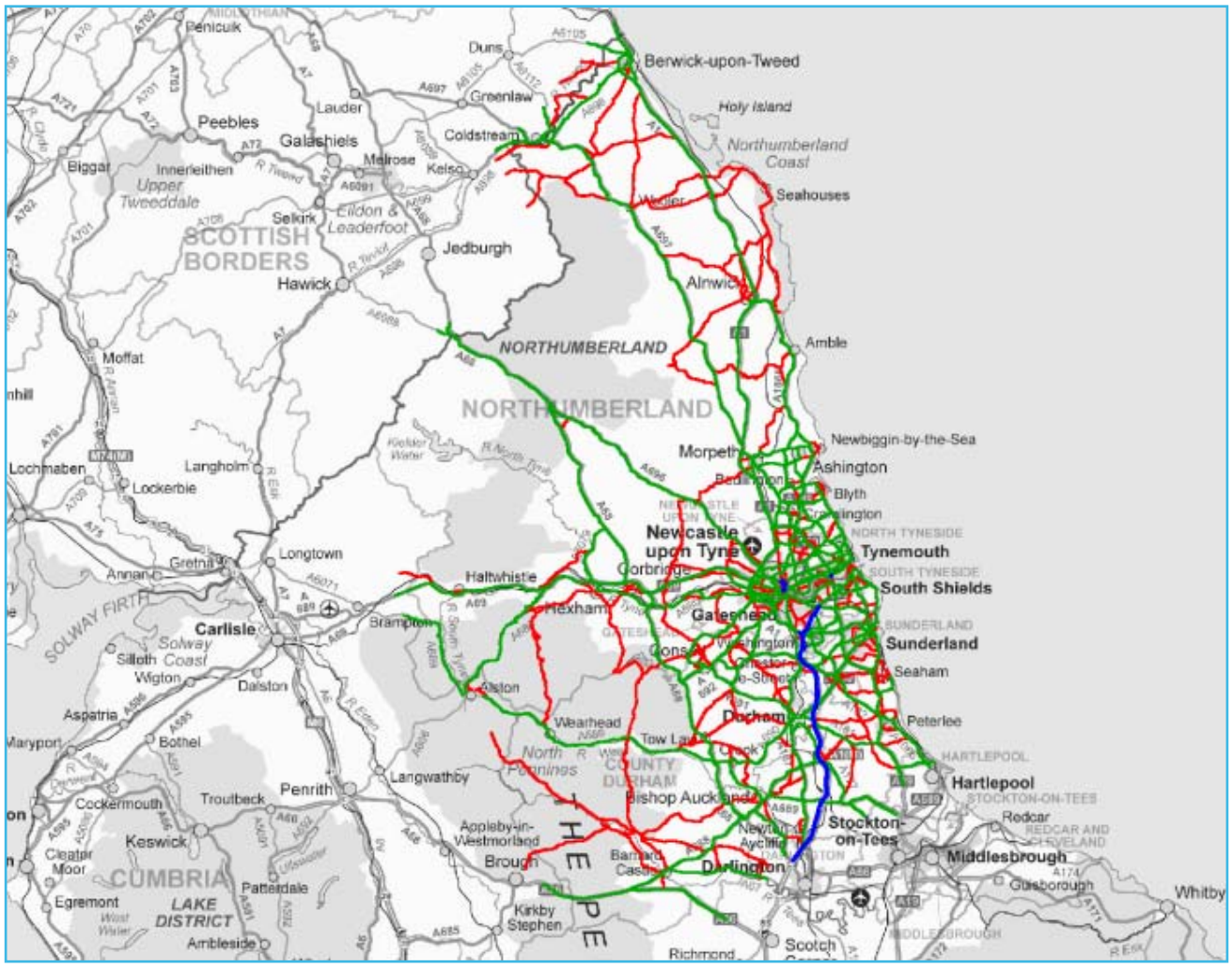
6.4.3. Link Structure

The Link structure of the VISUM model is based upon the Ordnance Survey MasterMap product, filtered to Motorways, A Roads and B Roads.

The network is a coarse one, with no turn restriction. As such, a degree of cleaning needed to be undertaken to this data to ensure that vehicles are not going the wrong way along motorways, dual carriageways, roundabouts etc.

However, the network remains a course highway network, with little detail coded. This is considered to be adequate for the assignment model.

VISUM Model Link Extents



6.4.4. Simulation

There is no simulation undertaken in the VISUM model.

6.4.5. Assignment

The assignment process invoked by VISUM relies entirely on the TrafficMaster data forming an estimation of journey times on each link, and does not simulate delays based upon the assignment. In this way, an estimation of the route choice between origin and destination can be obtained.

Because there is no simulation involved, there is no assignment-simulation loop process, and so a traditional Wardrop Equilibrium assignment would simply produce an all or nothing assignment. This is not considered to be an accurate representation, and so a stochastic user equilibrium assignment algorithm is chosen.

6.4.6. Output

The output from the VISUM model is in the form of a list of link flows associated with the matrix assigned. This flow can be directly read into the spreadsheet model for further analysis.

6.5. Spreadsheet Model

6.5.1. Purpose

The purpose of the spreadsheet model is to take the outputs from the VISUM model and calculate the journey time benefits associated with improvements modelled.

6.5.2. General approach

The general approach of the model is to compare the flows assigned with the counted flows, or do minimum flows and use COBA speed flow curves in order to calculate a time saving associated with the reduction of flow.

6.5.3. Speed Flow Curves

The speed flow curves used are calculated by the method outlined in the COBA manual.

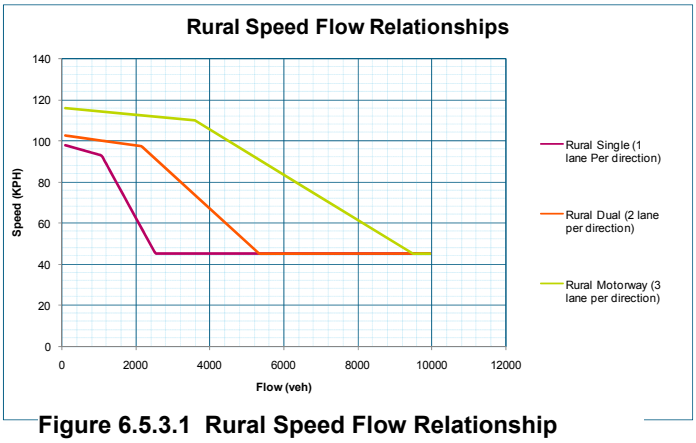


Figure 6.5.3.1 Rural Speed Flow Relationship

The links are split into the following categories:

- Rural Motorway
- Rural Dual Carriageway
- Rural Single Carriageway
- Urban Non Central
- Urban Central
- Small Town
- Suburban Single Carriageway
- Suburban Dual Carriageway

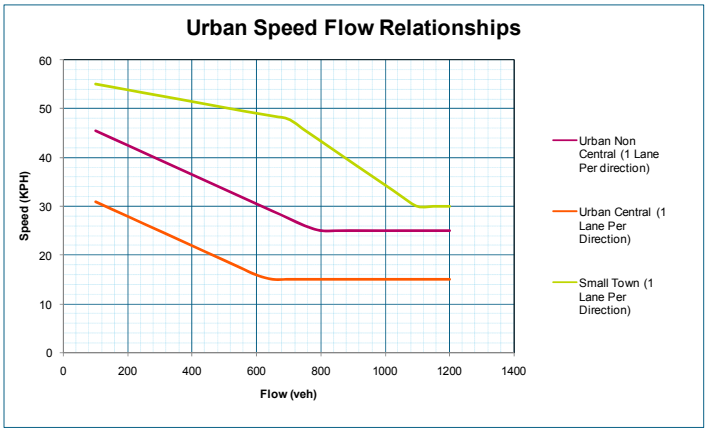


Figure 6.5.3.2 Urban Speed Flow Relationships

Each Category is further divided into Good, Typical and Poor Standard. Default values taken from DMRB are used with the relationships defined in DMRB to give 24 standard speed flow relationships. These are then adjusted on an individual basis in order to make sure they represent each link.

Graphical representations of typical speed flow curves are given in Figure 6.5.3.1, Figure 6.5.3.2 and Figure 6.5.3.3.

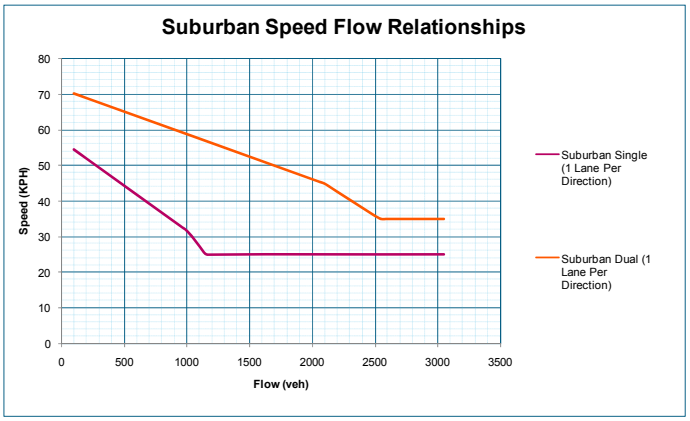


Figure 6.5.3.3 Suburban Speed Flow Relationships

6.5.4. Junction delay corrections

In some cases, the speed flow curves underestimate the delay associated with links in the network. This is because junction delay is not explicitly considered in the speed flow approach. Whilst speed flow curves do contain assumptions regarding junction spacing, their general approach cannot explicitly account for key factors such as opposing flow and junction layout. In these cases, it is considered reasonable to apply a correction to each link in the network to account for this. This correction will be based on the comparison of measured journey times on the links and the journey time modelled using the counted flow and the speed flow curve. It is assumed that the relationship between the flow and the additional delay will be of linear form, and so the effect of the adjustment factor is to steepen the gradient of the speed flow curve of that particular link. Full details on assumptions used as included in Appendix D.

6.5.5. Link Structure

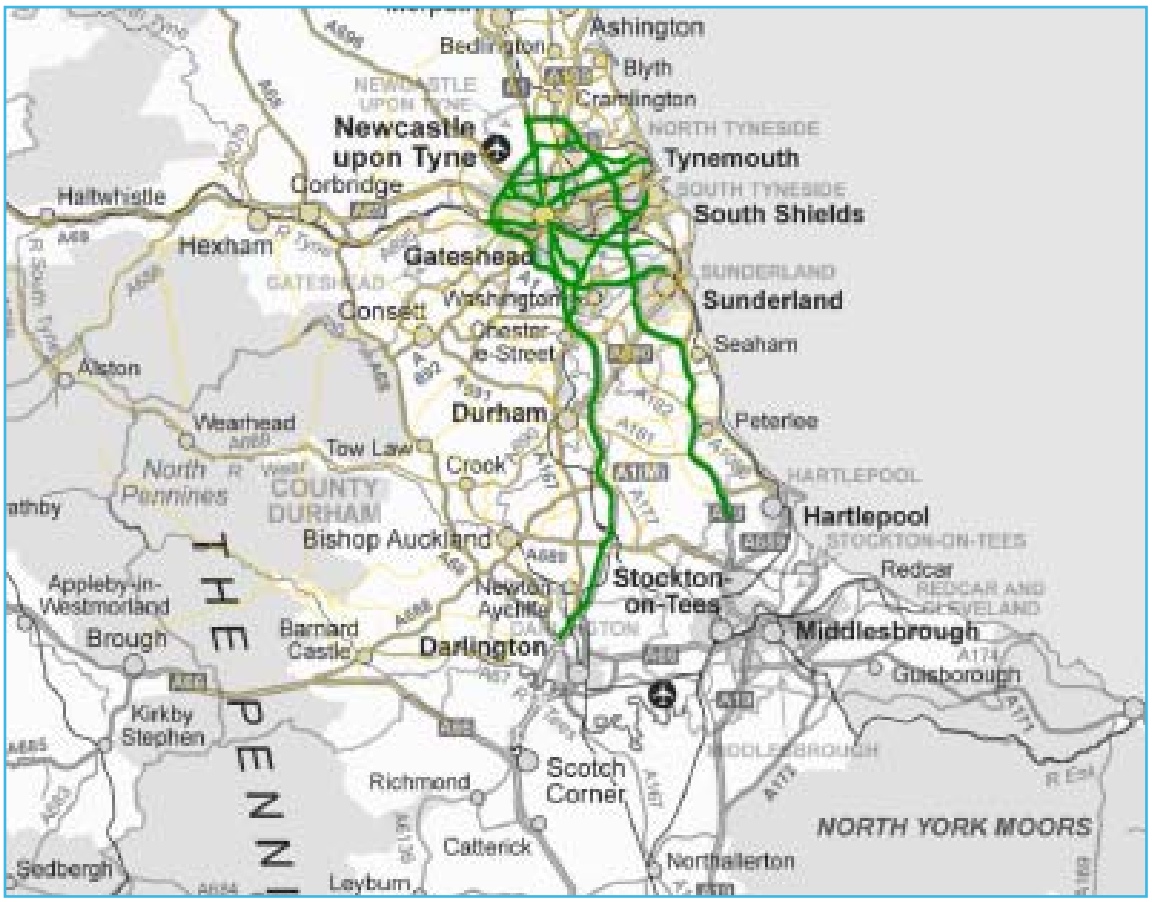
The link structure of the spreadsheet model is based on that of the VISUM model, however it is considerably more coarse. For example, the A1 is split into only 5 links in each direction.

Links are chosen such that where traffic conditions or highway conditions change significantly, a new link begins, though not at each individual junction.

The flow represented in the spreadsheet model is an average, weighted by length, of the flows on the corresponding links in the VISUM model.

Because of the way the COBA speed flow curves are constructed, as a series of linear relationships, assuming the flow conditions do not change between VISUM links in such a way that moves the speed flow between 2 of the separate linear relationships represented in the COBA speed flow curve, this assumption is valid. This also assumes that the link itself does not change in nature along its length, and so the links are chosen in such a way that this is the case. Full details on assumptions used as included in Appendix D.

Spreadsheet Model Link Extents



6.6. Data

6.6.1. Traffic Flow Counts

Traffic count data was obtained from Newcastle City Council. The counts used were Automatic Traffic Counts (ATCs). Each count was associated with a link in the VISUM model, and averaged in the same way as the modelled flows before being transferred into the spreadsheet model.

6.6.2. TrafficMaster

In order to estimate the journey time associated with each link, TrafficMaster was obtained from Newcastle City Council. This data is input into the VISUM model, and forms the basis for the assignment in the model.

The TrafficMaster data provides average speeds measured on each link in the trafficmaster network. In order to use this information in the VISUM network, this data is aggregated to account for the nonparity in network detail.

6.7. Assignment Validation

In order to ensure that the assignment model reproduces a representative estimate of the real assignment, a series of trees were produced, using the census journey to work trip distribution. The trees were then considered in the context of local knowledge, in order to ensure that they are reasonable. A selection of trees are given below. These figures all represent pm peak trips away from the relevant area and it can be seen that in each case traffic is assigned to realistic routes.

Figure 7.4 – Newcastle City Centre Tree

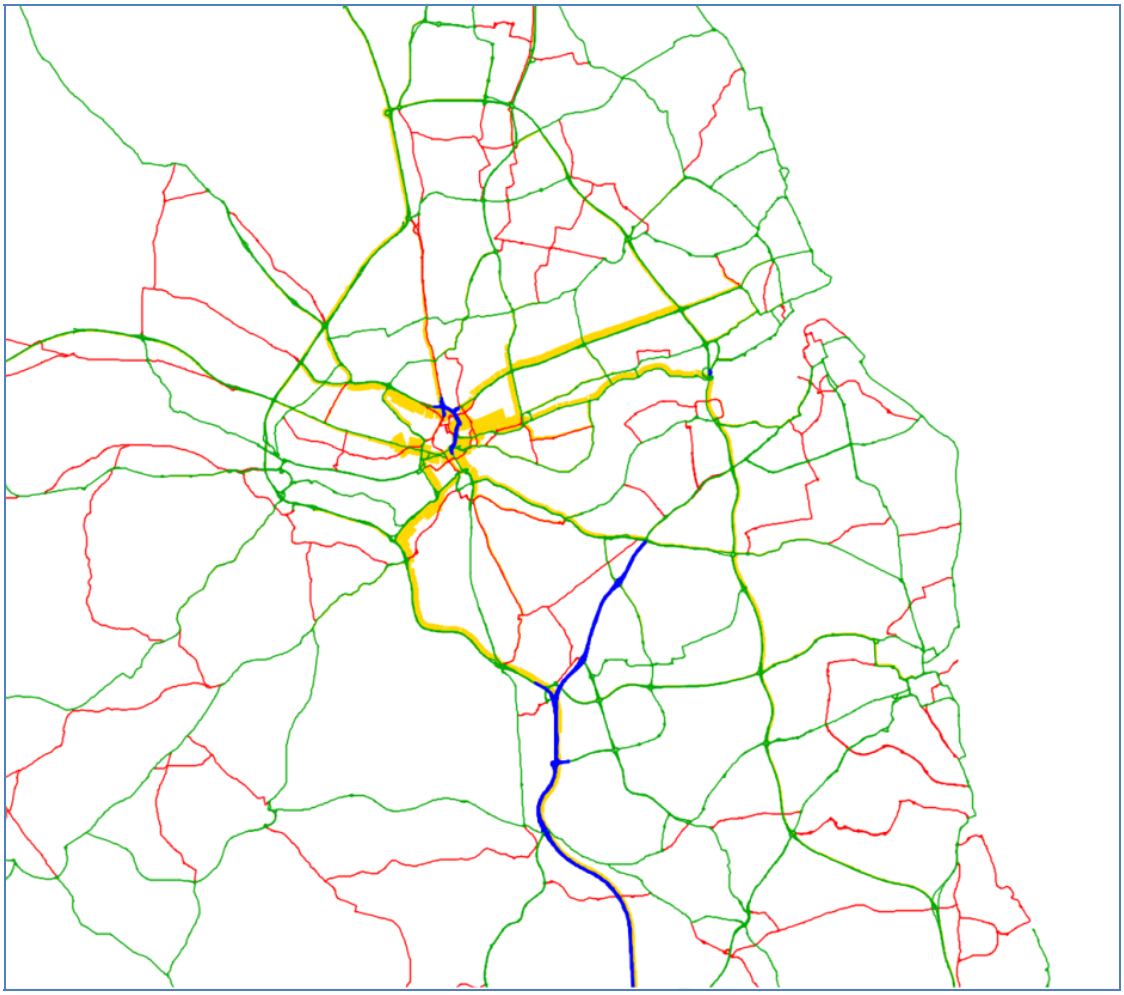


Figure 7.5 – North Shields Tree

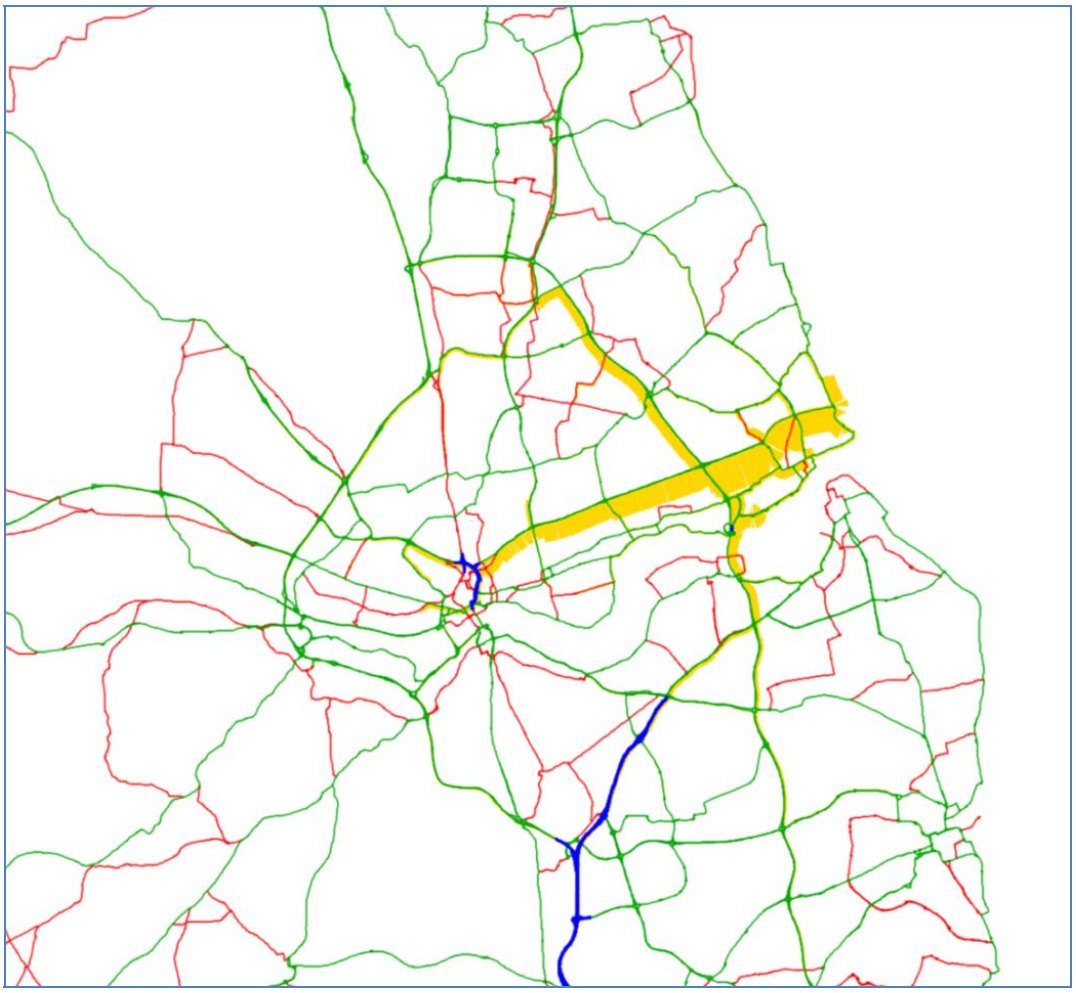


Figure 7.6 – Hexham and Corbridge Tree

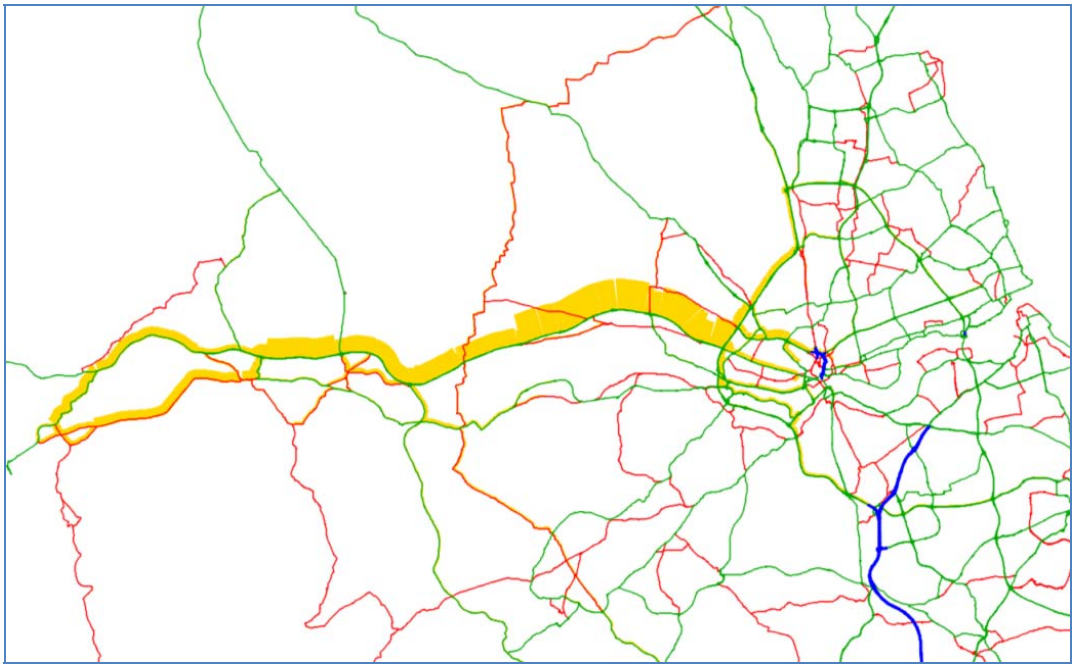


Figure 7.7 – South Shields Tree

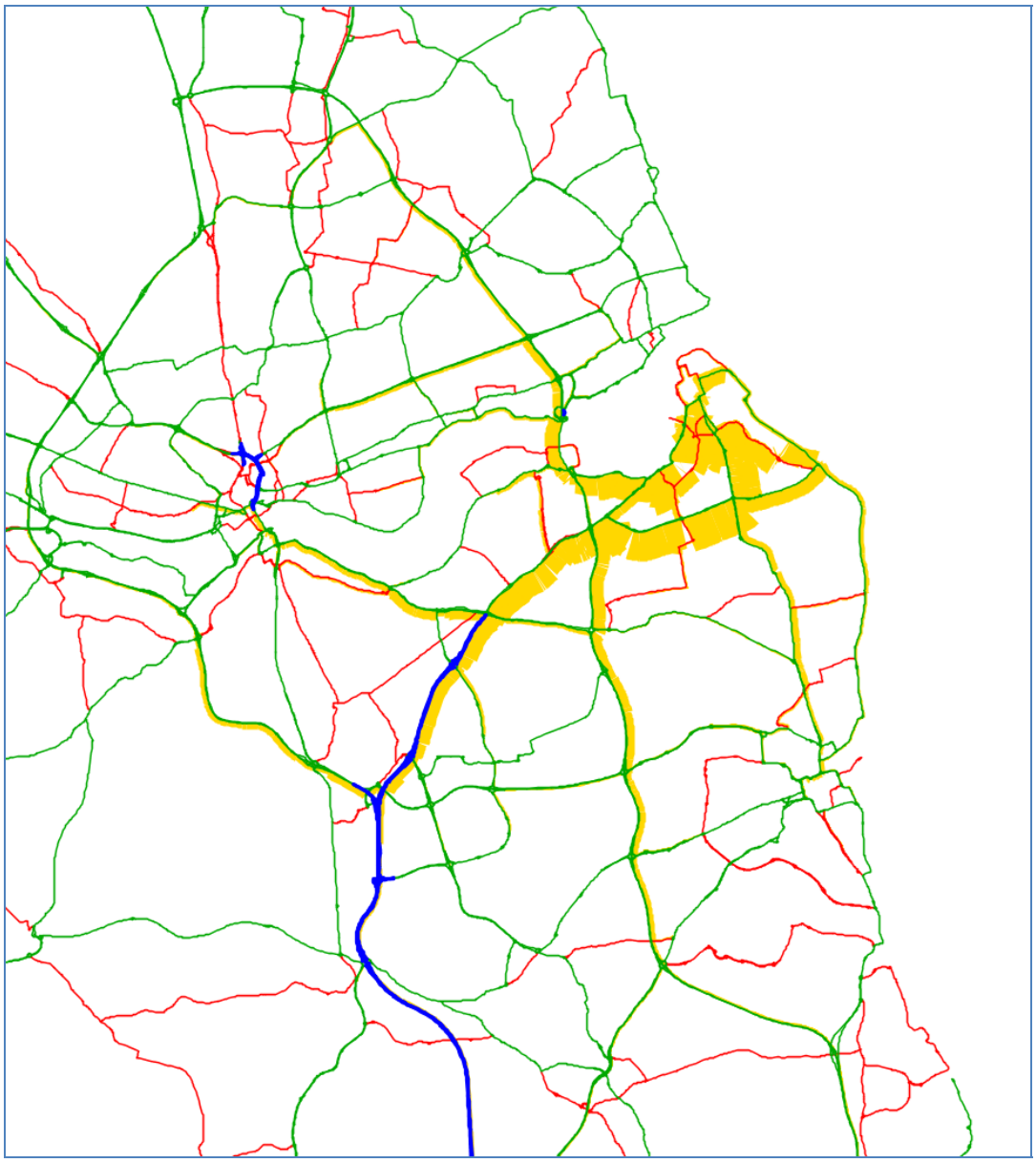
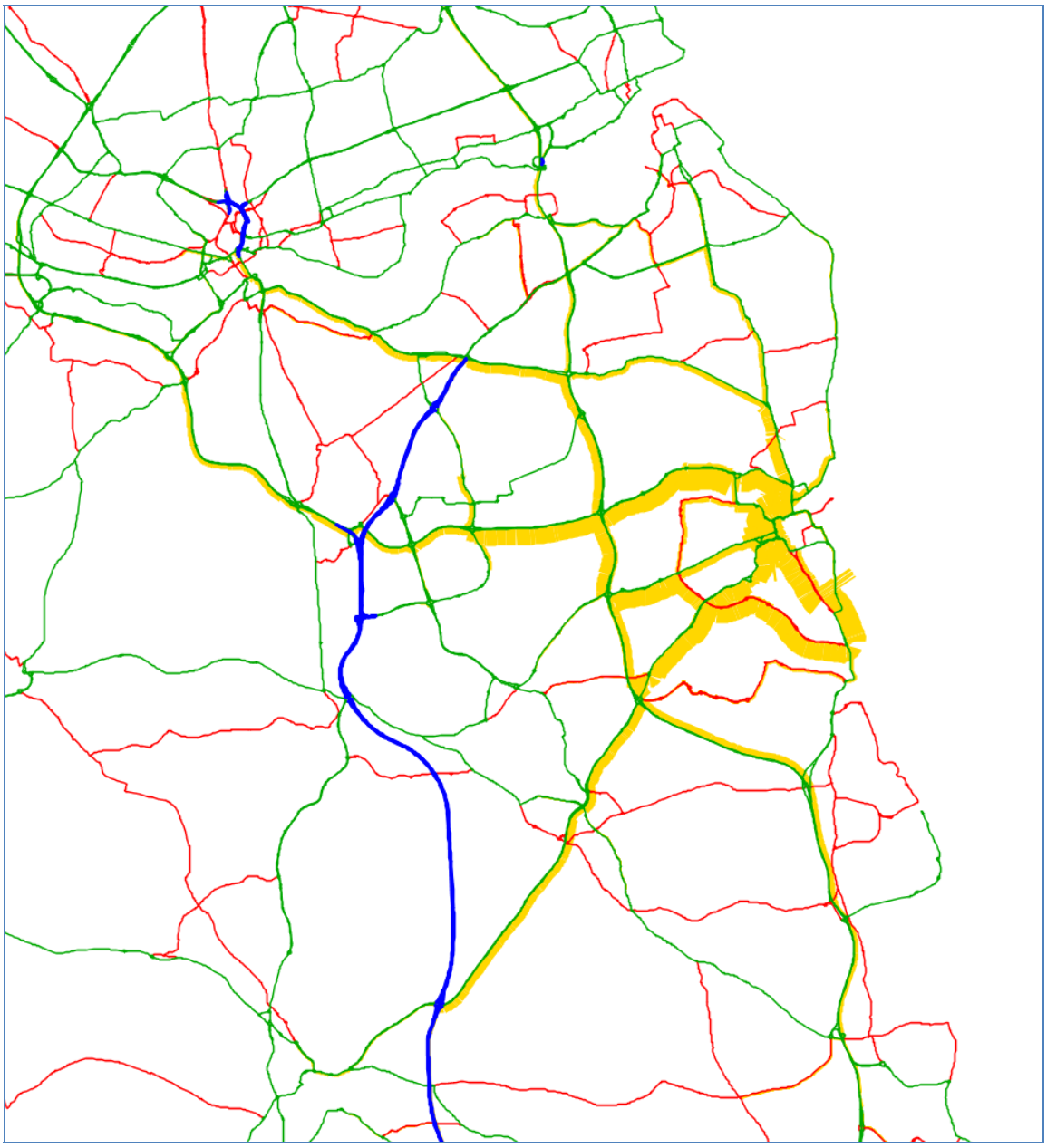


Figure 7.8 – Sunderland City Centre Tree



6.8. Do-minimum Model

6.8.1 Background Growth

6.8.1.1. Local Plan

Key developments have been obtained from the Local Plan. These developments have been entered into the model individually and explicitly modelled. Trip generation rates have been derived from TRICS (mean trip rates) and combined with estimates of development take-up in the model years to determine estimated trip generation.

6.8.1.2. Tempro

Overall growth for the model years has been determined using Tempro central growth estimates for the Tyne and Wear region.

6.8.2. Key Components Schools Impacts

6.8.2.1. Available Information

The information available for this process consisted of the names and location of each school, and which schemes they would be implementing. Additionally, the modal split and number of trips were provided, combined with an estimate of trip length distribution, in the form of a banded frequency distribution.

6.8.2.2. General Approach

In order to estimate the reduction in flow on the spreadsheet model links associated with the Key Components Schools schemes, the following approach was taken.

- Firstly the existing car trip distribution is estimated using a gravity model.
- Modal Shift effects are estimated based upon the various schemes implementedNew trips based upon these assumptions are then distributed using gravity models.
- These new trips are subtracted from the existing trips to produce a new matrix of trips for the schools.

6.8.2.3. Demand Model

The initial existing trip distribution is estimated from a gravity model of the following form:

$$f(U) = aPU^{b}e^{cU} \qquad (0.1)$$

Where:

P = Population of Zone

U = Utility function. Journey time is chosen.

a, b, c are balancing factors

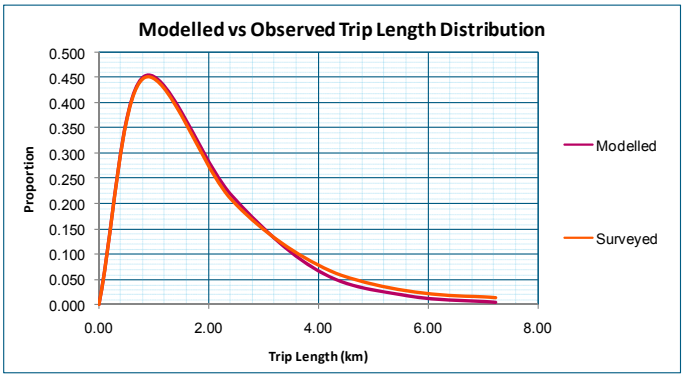


Figure 0.9 Modelled vs Observed Trip Length Distribution

a, b and c were chosen to ensure that the gravity model's trip length distribution recreated the trip length distribution given in the survey information. These were chosen to be:

a = 1.2

b = 0.8

c = 1.0

These values of a, b and c give the trip length shown in Figure 0.9 which can be seen to be a good approximation of the observed trip length distribution.

Because the observed trip length distribution of car trips are weighted so heavily to short trips, this trip length distribution is assumed to be valid also for cycle trips.

The walking trip distribution is estimated using a gravity model of the following form:

$$f(U) = aPe^{cU} \qquad (0.2)$$

Where P = Population of Zone

U = Utility function, Journey time is chosen.

a and c are balancing factors.

6.8.3 Local Transport Plan Proposals

The Tyne & Wear LTP contains a number of proposals that will impact on highway capacity and are likely to be implemented before the design year (2021) for the

modelling and appraisal work. A summary of the schemes and adjustments to the model is presented below:

A1056 Northern Gateway Strategic Regeneration Link: This scheme will relieve congestion at the A1056/A189 junction. The existing A1056 Sandy Lane is replaced with a new 1.8km dual carriageway link between the B1318 and the A189. The model has been adjusted by reducing delay at the A1056/A189 junction.

A1 Western Bypass: This scheme introduces three narrow lanes between the A69 and A1056. The speed flow curve in the model has been adjusted to reflect this.

A19 Silverlink: This comprises improvements to the A19 junction at Silverlink to increase capacity. The model has been adjusted by reducing delay at the junction.

Redheugh Bridgehead: Provision of a new signalised junction at the bridge resulting in greater delays for traffic into and out of Newcastle city centre. The model was adjusted by lowering link capacity and increasing junction delays.

A1058: Introduction of 50mph speed limit across modelled length. The model was amended by adjusting speed flow curves.

Wheatsheaf Gyratory: Provision of signalised junction at Southwick Road/Newcastle Road/Roker Avenue/North Bridge Street together with capacity improvements on Southwick Road. The model was amended by reducing delays at the junction.

6.9 Do Something Model

6.9.1. General Approach

In order to estimate the reduction in flow on the spreadsheet model links associated with the proposed schemes, the following approach was taken.

- The modal shift effect of each scheme is estimated, on a site by site basis.
- New walking, cycling and public transport trips are distributed onto the local network using a series of gravity models.
- The trips are assigned using the VISUM model, the outputs from the model is taken to be a negative car trip.
- The negative link flows are taken into the spreadsheet model, subtracted from the do minimum flow scenario. The resulting difference in speed, calculated using the speed-flow curve is used to estimate the journey time saving to each vehicle remaining on the network.

6.9.2. Demand modelling

4 separate gravity models were utilised in order to account for the different trip length distribution for the different modes. The details of each are summarised below:

Mode	Gravity Model Form	Parameters
Walk	$f(U) = aPe^{cU}$	a = 1 c = -2
Cycle	$f(U) = aPU^{b}e^{cU}$	a = 0.0015 b = 4 c = -0.42
Public Transport	$f(U) = aPU^{b}e^{cU}$	a = 0.00035 b = 4 c = -0.3
Other	$f(U) = aPU^{b}e^{cU}$	a = 0.0006 b = 4 c = -0.2

The parameters for each gravity model were used to calibrate the model to reproduce observed trip length distribution from the 2001 census.

6.9.3 Outputs

The model outputs are link flow, speed, journey time saving. These are used in the economic appraisal in order to calculate monetised benefits.

6.10 Environmental Constraints

Environmental constraints have not been identified due to the nature of the measures proposed. Using the proportionality approach it is considered that no environmental constraints of note lie within the affected network

Annexes

Annex 1: AST worksheets

Worksheet 1 Environment: Greenhouse Gases – Strategy and Plan Level

APPRAISAL- Greenhouse Gases

Proposal Name:	
Current Year of Appraisal:	2009
Proposal Opening year:	2009
Project (Road/Rail or Road and Rail):	

Overall Assessment Score:

Net Present Value of Carbon Emissions of Proposal (£): 477,703

*positive value reflects a **net benefit** (i.e. carbon emissions reduction)

(60 Year Period)

Quantitative Assessment:

Change in Carbon Emissions over 60 year appraisal period (tonnes) -8,230
(between 'with scheme' and 'without scheme' scenarios)

Change in Carbon Emissions in Opening year (tonnes): 0
(between 'with scheme' and 'without scheme' scenarios)

Qualitative Comments:

Sensitivity Analysis:

Description:

Upper Estimate Net Present Value of Carbon Emissions of Proposal (£): 573,243

Lower Estimate Net Present Value of Carbon Emissions of Proposal (£): 429,932

Data Sources:

Worksheet 1 Environment: Physical Fitness

APPRAISAL- Greenhouse Gases

Proposal Name:	
Current Year of Appraisal:	2009
Proposal Opening year:	2009
Project (Road/Rail or Road and Rail):	

Overall Assessment Score:

Net Present Value of Carbon Emissions of Proposal (£): 596,252

*positive value reflects a **net benefit** (i.e. carbon emissions reduction)

(60 Year Period)

Quantitative Assessment:

Change in Carbon Emissions over 60 year appraisal period (tonnes) -10,259
(between 'with scheme' and 'without scheme' scenarios)

Change in Carbon Emissions in Opening year (tonnes): 0
(between 'with scheme' and 'without scheme' scenarios)

Qualitative Comments:

Sensitivity Analysis:

Description:

Upper Estimate Net Present Value of Carbon Emissions of Proposal (£): 715,502

Lower Estimate Net Present Value of Carbon Emissions of Proposal (£): 536,626

Data Sources:

APPRAISAL- Greenhouse Gases

Proposal Name:	
Current Year of Appraisal:	2009
Proposal Opening year:	2009
Project (Road/Rail or Road and Rail):	

Overall Assessment Score:

Net Present Value of Carbon Emissions of Proposal (£):	738,288
(60 Year Period)	*positive value reflects a **net benefit** (i.e. carbon emissions reduction)

Quantitative Assessment:

Change in Carbon Emissions over 60 year appraisal period (tonnes) (between 'with scheme' and 'without scheme' scenarios)	-12,692
Change in Carbon Emissions in Opening year (tonnes): (between 'with scheme' and 'without scheme' scenarios)	0

Qualitative Comments:

Sensitivity Analysis:

Description:

Upper Estimate Net Present Value of Carbon Emissions of Proposal (£):	885,946
Lower Estimate Net Present Value of Carbon Emissions of Proposal (£):	664,460

Data Sources:

Worksheet 1: Environment: Physical Fitness

Change in Cycling & Walking by assessment years including average distance travelled

Mode	Year	Benefit Range	Average Distance (KM)	Number of New Trips
Cycling	2015	Low	5.005	1828
Cycling	2015	Medium	5.1998	2675
Cycling	2015	High	5.292	3557
Cycling	2021	Low	5.045	3612
Cycling	2021	Medium	5.031	4624
Cycling	2021	High	5.0258	5618
Walking	2015	Low	2.544	597.67
Walking	2015	Medium	2.543	601.39
Walking	2015	High	2.541	608.67
Walking	2021	Low	2.144	3266.62
Walking	2021	Medium	2.145	3277.49
Walking	2021	High	2.145	3312.52

Reference Source(s):_____

Summary assessment score: **Strong Beneficial**, the assessment of the economic benefits of health associated with delivering the package of measures was identified as between £1.296 and £2.4694M per annum at 2015. By 2021 the health benefits identified have risen to between £3.1673M and £4.2918M per annum.

Qualitative comments The packages of measures are strongly directly focused towards encouraging increased levels of sustainable travel, including walking and cycling for the journey to work. The measures will include both strategic infrastructure interventions and softer smarter choice options, training and opening up opportunities for increased travel for low income groups. The table above outlines the significant scale of the level of cycling and walking increase for journeys to work.

Worksheet 1 Integration: Passenger Interchange

Passenger Interchange Indicator	Without strategy (Poor/Moderate/High)	With strategy (Poor/Moderate/High)
Waiting environment	Moderate	Moderate
Level of facilities	Moderate	Moderate
Level of information	Moderate	Moderate
Visible staff presence	Poor	Poor
Physical linkage for next stage of journey	Poor	Moderate
Connection time and risk of missing a connection	Moderate	Moderate

Approximate numbers of users affected: Approximate increase in interchange users due to the strategy proposed is 1,630 (2015) and 2,693 (2021) (Mid level)

Overall assessment of passenger interchange impact: (slight/moderate/large positive/negative or neutral: Slight Positive

Reference Sources:

Sloman L, Cavill N, Cope A, Muller L and Kennedy A, Analysis and synthesis of evidence on the effects of investment in six Cycling Demonstration Towns, Nov 2009

Slomon L, Cairns S, Newson C, Anable J, Pridmore A & Goodwin P, The Effects of Smarter Choice Programmes in the Sustainable Travel Towns: Research Project, 2010

DH, HA, NHS South West, Travelwise, South West RDA, "Soft Measures - hard facts": The value of money of transport measures which change travel behaviour, January 2011

Qualitative comments: Transport Interchange improvements can be seen through the implementation of cycle hire facilities at employment sites and improved cycle storage at metro stations. This can be seen to encourage more interchange users by allowing greater connectivity between employment sites and the affected Metro stations. The affected users are more likely to be due to a modal shift from walkers to cyclists than from other means; however there is the potential for a slight increase in users gained from a modal shift from car drivers/passengers to public transport and cycle methods due to the availability of improved cycle provision.

Worksheet 1: Assessment of Security Sub-objective

Security Indicator	Relative importance (High/Medium/Low)	Without strategy (Poor/Moderate/High)	With strategy (Poor/Moderate/High)
Site perimeters, entrances and exits	Low	Moderate	Moderate
Formal surveillance	Medium	Moderate	High
Informal surveillance	Low	Moderate	Moderate
Landscaping	Low	Moderate	Moderate
Lighting and visibility	Medium	Moderate	High
Emergency call	Low	Moderate	Moderate

Approximate numbers of users affected:_the proposals will predominantly affect cyclists and pedestrians. The best estimate of numbers affected in 2021 is 9,200 cycle trips and 3,300 pedestrian trips_____

____

Overall assessment of impact on Security sub-objective (slight/moderate/large positive/negative or neutral):___

Moderate

Positive_____

_____

Reference Source(s):__See Economic Case Report_____

_____

_____

Qualitative comments:_the proposals will improve lighting and surveillance for cyclists and public transport users. This will be through provision of well lit cycling routes, well lit parking facilities with CCTV, CCTV on key roads and new bus shelters with CCTV.

_____

_____

_____

Annex 2: Monetary Value of Physical Activity workings

Cycling 2015 Low

Calculate mean distance travelled per annum
Mean distance travelled on route 5.00km
Mean speed on route 14kph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 5*(100%)*230= 1150km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 1150/1620*0.28 = 0.199
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case = 1828
Expected deaths in this population = 0.00235*1828 = 4.2958
Lives saved (in year x) = 4.2958*0.199 = 0.855
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.855*1.3M = £1.1115 M

Cycling 2015 Medium

Calculate mean distance travelled per annum
Mean distance travelled on route 5.12 km
Mean speed on route 14kph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 5.12*(100%)*230= 1177.6km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 1177.6/1620*0.28 = 0.204
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*2675 = 6.286
Lives saved (in year x) = 6.286*0.204 =1.282
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 1.282*1.3M =£1.667M

Cycling 2015 High

Calculate mean distance travelled per annum

Mean distance travelled on route 5.29km
Mean speed on route 14kph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 5.29*(100%)*230= 1216.7km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 1216.7/1620*0.28 = 0.21
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*3557= 8.359
Lives saved (in year x) = 8.359*0.21 = 1.755
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 1.755*1.3M =£2.2815M

Cycling 2021 Low

Calculate mean distance travelled per annum
Mean distance travelled on route 5.045km
Mean speed on route 14kph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 5.045*(100%)*230= 1160.35km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 1160.35/1620*0.28 = 0.201
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*3612= 8.488
Lives saved (in year x) = 8.488*0.21 = 1.783
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 1.783*1.3M =£2.3173M

Cycling 2021 Medium

Calculate mean distance travelled per annum
Mean distance travelled on route 5.031km
Mean speed on route 14kph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 5.031*(100%)*230= 1157.13km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km

Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 1157.13/1620*0.28 = 0.2
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*4624 = 10.866
Lives saved (in year x) = 10.866*0.2 = 2.173
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.029*1.3M =2.173*1.3 = £2.8253 M

Cycling 2021 High

Calculate mean distance travelled per annum
Mean distance travelled on route 5.026km
Mean speed on route 14kph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 5.026*(100%)*230= 1155.98km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 1155.98/1620*0.28 = 0.1998
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*5618= 13.20
Lives saved (in year x) = 13.20*0.1998 = 2.637
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 2.637*1.3M =£3.4286

Walking 2015 Low

Calculate mean distance travelled per annum
Mean distance travelled on route 2.544 km
Mean speed on route 6kmph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per Pedestrian = 2.544*(100%)*230= 585.12km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 585.12/1620*0.28 = 0.101
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who die each year from all causes (Source: ONS, 2007) 0.00235
Extra pedestrians encouraged by scheme relative to "without intervention" case 598

Expected deaths in this population = 0.00235*598 = 1.4053
Lives saved (in year x) = 1.4053*0.101 = 0.1419
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.1419*1.3M =£0.1845M

Walking 2015 Medium

Calculate mean distance travelled per annum
Mean distance travelled on route 2.542km
Mean speed on route 6kmph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist =2.542=*(100%)*230= 584.66km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) =584.66/1620*0.28 =0.101
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who
die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to “without intervention” case 100
Expected deaths in this population = 0.00235*601 = 1.412
Lives saved (in year x) = 1.412*0.101= 0.1426
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.1426*1.3M = £0.185M

Walking 2015 High

Calculate mean distance travelled per annum
Mean distance travelled on route 2.541km
Mean speed on route 6 kmph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 2.541*(100%)*230= 584.43km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 584.43/1620*0.28 = 0.101
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who
die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to “without intervention” case 100
Expected deaths in this population = 0.00235*609= 1.4312
Lives saved (in year x) = 1.4312*0.101 = 0.1445
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.1445*1.3M =£0.1879M

Walking 2021 Low

Calculate mean distance travelled per annum
Mean distance travelled on route 2.144km
Mean speed on route 6kmph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 2.144*(100%)*230= 493.12km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 493.12/1620*0.28 = 0.0852
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who
die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*3266.62 = 7.677
Lives saved (in year x) = 0.0852*7.677= 0.654
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.654*1.3M =£0.85M

Walking 2021 Medium

Calculate mean distance travelled per annum
Mean distance travelled on route 2.145km
Mean speed on route 6kmph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 2.145*(100%)*230= 493.35km
Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 493.35/1620*0.28 = 0.0852
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who
die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*3277.49 = 7.702
Lives saved (in year x) = 0.0852*7.702 = 0.656
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.656*1.3M =£0.8528M

Walking 2021 High

Calculate mean distance travelled per annum
Mean distance travelled on route 2.145km
Mean speed on route 6kph
Proportion of users who make return trip 100%
Average days travelled on route per year 230
Mean distance travelled per year per cyclist = 2.145*(100%)*230= 493.35km

Calculate relative risk for scheme study area
Mean distance travelled per year per cyclist in Copenhagen study 1,620km
Relative risk (Copenhagen) 0.72
1 – Relative Risk (Copenhagen) 0.28
1 – Relative Risk (Scheme study area) = 493.35/1620*0.28 = 0.0853
Calculate reduced mortality benefit
Mean proportion of England and Wales population aged 15-64 who
die each year from all causes (Source: ONS, 2007) 0.00235
Extra cyclists encouraged by scheme relative to "without intervention" case 100
Expected deaths in this population = 0.00235*3312.45 = 7.784
Lives saved (in year x) = 7.784*0.0853 = 0.6640
Cost of life (Source: DfT, 2002 cost at 2002 prices)
£1.215M
Reduced mortality benefits (in year 2002) = 0.6640*1.3M =£0.8632

Annex 3: Assumption table

Tyne & Wear LSTF Large Project Business Case Assumption Log

Issue	Assumption	Notes
VISUM MODEL		
General Road Network	Only Motorways, As and Bs will be considered in the assignment process.	The cars in the model will be constrained to A roads and B roads. However, since the total number of cars in the model is not representative of the total number of cars on the ground, this will not overestimate flows on the highway network.
Urban road speeds where TrafficMaster Data is available	Where available, trafficmaster data will be used to determine the road network speeds. This is generally the case for roads in urban areas.	
Urban road speeds where TrafficMaster Data is not available	Average speeds based on road type were taken from the available trafficmaster data and assigned to urban links where trafficmaster data is not available	
Extra Urban Road Speeds	Rural roads where individual trafficmaster speeds are not available will be assigned speeds based on the road type. These speeds are initially set to be: 40kmph - Roundabout/Traffic Island 64kmph - SlipRoad 80kmph - A Road or B Road Single C 113kmph - Dual and M	

Zonal Structure	The 2001 census wards were used as a basis for the zonal structure. In some areas, wards were aggregated.	
Assignment	The assignment process is undertaken within VISUM. Stochastic assignment is used, using the road speed assumptions set out above. The disutility function is set to be equal to journey time.	
Counts	Traffic Count data was taken from a large number of ATCs. Averages were used, and in cases where traffic count data is absent, counts were estimated from neighbouring counts.	Because of the way the counts are used in order to estimate the position on a speed flow "curve", the actual count value is not as critical as it may appear. The COBA speed flow curves are constructed as a series of linear segments, and so assuming the flow is on the relevant segment, there advantage gained by taking cars off the link is not dependent on the original flow. For this reason, estimates based on neighbouring counts are considered acceptable.
Spreadsheet Model		
Corridors Considered	Not all of the network considered in the Visum Model is considered in the spreadsheet model. The spreadsheet model instead only considers delays on the network shown.	

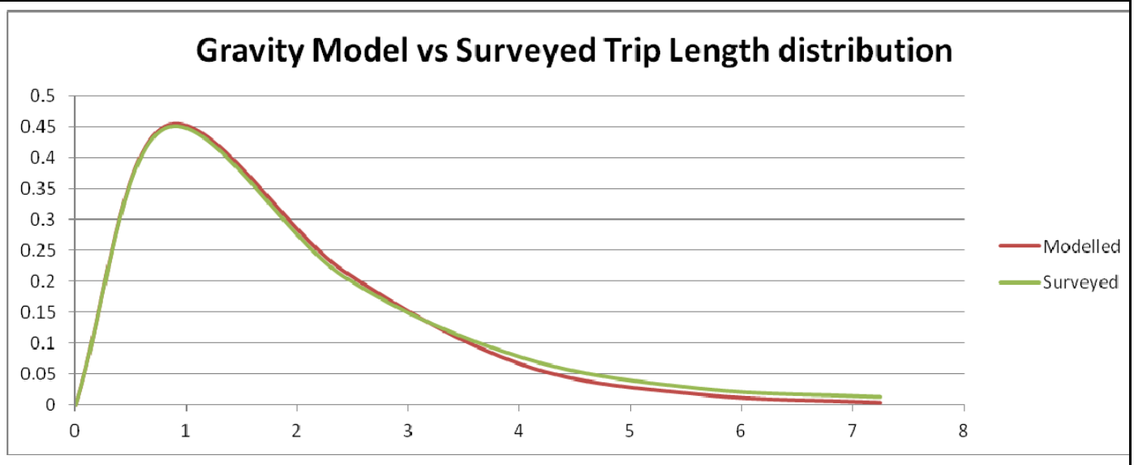
Speed flow relationship	Speed flow relationships are assigned by road type. The road type is split down into the following. Each type is further split into Good, Typical or Poor. Speed flow relationships are taken from the COBA Manual (Volume 13 of DMRB). Speed flow curves are available on request.		Standard	PercHeavy	Bend	Hills	HR	HF	CWID	SWID	VWID	Junc	VISI	DEVEL	SpeedLim	INT	P	AXS
		Rural Dual	**Good**	15	30	15	7.5	7.5										
		Rural Motorway	**Good**	15	20	15	7.5	7.5										
		Rural Single	**Good**	15	75	15	15	15	10	1	4	0.6	400					
		Urban Non Central	**Good**	15										50				
		Urban Central	**Good**	15										50		2		
		Small Town	**Good**	15										35			20	
		Suburban Single	**Good**	10												0.4		15
		Suburban Dual	**Good**	12												0.4		15
		Rural Dual	**Typical**	15	30	15	7.5	7.5										
		Rural Motorway	**Typical**	15		15	7.5	7.5										
		Rural Single	**Typical**	15	75	15	15	15	7.3	1	4	0.6	300					
		Urban Non Central	**Typical**	15										80				
		Urban Central	**Typical**	15										70		45		
		Small Town	**Typical**	15										60			50	
		Suburban Single	**Typical**	15												0.8		60
		Suburban Dual	**Typical**	12												0.8		30
		Rural Dual	**Poor**	15	30	15	7.5	7.5										
		Rural Motorway	**Poor**	15		15	7.5	7.5										
		Rural Single	**Poor**	15	75	15	15	15	7.3	0	1	2	300					
		Urban Non Central	**Poor**	15										90				
		Urban Central	**Poor**	15										90		9		
		Small Town	**Poor**	15										90			100	
		Suburban Single	**Poor**	20												1.2		75
		Suburban Dual	**Poor**	12												1.2		40

Where
P = Population
U = Journey Time
a,b,c are
balencingfactors

Demography / Geography

Zonal Structure	The 2001 census wards were used as a basis for the zonal structure. In some areas, wards were aggregated.	
Population	mid year population projections for 2010 were used in order to inform the gravity model process	

Gravity Model

Key Components bid measures trip distribution	Initial, existing car trip distribution was based upon a gravity model of the form: $f(U) = aPU^{b}e^{cU}$ a = 0.00006 b = 4 c = -0.2	
	Walking Trips are distributed using a gravity model of the following form $f(U) = aP\mathcal{E}^{U}$ a = 1 c = -2	

Cycling Trips are distributed using a gravity model of the following form

$$f(U) = aPU^{b}e^{cU}$$

a = 0.0015
b = 4
c = -0.42

Public Transport Trips are distributed using a gravity model of the following form

$$f(U) = aPU^{b}e^{cU}$$

a = 0.00035
b = 4
c = -0.3

Do Minimum scenario

Effects of Key Components bid measures	Existing car trips distributed to the network using a gravity model. Cycle and Walking projections are then subtracted from this distribution.

Economic Appraisal

Value of Time

The values of time are taken from the WebTAG standard values. These are set for 2002 and are growthed by year. The details are given to the right.

£ per Hour, 2002 Values			
Purpose	**Resource Cost**	**Perceived Cost**	**Market price**
Commuting	4.17	5.04	5.04
Other	3.68	4.46	4.46

Year	Growth (Work)	Growth(Non Work)
2003	2.44	1.95
2004	2.55	2.04

		2005	1.67	1.34
		2006	2.18	1.74
		2007	1.97	1.57
		2008	-0.09	-0.07
		2009	-5.53	-4.43
		2010	0.57	0.45
		2011	0.96	0.77
		2012	1.78	1.42
		2013	2.18	1.75
		2014	2.19	1.76
		2015	2.1	1.68
		2016	2.05	1.64
		2017-2021	1.67	1.34
		2022-2031	1.67	1.34
		2032-2051	1.97	1.58
		2052 onwards	1.91	1.53

Trip Purpose	Trip purposes are based on WebTAG standard values. These are outlined to the right.	**Journey Type Proportions**
		Work 0.181
		Commute 0.46
		Other 0.359

Vehicle Occupancy	The Vehicle occupancy values are taken from the WebTAG standard values. These are outlined to the right.	**2000 Car Occupancy**
		Work 1.28
		Commuting 1.14
		other 1.97
		Vehicle Occupancy Growth
		Work -0.45%
		Non-Work -0.56%

Discounting	Future year costs and benefits are discounted to the current year. This is done using the method outlined in the HM Treasury's Green Book. Discount rates are given to the right.	**Discount Rates**		
		Compared to current year		
		from	**to**	**Discount Rate**
		0	30	0.035
		31	75	0.03
		76	125	0.025
		126	200	0.02

201	300	0.015		
301	inf	0.01		

Employment Growth	Economic Growth figures were taken from Tempro 5.2 job growth factors and applied to individual site to predict 2015 employment levels. For sites where no specific future growth figures were provided by the local authority a Tempro growth factor has been applied to derive 2021 levels of employment	TEMPRO 2015-2021 jobs growth factor **1.0222**	**Comment [JRH1]:** Check should this be 6.2
		TEMPRO 2011-2015 jobs growth factor **1.0204**	
		TEMPRO 2009-2015 jobs growth factor **1.0104**	

Employment Site Modal Shift Assumptions

All Sites	Average distance travelled to work by mode has been taken from 2001 Census data and used when considering propensity to change mode	Existing proportion of employment population within 2km was used when considering site specific effectiveness of walking measures, employment population up to 5km has been considered for cycling based proposals, but also taking into account any potential changes in walking trips.	
	Assumptions on effectiveness of Individual Measures. The results of these will inform the appropriateness of measures for the individual site packages of measures.	**Car Clubs**	
		Range of impact from evidence	Evidence: • Car club members who give up their car reduce the mileage by 60% - 70%. For all car club members the mileage decrease was 33% • Every member results in a reduction of 0.63 cars on the road
		Notes	Uptake of Car Clubs in urban centres with excellent alternative transport linkages will result in greater likelihood of successful implementation (from corporate use). Private use will depend on local population meeting specific socio-geodemographic template detailed below. However trips likely to occur outside modelled peak periods. Additional opportunities for implementation in dense employment areas with restricted parking provision. Newcastle City Centre (incorporating Gateshead Quays) represents the best opportunity for successful implementation. Team Valley and Cobalt possibly but would depend on future enhancements to PT accessibility. Cross benefit of increased PT uptake to form linked trips which replace a single private vehicle trip.
		Modelling results check	Reduction in traffic volumes and need for car parking provision. “every car club car has the potential to replace five privately-owned cars” (1) Car clubs work best in city centre locations which are easily accessed via public transport, walking and cycling. (1) Every member results in a reduction of 0.63 cars on the road. (2) On average car club cars produce 64% of the CO2 emissions of the average car that has been disposed of by members (2) Research conducted by Synovate (2007) indicates that car clubs are likely to appeal to a particular socio-geodemographic group, namely male, 25-35, relatively well-educated, living in urban centres.
		References	(1) DfT, Making Car Sharing and Car Clubs Work: A Good Practice Guide, March 2005 (2) Myers D & Cairns S, Carplus annual survey of car clubs 2008/09, May 2009
		Range of impact from evidence	Local evidence: · Darlington's Sustainable Travel Town Resulted in 13% increase in manual cycling monitored at crossings and 9% decrease in car driving between 2004 and 2008. · Increase in proportion of adult resident doing any cycling in from 24.3% in 2006 to 27.7% in 2009. · Cycling counters indicated a 56.8% increase in cycling.

Average Obtainable Modal Shift (reduction in private vehicle modal split)	Sites with a mixture of strong cycle infrastructure supported by a robust promotion and marketing through travel planning etc should expect the best results. Sites with a high proportion of journeys between 2km and 10 km journeys will have the greatest propensity to change from car driving. 2015 High 3% Medium 2% Low 1% 2021 High 5% Medium 3% Low 1%
Workplace Travel Planning	
Modelling results check	Modelling work undertaken to measure overall workplace travel planning impact shows reductions in commuter traffic between 0.7 and 4.8% (1) "Overall, so far, travel planning may have reduced overall levels of car commuting by 0.4 – 1.5% using our conservative assumptions (model A), or by 0.7 – 3.3% under model B." (1) The reduction in car commuter trips (all car journeys to work in the area) would be 5% (low scenario) or 9% (high scenario) in urban areas, and 2% or 4% in non-urban areas (2) The evaluation of the results of the three Sustainable Towns projects show that car driver trips per resident of the three towns taken together fell by 9% between 2004 and 2008, whilst car driver distance per resident fell by 5%~7% (trips of 50km or less). Car use per head also fell nationally in comparable (medium-sized) urban areas during this period, but by a much smaller amount: a change of -1.2% for car driver trips and -0.9% for car driver distance (NTS all trip lengths). Traffic count data showed variable results in different areas of the three towns, with overall reductions of the order of 2%, and more substantial reductions in inner areas, of the order of 7-8%, taking place prior to the economic downturn. Bus use grew substantially in Peterborough and Worcester during the period of the Sustainable Travel Town work, whereas it declined in Darlington. According to the household travel survey data, between 2004 and 2008, bus trips per resident of the three towns taken together increased by 10%~22% (trips of 50km or less), whereas, according to the NTS, there was a national decline of bus trips in medium-sized towns of 0.5% over the same period. According to the household travel survey data, between 2004 and 2008, cycle trips per resident of the three towns taken together increased by 26~30% (NTS shows a decline of cycle trips in medium-sized towns over a similar period). According to the household travel survey data, between 2004 and 2008, walk trips per resident of the three towns taken together increased by 10%~13% (NTS shows a decline in walk trips in medium-sized towns of at least 9% over a similar period). The travel behaviour change in the towns involved a combination of mode shift (with unchanged destination); switch of destination and mode (e.g. replacing a medium-length car trip with a shorter journey by foot, bike or bus); and trip evaporation (not making a trip at all). At the aggregate level, roughly 7% of the reduction in car use (including car driver and car passenger trips) was from a net reduction in trips. (3)
References	(1) Smarter Choices, Changing the way we travel, 2004, Chapter 3 Workplace travel plans (2) Smarter Choices, Changing the way we travel, 2004, Chapter 13 Projections and costs (3) The Effects of Smarter Choice Programmes in the Sustainable Travel Towns, Summary Report, Sloman at al. for DfT, 2010
Information, publicity and promotion (other than PT)	
Range of impact from evidence	• "General travel awareness campaigns could reduce car use by 0.1 or 1% overall" over a 10 year period (1)
Assumptions applicable to all sites	Reduction in car driver mileage: **2015** – high: 0.6%, **medium**: 0.36%, low: 0.06% **2021** – high: 1%, **medium**: 0.6%, low: 0.1%
Additional notes	
References	(1) 'Smarter Choices – Changing the Way We Travel' campaigns, Cairns S, Sloman L, Newson C, Anable J, Kirkbride A & Goodwin P, 2004, Chapter 13 Projections and costs
Sub-element	**Public transport information (incl. real time), publicity and ticketing**
Content	**Public transport information, publicity and promotion**, **POP card promotion** (Nexus), extension of Newcastle City Council travel office, procurement of ticketing via Newcastle City Council travel office, **bus real time information** (Nexus)
Range of impact from evidence	• Public transport information and marketing measures could reduce car driver mileage in urban areas outside London by 0.2% (low intensity scenario) or 0.9% (high intensity scenario) overall after ten years. In non-urban areas, car driver mileage could be reduced by 0.1% or 0.3% after the same period. (1) • Modelling work "suggests that a package of (bus) soft factors could reduce car commuting by between 1% and 2%. This equates to an increase in bus demand of between 4% and 8%, based on the application of the 4 to 1 rule. In terms of changing bus demand, the largest source of potential future growth is likely to come from the existing car users market who

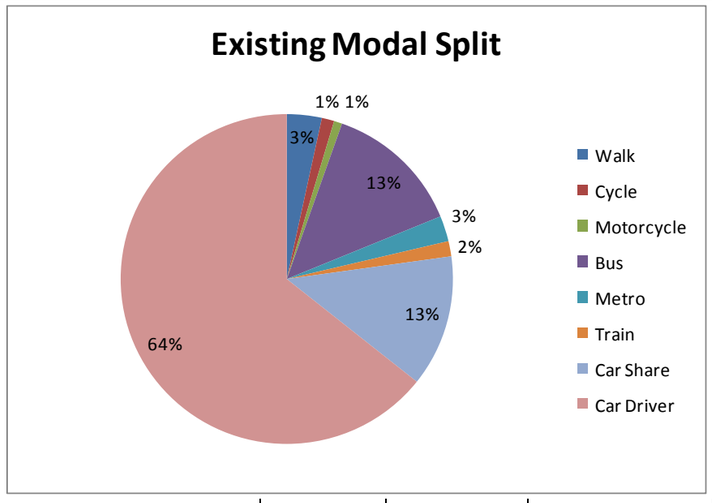
	switch to quality bus services" (2)
Proposed assumptions for LSTF modelling	
Range	Three assumptions are presented: - High – assuming high level of funding and take-up (sensitivity test) - **Medium – proposed modelling assumptions** - Low – assuming reduced level of funding and lower take-up (sensitivity test)
Timeline	Full impact of LSTF funding assumed to be achieved by 2021 (10 year period from 2011), with 60% of results achieved by 2015
Notes	Evidence on the impact of public transport information is used for all sites.
Modelling assumptions for all sites	
Assumptions applicable to all sites	Reduction in car driver mileage: **2015** – high: 1.2%, **medium**: 0.9%, low: 0.6% **2021** – high: 2%, **medium**: 1.5%, low: 1%
Additional notes	
References	(1) 'Smarter Choices – Changing the Way We Travel' campaigns, Cairns S, Sloman L, Newson C, Anable J, Kirkbride A & Goodwin P, 2004, Chapter 13 Projections and costs (2) The role of soft measures in influencing patronage growth and modal split in the bus market in England, Final Report, DfT, 2009
Sub-element	**Travel to work support**
Content	Support made available for those getting back into employment, at the interview stage and at the start of their new contract, to access their workplace. This would include, on a case by case basis: • travel information (personalised journey planning); as well as • the provision of bicycles (including refurbished second hand bikes and training to maintain them); • electric bikes; • scooters; • public transport tickets; • discounted car rental (e.g. JobCarz); • car club membership; • car share matching/travel buddy services; and • independent travel training.
Range of impact from evidence	• **Impacts** Evidence suggests that WorkWise beneficiaries are able to sustain their employment. In the West Midlands, for example, 80% are still in employment after 13 weeks and in Tyne and Wear 92% sustained employment. As well as sustaining employment, evidence shows that ex-WorkWise customers continue to use public transport after participating in the schemes, thereby promoting sustainable travel. More than 90% of beneficiaries from WorkWise in the West Midlands, for example, are still using public transport 12 months after starting work. (8) Workwise West Midlands - more than 80% of WorkWise customers said they would have struggled to get to new jobs or interviews without the free travel passes. (8) • **Savings achieved and scheme costs** Derbyshire Wheels to Work Scheme assessed to have saved the public purse £1,000/month per beneficiary through the end of benefits payments (accounting for Job Seekers Allowance, Income Support, Council Tax Benefit and Housing Benefit) (1) "The evaluation found that the costs in benefits can amount to over £639 per month for an unemployed person dependent upon their individual circumstances. There is also loss of earnings and associated National Insurance and tax contributions to the economy as well as overhead costs associated with Jobcentre Plus and other agency staff dealing with the unemployed" as well as reduced prescription charges. (2) Cost of scooter schemes between £1,500 and £3,000 per beneficiary (usually 6 to 9 months loans) (1) WorkWise schemes combine journey-planning support with free or discounted tickets and passes to reach interviews and work, including during the first crucial weeks of a new job when money can be particularly tight until the first pay packet arrives. The average cost of supporting a person into a new job through WorkWise is around £250. (6)

	• **Access to cars and access to work** Half of households in the bottom income bracket do not own a car, compared to a national average of 25% (10% of the top bracket). Nearly two-thirds of people claiming income support or jobseeker's allowance (the main benefit for unemployed people seeking work) do not have access to a car and a licence to drive it. (6) Two out of five jobseekers say lack of transport is a barrier to getting a job. 38% of jobseekers say that transport (lack of personal transport or poor public transport) is a key barrier to getting a job. 12%of jobseekers claim that a lack of available transport has stopped them from attending interviews. 13% of people say they have not applied for a particular job in the last 12 months because of transport problems. This figure rises to 18% for people living in low-income areas, and 25% for 16–25-year-olds. 5% of people say they have been offered a job but turned it down in the last 12 months because of transport problems. For people living in low-income areas this figure is 10%. (7) One in four people say their job search is inhibited by the cost of travel to interviews and 14% of out-of-work lone parents say they can't afford the cost of transport to work. (7) • **Case studies** Over the course of 4 years, WorkWise in the West Midlands has helped over 4,200 people to get to interviews and over 4,300 people to travel to a new job. The average cost of supporting a person into a new job through WorkWise is just £200. To date, the scheme has issued over 6,000 day passes to get people to job interviews and almost 8,000 monthly passes to get people to work (8) WorkWise Merseyside distributed 2,800 travel tickets to help people access jobs, training and interviews between April 2007 and December 2008. (8)
Proposed assumptions for LSTF modelling	
Range	Three assumptions are presented: - High – assuming high level of funding and take-up (sensitivity test) - **Medium – proposed modelling assumptions** - Low – assuming reduced level of funding and lower take-up (sensitivity test)
Timeline	2015 assumptions assume full impact of LSTF funding achieved by 2015, with results maintained to 2021
Notes	Some schemes are already in place including: • JobCarz (car rental scheme for people starting a new job in East Durham) (3) • Access to Work (financial support for people with disability who are not able to use public transport to get to work – run by Job Centre Plus) (4) • Help with travel expenses when attending job interviews (run by Job Centre Plus) (5) • Information on what Nexus have done so far? Workwise equivalent? Merseyside evidence applicability to Tyne & Wear is high. Comparison on key indicators between the two areas show very similar age profiles (Census 2001), distances travelled to work (Census 2001), travel to work mode split (Census 2001), socio economic status (ONS Annual Population Survey 2010, Census 2001 and Job Seekers Allowance data - ONS claimant count October 2011)
Site specific assumptions	
Assumptions applicable to all sites	Assuming a budget of £900k over 4 years for the high scenario, £750k over 4 years for the medium scenario and £500k for the low scenario Assuming an average spend of £500 per beneficiary (majority would receive information only or free monthly bus pass but some would benefit from the loan of a scooter or car) Scheme would help: High: 1,800 people, Medium: 1,500 people, Low: 1,000 people • **Job creation benefits** Assuming that job creation benefit = 80% of people helped required the help to get the job and that 92% of these remain in their job (PTEG West Midlands and Tyne & Wear evidence). **Job creation over 4 years** (by 2015) = High: 1,325 people, **Medium**: 1,104 people, Low: 736 people • **Public purse savings** This equates to a **minimum per annum savings for the state after four years** (from 2015) of High: £15.9m, **Medium**: £13.2m, Low: £8.8m (assuming benefit cost of £12,000 per annum per person) • **Carbon benefit** Assuming that 90% of beneficiaries keep using public transport in the medium to long term (PTEG West Midlands Wear evidence) and that the other 10% start using the car Number of people still using public transport in 2015 and to 2021 = High: 1,192 people, Medium: 994 people, Low: 662 people

	Number of people using the car in 2015 and to 2021 = High: 132 people, medium: 110 people, low 74 people Compared to Census 2001 travel to work data for Tyne & Wear where 32.6% of people use a car to commute (as a driver or passenger), number of people using the car without the scheme (assuming that they could get the jobs) would have been = high: 432 people, medium: 360 people, low: 240 people Number of car trips avoided from 2015 (continuing to 2021) = High: 299, medium: 250, low: 166
Additional notes	
References	(1) Evaluation of Wheels to Work Derbyshire, Final Report, ERS, 2009 (2) Wheels to Work: the way forward, Commission for Rural Communities, 2005 (3) www.jobcarz.co.uk (4) www.direct.gov.uk/en/DisabledPeople/Employmentsupport/WorkSchemesAndProgrammes/DG_4000347 (5) www.direct.gov.uk/en/MoneyTaxAndBenefits/BenefitsTaxCreditsAndOtherSupport/Employedorlookingforwork/DG_10013908 (6) Transport, social equality and welfare to work, A joint report by Campaign for Better Transport and Citizens Advice, 2010 (7) Making the Connections: Final Report on Transport and Social Exclusion, Social Exclusion Unit, 2003 (8) WorkWise - a ticket to employment, PTEG Briefing, 2009
UTMC – Air Quality Monitoring, VMS Corridor Information, Journey Time monitoring, CCTV. Smartphone Application	
Range of impact from evidence Notes	Evidence: • Reading City Centre observed reduction in car journeys of 7% since 2001 with a bus passenger increase of 11% linked to AVL/RTPI (source: DfT UTMC Case Study (Reading)) Several DfT Case studies fail to report UTMC related journey time benefits and subsequent reductions in delay. The CCTV aspects will result in improved handling of incident response which will limit delays and increase journey time predictability. VMS will enable the LA's to maximise car parking revenue by guiding vehicles to previously underutilised car parks and reducing delays. VMS also allows traffic to be informed and directed around already congested roads. The package of UTMC measures as a whole will provide drivers information to make more informed route decisions whilst travelling but is unlikely to result in any material modal shift opportunities.
Site specific assumptions	
16 Key Congestion Corridors including 5 CCTV locations	The benefits per corridor will be estimated based on traffic volumes and the level of traffic signalisation present along the corridor. Only journey time benefits will be quantified and this will be done on a link by link basis considering efficiency savings per signalised junction. 2015 – There will be no resultant modal shift 2021 - There will be no resultant modal shift
Additional notes	
Modelling results check	Very few existing UTMC systems in place nationally provide quantified benefits in journey times or modal shift. The DfT Reading City Centre case study highlights modal shift due to UTMC but these are directly linked to the AVL/RTPI elements which Tyne & Wear have not proposed.
Sub-element	**Workplace travel planning**
Content	Car sharing support and promotion, public transport information and promotion, cycling and walking information and promotion, cycle parking and showering facilities, commuter clubs and forums. No additional parking management measures assumed.
Range of impact from evidence	Local evidence: • Cobalt (out of town, good transport links) mode share 2005: 70% SUV, 2008: 63% SUV, 10% decrease between 2005 and 2008 (source: staff travel surveys) • Newcastle Uni (in city, good transport links, strong parking management) mode share 2004: 40.4% SUV, 2006: 35.3% SUV, 2008: 25.3% SUV, 37% decrease between 2004 and 2008 (source: staff travel surveys) • Quorum (out of town, good transport links) mode share 2008: 53% SUV, 2011: 45% SUV, 13% decrease between 2008 and 2011 "Basic travel plans can be expected to reduce car use by 6-10%, whilst fully fledged travel plans with parking management will typically achieve reductions in the order of 20-25%" UK wide evidence (1)
Proposed assumptions for LSTF modelling	
Range	Three assumptions are presented: - High – assuming high level of funding and take-up (sensitivity test) - **Medium – proposed modelling assumptions**

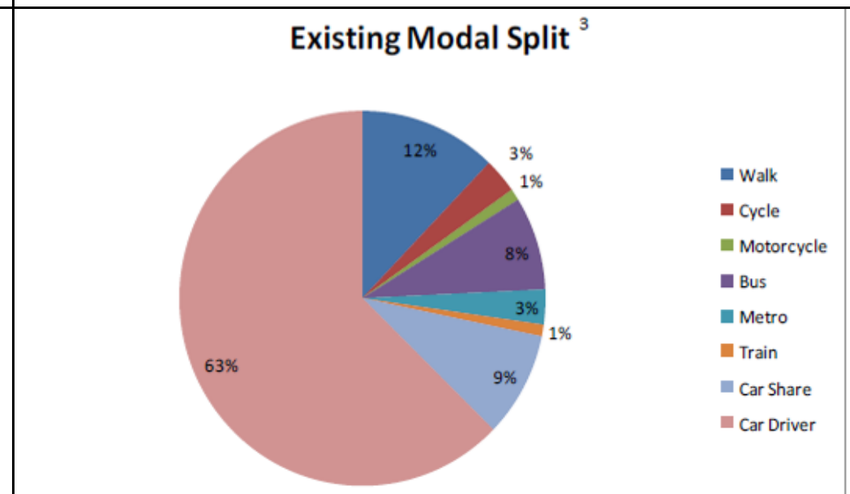
	- Low – assuming reduced level of funding and lower take-up (sensitivity test)
Timeline	2015 assumptions assume full impact of LSTF funding achieved by 2015, with further lower reductions achieved in 2021 through continuation of travel planning activities after 2015 but at a lower level of intensity
Notes	Basic assumptions based on national data (6 to 10% reduction in SUV) without parking management Impact of travel plans in urban locations with good transport connections and some form of parking management (lack of space) assumed to be higher than out of town locations for sites which have not yet implemented an active travel plan (applied to Newcastle City Centre, Gateshead Quays and South Shields town centre) Impact of further travel plan activity in areas where active travel planning is already in place is assumed to be lower (applied to Quorum, Cobalt, Team Valley, Doxford Park, as well as a proportion of employees in Newcastle city centre, Gateshead Quays and South Shields town centre)
Additional notes	
Modelling results check	Modelling work undertaken to measure overall workplace travel planning impact shows reductions in commuter traffic between 0.7 and 4.8% (1) "Overall, so far, travel planning may have reduced overall levels of car commuting by 0.4 – 1.5% using our conservative assumptions (model A), or by 0.7 – 3.3% under model B." (1) The reduction in car commuter trips (all car journeys to work in the area) would be 5% (low scenario) or 9% (high scenario) in urban areas, and 2% or 4% in non-urban areas (2) The evaluation of the results of the three Sustainable Towns projects show that car driver trips per resident of the three towns taken together fell by 9% between 2004 and 2008, whilst car driver distance per resident fell by 5%~7% (trips of 50km or less). Car use per head also fell nationally in comparable (medium-sized) urban areas during this period, but by a much smaller amount: a change of -1.2% for car driver trips and -0.9% for car driver distance (NTS all trip lengths). Traffic count data showed variable results in different areas of the three towns, with overall reductions of the order of 2%, and more substantial reductions in inner areas, of the order of 7-8%, taking place prior to the economic downturn. Bus use grew substantially in Peterborough and Worcester during the period of the Sustainable Travel Town work, whereas it declined in Darlington. According to the household travel survey data, between 2004 and 2008, bus trips per resident of the three towns taken together increased by 10%~22% (trips of 50km or less), whereas, according to the NTS, there was a national decline of bus trips in medium-sized towns of 0.5% over the same period. According to the household travel survey data, between 2004 and 2008, cycle trips per resident of the three towns taken together increased by 26~30% (NTS shows a decline of cycle trips in medium-sized towns over a similar period). According to the household travel survey data, between 2004 and 2008, walk trips per resident of the three towns taken together increased by 10%~13% (NTS shows a decline in walk trips in medium-sized towns of at least 9% over a similar period). The travel behaviour change in the towns involved a combination of mode shift (with unchanged destination); switch of destination and mode (e.g. replacing a medium-length car trip with a shorter journey by foot, bike or bus); and trip evaporation (not making a trip at all). At the aggregate level, roughly 7% of the reduction in car use (including car driver and car passenger trips) was from a net reduction in trips. (3)
References	(1) Smarter Choices, Changing the way we travel, 2004, Chapter 3 Workplace travel plans (2) Smarter Choices, Changing the way we travel, 2004, Chapter 13 Projections and costs (3) The Effects of Smarter Choice Programmes in the Sustainable Travel Towns, Summary Report, Sloman at al. for DfT, 2010
Sub-element	**Smarter working and working from home**
Content	Promotion and support to employers to implement home working, local working (relocating to premises nearer to home), flexible working hours, teleconferencing, video-conferencing
Range of impact from evidence	BT achieved "20% reduction in business travel between 2006 and 2008" through teleconferencing and videoconferencing(1) BT data on home working: average number of days per week at home 1.9, number of registered homeworkers 11,104 out of 92,000 UK based employees – approx. 12% of UK staff working from home (1) "10% or less of initial commute savings are offset by rebound effects" (2)
Proposed assumptions for LSTF modelling	
Range	Three assumptions are presented: - High – assuming high level of funding and take-up (sensitivity test) - **Medium – proposed modelling assumptions** - Low – assuming reduced level of funding and lower take-up (sensitivity test)
Timeline	2015 assumptions assume full impact of LSTF funding achieved by 2015, with results maintained in 2021 but no further reductions achieved

Notes	Home working assumptions to be applied only to staff who are able to work flexibly, assumed to be higher managerial and professional, lower managerial and professional, and intermediate Commuter travel reduction through homeworking: relevant staff work from home 1.9 days/week, equivalent to 85.5 days/annum (based on 45 weeks/annum), minus 10% to rebound effect into account = 76.5 days/annum, out of 225 working days, equivalent to a 33.6% reduction in commuting (all modes)
Site specific assumptions	
Assumptions applicable to all sites	**Commuter travel reduction** Based on BT evidence on homeworking, recognising strong commitment from BT (BT results equivalent to high modelling scenario) 12% of higher managerial and professional, lower managerial and professional, and intermediate reduce their commuting by: **2015** – High: 33.6%, Medium: 27%, Low: 20% **2021** - assumes no further reduction in mileage but reductions achieved by 2015 are maintained **Business travel reduction** (carbon modelling only) Based on BT evidence on tele/video-conferencing, recognising strong commitment from BT (BT results equivalent to high modelling scenario) **2015** – High: 20% reduction in business mileage, Medium: 15%, Low: 10% **2021** – assumes no further reduction in business mileage but reductions achieved by 2015 are maintained
Additional notes	
Other benefits	BT case study: Increased staff productivity, BT home workers are taking 63% less sick leave than their office-based counterparts, flexible working has reduced absenteeism to 3.1% (the national average is 8.5%), 99% of women return after maternity leave, compared with a national average of 47%, home based workers record 20% less absenteeism (1)
References	(1) Case Study: BT Flexible Working and Workstyle, British Telecom and National Business Travel Network, 2009 (2) Homeworking at BT - The Economic, Environmental and Social Impacts, Final Report June 15 2008
Sub-element	**Eco-driving training**
Content	Eco-driving training courses provided to employees at all sites. Assuming that courses are partly subsidised through LSTF funding
Range of impact from evidence	"Eco driving can immediately reduce emissions from cars, and fuel consumption, by 8%" (1) "Over time, drivers could achieve efficiency savings of as much as 10-15%" (2) "The Driving Standards Agency found that eco-driving training yields immediate results, with an 8.5% improvement in fuel efficiency for drivers on a set course after two hours of training. In the recently launched Act on CO_2 campaign, DfT says that if all drivers in the UK followed the Smarter Driving tips, CO_2 emissions from cars could be cut by 8%". (3)
Proposed assumptions for LSTF modelling	
Range	Three assumptions are presented: - High – assuming high level of funding and take-up (sensitivity test) - **Medium – proposed modelling assumptions** - Low – assuming reduced level of funding and lower take-up (sensitivity test)
Timeline	Full impact of LSTF funding is assumed to be achieved by 2015 No further savings are assumed after 2015 but the 2015 levels of fuel savings are assumed to be maintained mainly through repeat training with some support from employers and public sector but at reduced costs as some staff will have been trained to become trainers and train their colleagues after 2015
Notes	**This measure is relevant for the carbon modelling work only**
Site specific assumptions	
Assumptions applicable to all sites	**Number of employees** having received eco-driving training by 2015 High: 20,000, **Medium**: 15,000, Low: 10,000 Medium assumption assumes £900k spent on eco-driving training between 2011 and 2015 with cost of training one individual assumed to be £60 (4) **Improvement in fuel efficiency achieved**: 8%
Additional notes	
References	(1) UK Energy Efficiency Action Plan 2007, DEFRA

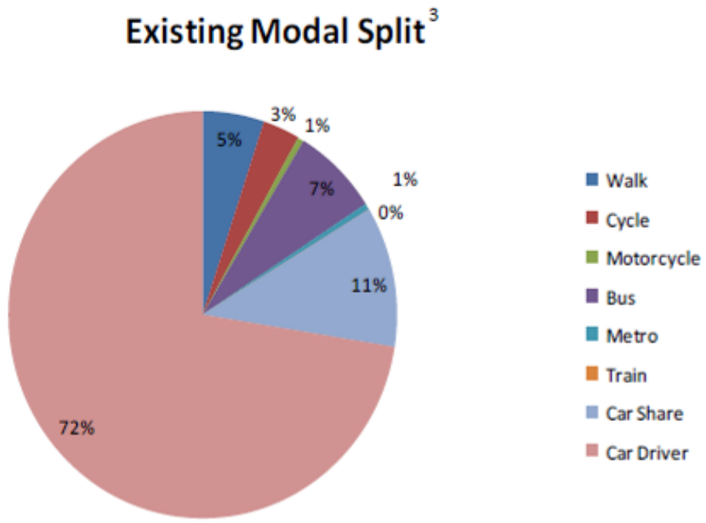
		(2) Ecodriving - Energy Saving Trust, 2005 (3) Anable & Bristow Transport and Climate Change: Supporting document to the CfIT report, Commission for Integrated Transport 2007 (4) DfT Carbon Reduction Strategy, 2009
	Sensitivity Testing - Low and High Options have been derived based on a change of +/- 1% or 2% according to baseline modal splits being achieved.	Site with low baseline car modal splits and good existing travel plans and travel advisor support have been assumed to have high/low sensitivity options that only slightly deviate about the mean (medium option). Sites without travel plan measures in place or limited infrastructure to support non-car modes are more difficult to predict changes for. These sites have had a +/- 2% sensitivity change applied to them.
	Workwise measure will remove trips from network entirely. The viability of this measure is dependent on job types at employment site.	Sites with predominantly manufacturing, warehousing, and retail based industry have been assumed to have no uptake of the measure
Team Valley Trading Estate, Gateshead	Baseline modal split was taken from the 2008 Highways Agency Travel Plan Monitoring Report.	
	2015 and 2021 Medium option modal splits have been derived based on full package of measures operational on this site including site specific infrastructure improvements	

	Walk	Cycle	Motorcycle	Bus	Metro	Train	Car Share	Car	
Base	3.0%	1.0%	1.0%	13.0%	3.0%	2.0%	13.0%	64.0%	
2015	4.2%	2.7%	1.0%	13.8%	3.0%	2.0%	14.5%	58.8%	
2021	4.8%	3.5%	1.0%	14.4%	3.0%	2.0%	14.5%	56.8%	

Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by Gateshead Council	2009 employee numbers are 23,422 with 3,500 additional jobs by 2021
Site specific walking & cycling Infrastructure improvements are proposed thought the Team Valley site. These improvements will remove existing on site barriers and help contribute to increases in walking and cycling uptake.	Specific route plans have not been provided so a best case scenario has been assumed based on existing barriers/gaps in the local walking/cycling network

	Proposed "Crosslink" bus service has been considered as part of PT modal shift increase	Crosslink consolidates and enhances several existing services that route through the wards with the highest concentration of employee trips. The specific impact this will have on PT modal shift has been estimated based on the proportion of 2001 census PT users originating from these wards with a percentage increase applied based on the number of car trips also originating from these wards. Supporting promotional and marketing measures are likely to improve potential for PT uptake also
	Sensitivity Test (Low) - Assumes that PT increase is 0% based on the route not becoming economically viable within the LSTF pump-prime funding time frame	
	Car Club has potential for 2 vehicles to be viable based on the size of the employment site and nature of the job types	The impact of the car club on reducing car trips is likely to remain static due to the number of cars available being fixed initially
Sunderland Enterprise Park, Sunderland	Baseline modal split was taken from the 2008 Highways Agency Travel Plan Monitoring Report.	
	2015 and 2021 Medium option modal splits have been derived based on full package of measures operational on this site including site specific infrastructure improvements	
	Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by Sunderland City Council	2009 employee numbers are 3,400 with 600 additional jobs by 2021
	Site Specific Cycling Infrastructure route benefits (A1231 corridor) will influence propensity to change.	The A1231 route improvements will provide a parallel off-road cycle route from centre of Sunderland westwards through elements of the SEP and remove the barrier to cyclists that the A1231 presents (dual carriageway, national speed limit in places). The route also has several branch routes which link into local residential areas which will also improve cycling uptake as 45% workforce within reasonable cycling distance of site. Gradient issues will slightly detract from uptake achieved
	Bus Service improvements (Wear Express) will increase peak frequency of service to 15 mins.	Wear Express route enhancement will provide high frequency service from Sunderland centre to Washington providing improved PT access to local workforce. This will likely remove local short car trips from the A1231.
	Cycle Hire opportunity from Stadium of Light Metro station for Scratch Bikes	Cycling uptake figures will be increased (and in-directly Metro PT trips) when combined with A1231 cycle corridor improvements.

	Walk	Cycle	Motorcycle	Bus	Metro	Train	Car Share	Car
Base	3.70%	1.90%	0.00%	16.00%	19.00%	1.00%	14.00%	44.40%
2015	4.70%	4.90%	0.00%	16.50%	19.50%	1.00%	14.00%	39.40%
2021	7.60%	5.70%	0.00%	16.90%	19.60%	1.00%	14.00%	35.20%

<table>
<tr><td></td><td>Car Club has potential for single vehicle based on the size of the employment site and nature of the job types.</td><td>The impact of the car club on reducing car trips is likely to remain static due to the number of cars available being fixed initially. Supporting non-car mode infrastructure improvements further improves potential for Car club to be successful.</td></tr>
<tr><td rowspan="5">Waterview Park & Pattinson Industrial Estate, Sunderland</td><td>Baseline modal split was taken from the 2010 Framework Travel Plan</td><td> 
</td></tr>
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<tr><th></th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr>
<tr><td>Base</td><td>5.0%</td><td>1.0%</td><td>0.6%</td><td>10.0%</td><td>0.5%</td><td>0.3%</td><td>12.5%</td><td>70.1%</td></tr>
<tr><td>2015</td><td>7.0%</td><td>3.0%</td><td>0.6%</td><td>15.0%</td><td>0.5%</td><td>0.3%</td><td>13.0%</td><td>60.6%</td></tr>
<tr><td>2021</td><td>7.0%</td><td>3.0%</td><td>0.6%</td><td>18.0%</td><td>0.5%</td><td>0.3%</td><td>14.0%</td><td>56.6%</td></tr>
</table></td></tr>
<tr><td>Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by Sunderland City Council</td><td>2009 employee numbers are 6,700 with 1,300 additional jobs by 2021</td></tr>
<tr><td>Site Specific Cycling Infrastructure route benefits (A1231 corridor) will influence propensity to change.</td><td>The A1231 route improvements will provide a parallel off-road cycle route from centre of Sunderland westwards through elements of the SEP and remove the barrier to cyclists that the A1231 presents (dual carriageway, national speed limit in places). The route also has several branch routes which link into local residential areas which will also improve cycling uptake as 45% workforce within reasonable cycling distance of site. Gradient issues will slightly detract from uptake achieved</td></tr>
<tr><td>Bus Service improvements (Wear Express) will increase peak frequency of service to 15 mins.</td><td>Wear Express route enhancement will provide high frequency service from Sunderland centre to Washington providing improved PT access to local workforce. This will likely remove local short car trips from the A1231.</td></tr>
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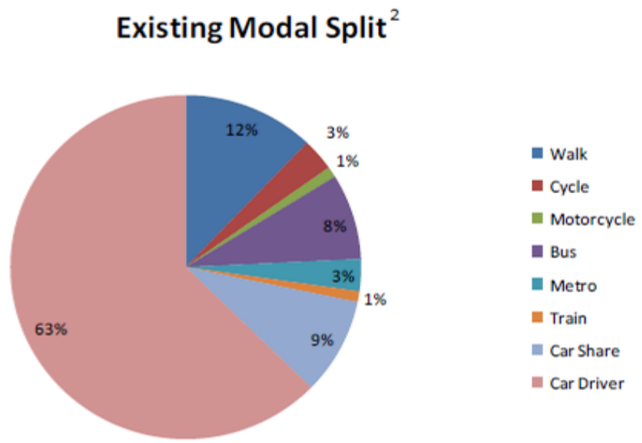
<table>
<tr><td rowspan="6">Royal Sunderland Hospital, Sunderland</td><td>Baseline modal split was taken from the 2009 Travel Plan</td><td> 
</td></tr>
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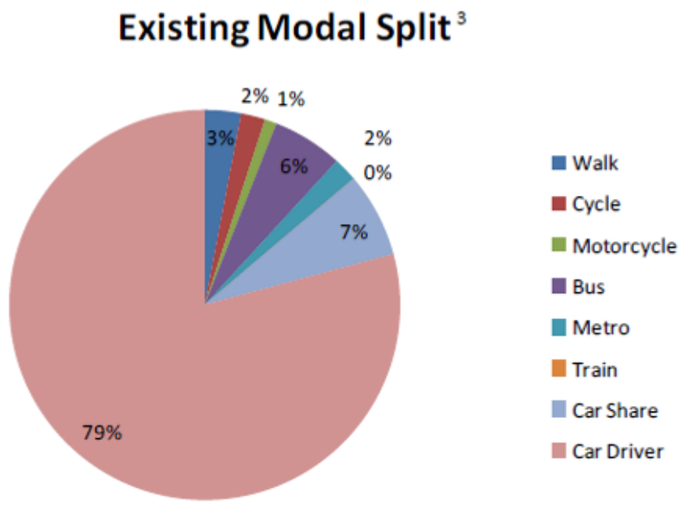
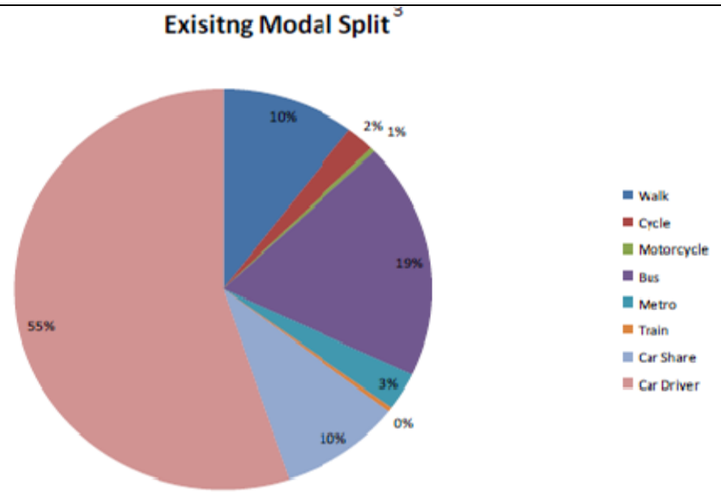
<tr><td>Base</td><td>12.0%</td><td>3.0%</td><td>1.0%</td><td>8.0%</td><td>3.0%</td><td>1.0%</td><td>5.0%</td><td>67.0%</td></tr>
<tr><td>2015</td><td>12.0%</td><td>5.0%</td><td>1.0%</td><td>13.0%</td><td>4.0%</td><td>1.0%</td><td>8.0%</td><td>56.0%</td></tr>
<tr><td>2021</td><td>12.0%</td><td>5.0%</td><td>1.0%</td><td>15.0%</td><td>4.0%</td><td>1.0%</td><td>10.0%</td><td>52.0%</td></tr>
</table></td></tr>
<tr><td>Current employment figures have been taken from 2009 inter-departmental business register.</td><td>2009 employee numbers are 5,267. Job growth estimated from Tempro</td></tr>
<tr><td>CUET – Hospital is specific test site and measure has already proved successful</td><td>CUET impacts will reduce short car trips between university and hospital and city centre. Further reducing need for staff to use their own vehicles for business trips during the day. Likely to result in PT and car share increases.</td></tr>
<tr><td>Cycle Hire opportunity from University Metro station for Scratch Bikes</td><td>Cycling uptake figures will be increased (and in-directly Metro PT trips). Monitoring required as students likely to uptake also between campuses and also from hall’s of residence which are spread around the City, although this does not contribute to peak travel times so benefits not included.</td></tr>
<tr><td>Site Specific Measures</td><td>It has been assumed that the proposed residential parking scheme combined with travel plan proposals to reduce staff parking on site will increase staff trips by non-car modes, most likely to become PT.</td></tr>
</table>

<table>
<tr><td rowspan="4">Doxford Park, Sunderland</td><td>Baseline modal split was taken from the 2005 Travel Plan and Tyne & Wear i-Trace</td><td> 
</td></tr>
<tr><td>2015 and 2021 Medium option modal splits have been derived based on full package of measures operational on this site including site specific infrastructure improvements</td><td><table>
<tr><th></th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr>
<tr><td>Base</td><td>3.0%</td><td>2.0%</td><td>1.0%</td><td>6.0%</td><td>2.0%</td><td>0.0%</td><td>7.0%</td><td>79.0%</td></tr>
<tr><td>2015</td><td>3.5%</td><td>2.5%</td><td>1.0%</td><td>7.0%</td><td>2.0%</td><td>0.0%</td><td>10.0%</td><td>74.0%</td></tr>
<tr><td>2021</td><td>3.5%</td><td>2.5%</td><td>1.0%</td><td>7.0%</td><td>2.0%</td><td>0.0%</td><td>13.0%</td><td>71.0%</td></tr>
</table></td></tr>
<tr><td>Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by Sunderland City Council</td><td>2009 employee numbers are 8,401 with 1,200 additional jobs by 2021.</td></tr>
<tr><td>Employee distribution revised from 2001 census due to site being unoccupied then.</td><td>Existing employer staff postcode plots were used to ascertain likely distribution of staff trips. This highlighted that due to nature of jobs (call centres) the workforce was very local with few trips outside of Sunderland borough area. Local knowledge of existing bus services and routing was also used to assess likelihood of modal shift towards PT (low). Also as many call centres in the region suffer from similar difficulties in deterring employee’s from using private car due to shift pattern issues (many finish after 7pm when PT service is reduced).</td></tr>
</table>

<table>
<tr><td rowspan="5">South Shields Town Centre, South Tyneside</td><td>Baseline modal split was taken from the 2001 Census Data.</td><td> 
</td></tr>
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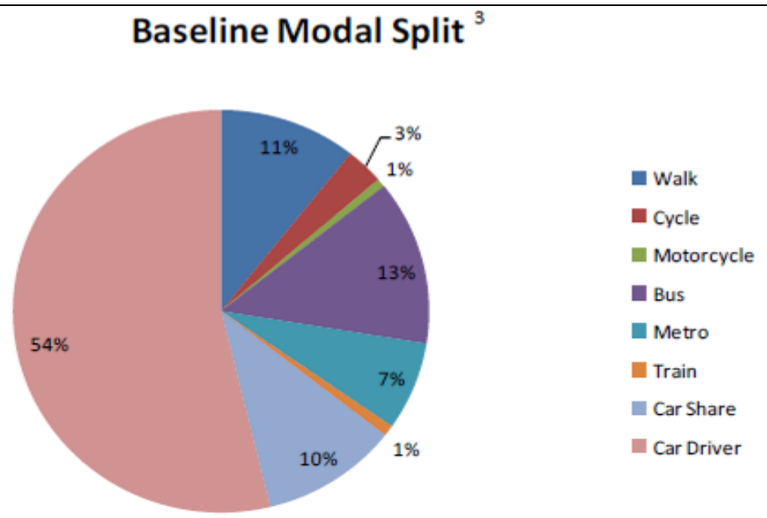
<tr><td>Base</td><td>10.0%</td><td>2.0%</td><td>1.0%</td><td>19.0%</td><td>3.0%</td><td>0.0%</td><td>10.0%</td><td>55.0%</td></tr>
<tr><td>2015</td><td>8.0%</td><td>4.0%</td><td>1.0%</td><td>22.0%</td><td>5.0%</td><td>0.0%</td><td>10.0%</td><td>50.0%</td></tr>
<tr><td>2021</td><td>10.0%</td><td>5.0%</td><td>1.0%</td><td>25.0%</td><td>6.0%</td><td>0.0%</td><td>10.0%</td><td>43.0%</td></tr>
</table></td></tr>
<tr><td>Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by South Tyneside Council</td><td>2009 employee numbers are 9,543 with 3,690 additional jobs by 2021.</td></tr>
<tr><td>Cycle infrastructure improvements improving linkages to Tyne Pedestrian Tunnel, Shields Ferry and South Shields Cycle Hub.</td><td>Cycling measures have been assumed to convert walking trips to cycling initially with additional increase up to 2021 with walking returning to existing levels. Bus PT trips also include some Ferry PT trips which will increase due to better links from terminals to Town Centre.</td></tr>
<tr><td>South Shields Metro Interchange improvements & Phase II of Tyne & Wear Metro Re-invigoration project.</td><td>Metro PT trips are likely to increase due to improved frequency of service on South Shields branch as part of Phase II re-invigoration project. Interchange improvements will increase potential for linked trips and bus trips will continue to increase due to metro only serving residential areas of Hebburn, Jarrow, and Gateshead (due to bus routes being more direct and quicker).</td></tr>
</table>

<table>
<tr>
<td rowspan="3">Bede Industrial Estate & Tyne Dock, South Tyneside</td>
<td>Baseline modal split was taken from the 2001 Census Data.</td>
<td> 
</td>
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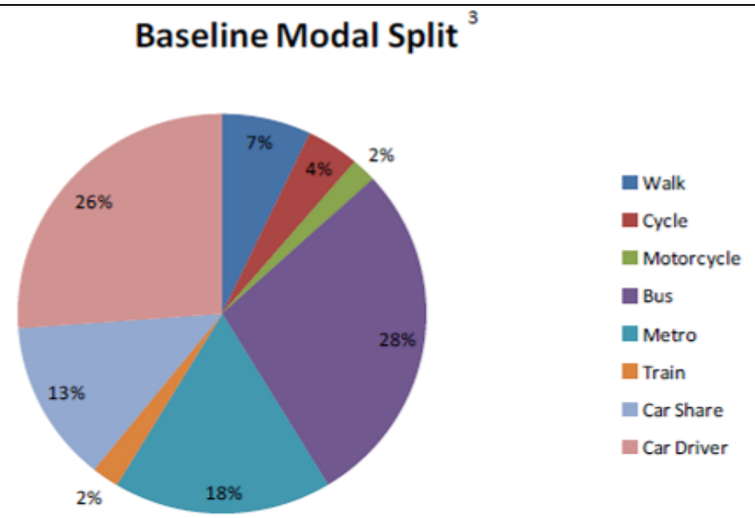
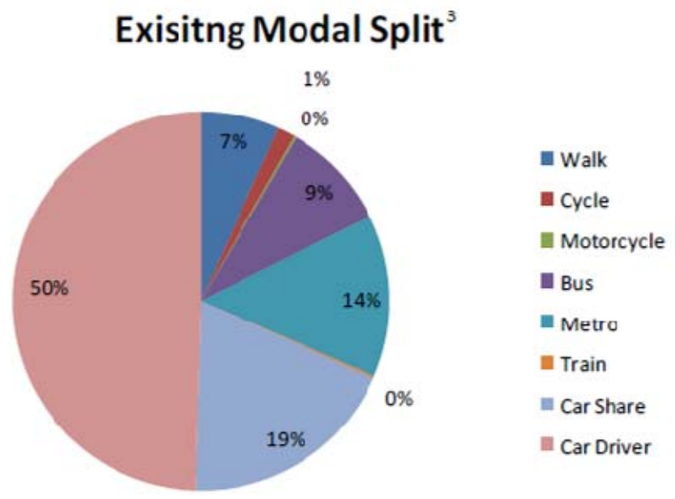
<tr>
<td>2015 and 2021 Medium option modal splits have been derived based on full package of measures operational on this site including site specific infrastructure improvements</td>
<td>
<table>
<tr><th></th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr>
<tr><td>Base</td><td>11.0%</td><td>3.0%</td><td>1.0%</td><td>13.0%</td><td>8.0%</td><td>0.0%</td><td>10.0%</td><td>54.0%</td></tr>
<tr><td>2015</td><td>13.0%</td><td>6.0%</td><td>1.0%</td><td>14.0%</td><td>9.0%</td><td>0.0%</td><td>10.0%</td><td>47.0%</td></tr>
<tr><td>2021</td><td>13.5%</td><td>6.0%</td><td>1.0%</td><td>14.5%</td><td>10.0%</td><td>0.0%</td><td>10.0%</td><td>45.0%</td></tr>
</table>
</td>
</tr>
<tr>
<td>Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by South Tyneside Council</td>
<td>2009 employee numbers are 4,286 with 1,088 additional jobs by 2021.</td>
</tr>
<tr>
<td>Newcastle City Centre incorporating Gateshead Quays</td>
<td>Baseline Modal Splits have been derived from 2001 Census Data representing 80% of City and several i-Trace Travel Plans representing 20% of the City (Chart represents 20% only). Gateshead Quays base modal split has been based on Baltic Framework TP.</td>
<td> 
</td>
</tr>
</table>

	2015 and 2021 Medium option modal splits have been derived based on full package of measures operational on this site including site specific infrastructure improvements. Newcastle site assumes all employees are covered by ATP by 2015 and therefore will be achieving modal shift proportions in line with existing sustainable sites (Universities, Eldon Square, NCC, RVI Hospital)	<table><tr><th>Newcastle</th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr><tr><td>Base</td><td>7.0%</td><td>4.0%</td><td>2.0%</td><td>28.0%</td><td>18.0%</td><td>2.0%</td><td>13.0%</td><td>26.0%</td></tr><tr><td>2015</td><td>7.0%</td><td>5.0%</td><td>2.0%</td><td>29.0%</td><td>19.0%</td><td>2.0%</td><td>13.5%</td><td>22.5%</td></tr><tr><td>2021</td><td>7.0%</td><td>5.5%</td><td>2.0%</td><td>29.0%</td><td>19.0%</td><td>2.0%</td><td>13.5%</td><td>22.0%</td></tr></table> <table><tr><th>Gateshead Quays</th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr><tr><td>Base</td><td>4.0%</td><td>1.0%</td><td>0.5%</td><td>24.1%</td><td>6.0%</td><td>0.7%</td><td>5.0%</td><td>58.7%</td></tr><tr><td>2015</td><td>5.0%</td><td>5.0%</td><td>0.5%</td><td>28.0%</td><td>8.0%</td><td>0.7%</td><td>7.0%</td><td>45.8%</td></tr><tr><td>2021</td><td>5.0%</td><td>5.5%</td><td>0.5%</td><td>28.0%</td><td>8.0%</td><td>0.7%</td><td>7.0%</td><td>45.3%</td></tr></table>
	Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by NCC & GMBC respectively	Newcastle 2009 employee numbers are 78,062. Gateshead Quays 2009 employee numbers are 2,000 with 7,000 additional jobs by 2021.
	Car Club has excellent potential for several vehicles to be viable.	Newcastle & Gateshead Quays represent ideal conditions for Car clubs to be successful based on demographics, ease of access by alternate modes, size of employment area, and job types. Assumed that several locations/vehicles spread across the city/quayside to reach out to as many potential users as possible.
	CUET – Inter-hospital travel (RVI/Uni – Freeman) have trialled measure which has already proved successful	CUET impacts will reduce short car trips between university and hospital and city centre. Further reducing need for staff to use their own vehicles for business trips during the day.
	Large scale cycle infrastructure improvements proposed along 3 key arterial routes in Newcastle and linking to existing excellent quayside network.	NCC plan 3 strategic cycle Superoutes running North to Gosforth, East to Walker, and West to Scotswood which will be high quality links into Newcastle City Centre. Each of the routes removes several barriers to entry into the City by cycling and so will likely achieve moderate success. Gateshead Quays has also got some small scale upgrade proposals. Newcastle City Centre will also provide a cycle hub which will improve awareness and provide maintenance, centralised storage and rental opportunities.
	Cycle Hire opportunity from Central Station Metro station and others for Scratch Bikes around Newcastle	Cycling uptake figures will be increased (and in-directly Metro PT trips). Several locations around city would result in conversion of linked short PT trips into cycling trips (Newcastle Business Park) in particular mainline rail trips.
Gosforth Corridor (Great Park)	Baseline modal split was taken from the 2009 i-Trace TP survey data.	

<table>
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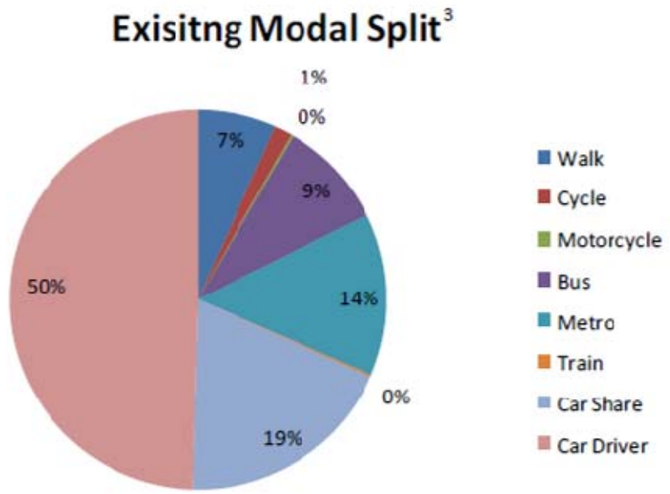
<table>
<tr><th></th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr>
<tr><td>Base</td><td>2.0%</td><td>3.0%</td><td>0.0%</td><td>11.0%</td><td>2.0%</td><td>0.0%</td><td>8.0%</td><td>74.0%</td></tr>
<tr><td>2015</td><td>2.0%</td><td>4.0%</td><td>0.0%</td><td>12.0%</td><td>2.0%</td><td>0.0%</td><td>11.0%</td><td>69.0%</td></tr>
<tr><td>2021</td><td>2.0%</td><td>4.0%</td><td>0.0%</td><td>12.0%</td><td>2.0%</td><td>0.0%</td><td>12.0%</td><td>68.0%</td></tr>
</table>
</td></tr>
<tr><td></td><td>Current employment figures have been taken from 2009 inter-departmental business register and future employment growth figures have been provided by Newcastle City Council</td><td>2010 employee numbers are 1,453.</td></tr>
<tr><td></td><td>Cycle Hire opportunity from Regent Centre Metro station for Scratch Bikes</td><td>Cycling uptake figures will be increased (and in-directly Metro PT trips). Cycle network between edge of Great Park and Regent Centre will improve as part of Newcastle Cycle Superoutes proposals. Great Park already has excellent cycle infrastructure.</td></tr>
<tr><td>Gosforth Corridor
(Gosforth High Street)</td><td>Baseline modal split was taken from the 2001 census data.</td><td> 
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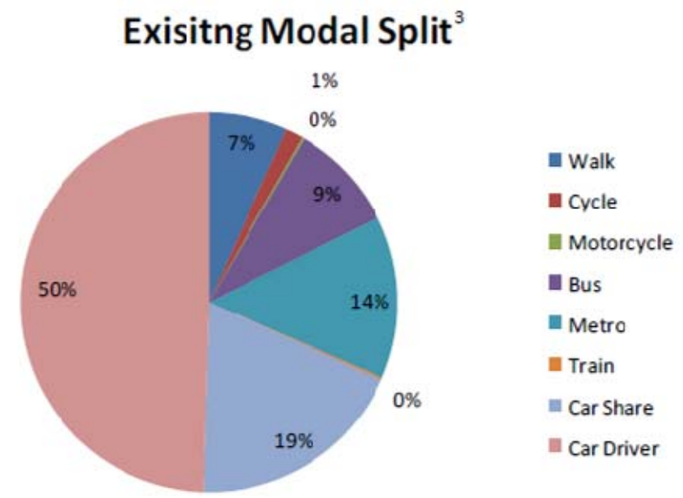
<tr><td>Base</td><td>9.0%</td><td>1.3%</td><td>0.6%</td><td>16.0%</td><td>6.9%</td><td>1.7%</td><td>8.9%</td><td>55.6%</td></tr>
<tr><td>2015</td><td>10.0%</td><td>3.0%</td><td>0.6%</td><td>19.0%</td><td>7.5%</td><td>1.7%</td><td>8.9%</td><td>49.3%</td></tr>
<tr><td>2021</td><td>10.0%</td><td>3.0%</td><td>0.6%</td><td>19.0%</td><td>7.5%</td><td>1.7%</td><td>8.9%</td><td>49.3%</td></tr>
</table>
</td></tr>
<tr><td></td><td>Current employment figures have been taken from 2009 inter-departmental business register.</td><td>2009 employee numbers are 1,090.</td></tr>
</table>

<table>
<tr><td rowspan="4">Gosforth Corridor (Regent Centre)</td><td>Baseline modal split was taken from the 2009 i-Trace TP survey data.</td><td> 
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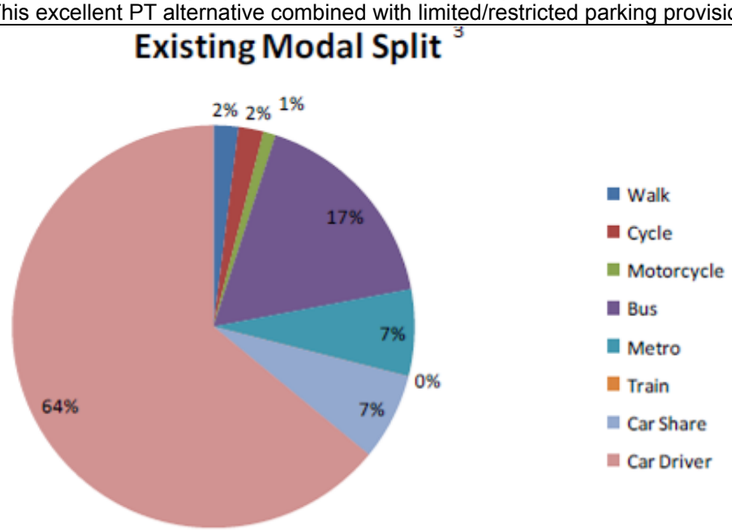
<tr><td>Base</td><td>7.0%</td><td>1.0%</td><td>0.0%</td><td>9.0%</td><td>14.0%</td><td>0.0%</td><td>19.0%</td><td>50.0%</td></tr>
<tr><td>2015</td><td>7.0%</td><td>2.0%</td><td>0.0%</td><td>11.0%</td><td>16.0%</td><td>0.0%</td><td>20.0%</td><td>44.0%</td></tr>
<tr><td>2021</td><td>7.0%</td><td>2.0%</td><td>0.0%</td><td>11.0%</td><td>16.0%</td><td>0.0%</td><td>20.0%</td><td>44.0%</td></tr>
</table></td></tr>
<tr><td>Current employment figures have been taken from 2009 inter-departmental business register.</td><td>2009 employee numbers are 4,462.</td></tr>
<tr><td>Car Club potential</td><td>Regent Centre is served by a public transport interchange provide bus and metro access directly to the majority of its residential catchment area. This excellent PT alternative combined with limited/restricted parking provision on site makes for an ideal Car club/Pool car installation.</td></tr>
<tr><td>Cobalt Business Park, North Tyneside</td><td>Baseline modal split was taken from the 2008 Cobalt TP monitoring report.</td><td> 
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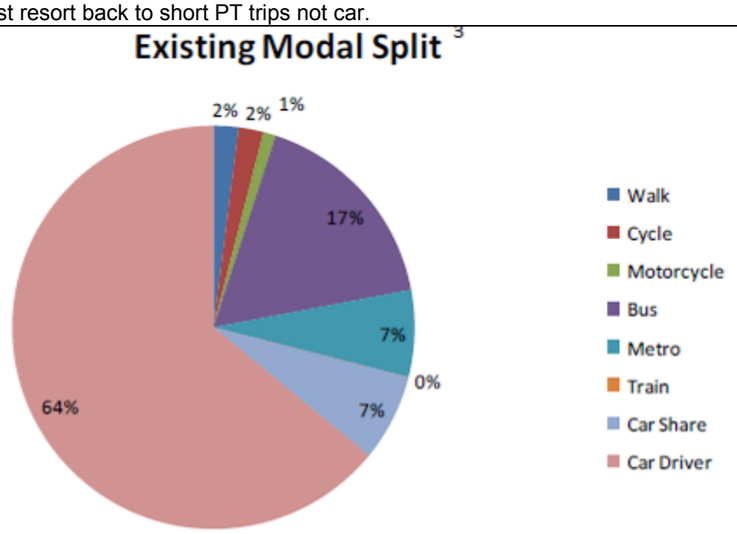
<tr><td>Base</td><td>2.0%</td><td>2.0%</td><td>1.0%</td><td>17.0%</td><td>7.0%</td><td>0.0%</td><td>7.0%</td><td>64.0%</td></tr>
<tr><td>2015</td><td>2.0%</td><td>4.0%</td><td>1.0%</td><td>21.0%</td><td>8.0%</td><td>0.0%</td><td>8.0%</td><td>56.0%</td></tr>
<tr><td>2021</td><td>2.0%</td><td>5.0%</td><td>1.0%</td><td>22.0%</td><td>8.5%</td><td>0.0%</td><td>8.0%</td><td>53.5%</td></tr>
</table>
</td></tr>
<tr><td></td><td>Current employment figures have been taken from 2009 inter-departmental business register. Growth figures are based on planning consents and vacant building GFA</td><td>2009 employee numbers are 9,506 with additional 5,932 jobs by 2021.</td></tr>
<tr><td></td><td>Cycle Hire opportunity from Northumberland Park Metro station for Scratch Bikes</td><td>Cycling uptake figures will be increased (and in-directly Metro PT trips). Would likely replace short bus PT trips (Route 19) between Metro and Cobalt site. Excellent direct cycle routes “Wagonways” would be utilised, as PT service would remain also it is likely that during bad weather trips just resort back to short PT trips not car.</td></tr>
<tr><td>Silverlink Retail Park, North Tyneside</td><td>Baseline modal split was taken from the 2001 Census data.</td><td> 
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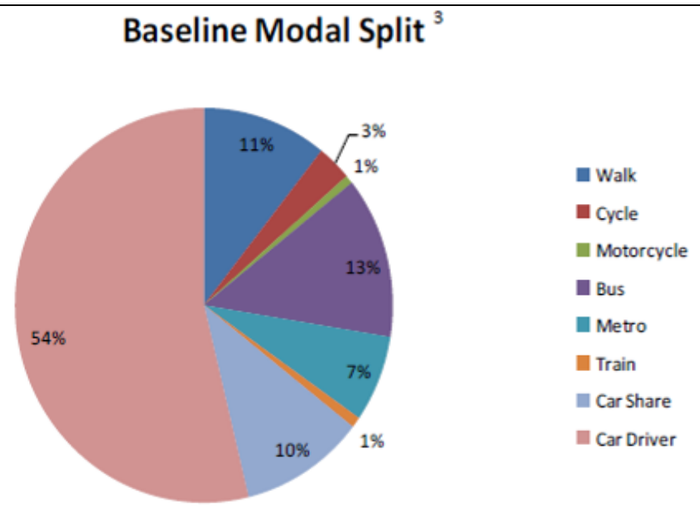
<tr><td>Base</td><td>5.1%</td><td>4.2%</td><td>0.8%</td><td>8.4%</td><td>1.9%</td><td>0.2%</td><td>16.2%</td><td>63.2%</td></tr>
<tr><td>2015</td><td>5.5%</td><td>6.0%</td><td>0.8%</td><td>11.5%</td><td>2.0%</td><td>0.2%</td><td>16.0%</td><td>58.0%</td></tr>
<tr><td>2021</td><td>6.0%</td><td>6.2%</td><td>0.8%</td><td>13.8%</td><td>2.0%</td><td>0.2%</td><td>16.0%</td><td>55.0%</td></tr>
</table>
</td></tr>
<tr><td></td><td>Current employment figures have been taken from 2009 inter-departmental business register. Growth figures are based on planning consents and vacant building GFA</td><td>2009 employee numbers are 4,238.</td></tr>
<tr><td></td><td>Cycle Hire opportunity from Northumberland Park Metro station for Scratch Bikes</td><td>Cycling uptake figures will be increased (and in-directly Metro PT trips). Would likely replace short bus PT trips (Route 19) between Metro and Silverlink site. Excellent direct cycle routes “Wagonways” would be utilised. Site consists of low paid retail jobs therefore cheap non-car alternatives have the potential to demonstrate mode change.</td></tr>
</table>

<table>
<tr><td rowspan="4">Tyne Tunnel Trading Estate, North Tyneside</td><td>Baseline modal split was taken from the 2001 Census data.</td><td> 
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<tr><td>Base</td><td>11.7%</td><td>4.8%</td><td>1.1%</td><td>10.6%</td><td>3.2%</td><td>1.5%</td><td>10.4%</td><td>56.7%</td></tr>
<tr><td>2015</td><td>12.0%</td><td>7.0%</td><td>1.1%</td><td>14.1%</td><td>3.5%</td><td>1.5%</td><td>11.0%</td><td>49.8%</td></tr>
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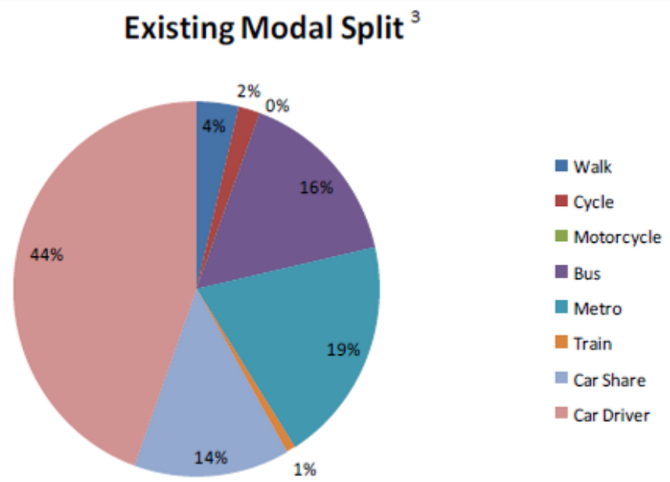
</table></td></tr>
<tr><td>Current employment figures have been taken from 2009 inter-departmental business register. Growth figures are based on planning consents and vacant building GFA</td><td>2009 employee numbers are 1,758 with additional 3,837 jobs by 2021.</td></tr>
<tr><td>Cycle Hire opportunity from Northumberland Park/Percy Main Metro station for Scratch Bikes</td><td>Cycling uptake figures will be increased (and in-directly Metro PT trips). Would likely replace short bus PT trips (Route 19) between Metro and Tyne Tunnel site. Excellent direct cycle routes “Wagonways” would be utilised.</td></tr>
</table>

<table>
<tr>
<td rowspan="4">Quorum & Balliol Business Parks, North Tyneside</td>
<td>Baseline modal split was taken from the 2011 Quorum TP.</td>
<td> 
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<tr>
<td>2015 and 2021 Medium option modal splits have been derived based on full package of measures operational on this site including site specific infrastructure improvements</td>
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<table>
<tr><th></th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr>
<tr><td>Base</td><td>3.7%</td><td>1.9%</td><td>0.0%</td><td>16.0%</td><td>19.0%</td><td>1.0%</td><td>14.0%</td><td>44.4%</td></tr>
<tr><td>2015</td><td>4.7%</td><td>4.9%</td><td>0.0%</td><td>16.5%</td><td>19.5%</td><td>1.0%</td><td>14.0%</td><td>39.4%</td></tr>
<tr><td>2021</td><td>7.6%</td><td>5.7%</td><td>0.0%</td><td>16.9%</td><td>19.6%</td><td>1.0%</td><td>14.0%</td><td>35.2%</td></tr>
</table>
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<tr>
<td>Current employment figures have been taken from 2009 inter-departmental business register.</td>
<td>2009 employee numbers are 7,500with additional 2,000 jobs by 2021.</td>
</tr>
<tr>
<td>Baseline modal split was taken from the 2001 Census Data. 2015 and 2021 Medium option modal splits have been derived based on full package of measures operational on this site including site specific infrastructure improvements</td>
<td>
<table>
<tr><th></th><th>Walk</th><th>Cycle</th><th>Motorcycle</th><th>Bus</th><th>Metro</th><th>Train</th><th>Car Share</th><th>Car</th></tr>
<tr><td>Base</td><td>7.8%</td><td>1.9%</td><td>0.7%</td><td>12.4%</td><td>5.1%</td><td>0.8%</td><td>11.1%</td><td>60.2%</td></tr>
<tr><td>2015</td><td>11.7%</td><td>5.7%</td><td>0.7%</td><td>12.8%</td><td>5.2%</td><td>1.0%</td><td>11.1%</td><td>51.8%</td></tr>
<tr><td>2021</td><td>11.7%</td><td>6.7%</td><td>0.7%</td><td>13.3%</td><td>5.7%</td><td>1.0%</td><td>14.1%</td><td>46.8%</td></tr>
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<tr>
<td>Current employment figures have been taken from 2009 inter-departmental business register.</td>
<td>2009 employee numbers are 3,000with additional 100 jobs by 2021.</td>
</tr>
</table>

Annex 4: Mitigation Bias Explanation

	Upper Bound Optimism Bias	Mitigation Factor	Mitigated Optimism Bias	Explanation
	44		**15**	
Late Contractor Involvement in Design	3	1	0	All Capital design works will be undertaken (and expedited) by Local Authorities, A Private Sector partnership has been established to ensure Revenue schemes are fit for purpose
Dispute and Claims Occurred	21	0.5	10.5	A Framework Working Group established to oversee financial transactions. Changes in Scope are to be mitigated by a private sector led Delivery Partnership. An appropriate management structure is in place to ensure timely release of information by various stakeholders
Environmental Impact	22	1	0	Construction works are all within current Highway curtilage. Revenue initiatives are likely to have a positive environmental impact owing to Carbon reduction and Modal shift
Other (please specify)	18	0.5	9	Appropriate project management arrangements have been put in place to mitigate problems associated with the delivery of revenue schemes that require multiple partners. There is still an element of risk associated with the co-ordination of a programme of works across various disciplines to ensure the maximum cumulative benefit
Inadequacy of Business Case	10	0.5	5	A robust project governance structure is in place, with an identified SRO and Programme Manager. Key partners from the private and health sectors have been built in to the delivery structure
Poor Project Intelligence	7	1	0	The package has been based on comprehensive engagement with stakeholders, and recent intelligence from the DaSTS process and the city-region Economic Review
Public Relations	9	0.6	3	An LSTF Communications Group has been established to publicise the project, and explain the approach taken and the benefits associated with it
Site Characteristics	3	1	0	Construction works are associated with current brownfield or highway sites. No SSSIs are involved, or areas with known ecological issues
Economic	7	0	7	Changes in underlying interest rates, materials prices etc are outwith the control of the Project Team
	100		34.5	

Annex 5

Technical note

Project:	Tyne & Wear LSTF	**To:**	Graham Grant, Tyne & Wear ITA and Mark Wilson, North East LEP
Subject:	Large Project Bid	**From:**	Helene Vergereau, Atkins
Date:	16 Dec 2011	**cc:**	

Tyne & Wear LSTF Large Project bid - Annex on appropriateness of measures

Sub-element	Workplace travel planning
Content	Car sharing support and promotion, public transport information and promotion, cycling and walking information and promotion, cycle parking and showering facilities, commuter clubs and forums. No additional parking management measures assumed.
Range of impact from evidence	Local evidence: • Cobalt (out of town, good transport links) mode share 2005: 70% SUV, 2008: 63% SUV, 10% decrease between 2005 and 2008 (source: staff travel surveys) • Newcastle Uni (in city, good transport links, strong parking management) mode share 2004: 40.4% SUV, 2006: 35.3% SUV, 2008: 25.3% SUV, 37% decrease between 2004 and 2008 (source: staff travel surveys) • Quorum (out of town, good transport links) mode share 2008: 53% SUV, 2011: 45% SUV, 13% decrease between 2008 and 2011 "Basic travel plans can be expected to reduce car use by 6-10%, whilst fully fledged travel plans with parking management will typically achieve reductions in the order of 20-25%" UK wide evidence (1)
Notes	Cobalt More Card for staff employed on Cobalt site offers various discounts (shopping and leisure) as well as public transport discounts: (2) - 14.5% discount on Network One annual tickets - 10% on Arriva 7 & 28 Days Tickets and up to 20% on Arriva annual tickets
References	(1) Smarter Choices, Changing the way we travel, 2004, Chapter 3 Workplace travel plans (2) www.morecobalt.co.uk/offers/?c=7

Sub-element	Smarter working and working from home
Content	Promotion and support to employers to implement home working, local working (relocating to premises nearer to home), flexible working hours, teleconferencing, video-conferencing
Range of impact from evidence	BT achieved "20% reduction in business travel between 2006 and 2008" through teleconferencing and videoconferencing(1) BT data on home working: average number of days per week at home 1.9, number of registered homeworkers 11,104 out of 92,000 UK based employees – approx. 12% of UK staff working from home (1) "10% or less of initial commute savings are offset by rebound effects" (2)
Other benefits	BT case study: Increased staff productivity, BT home workers are taking 63% less sick leave than their office-based counterparts, flexible working has reduced absenteeism to 3.1% (the national average is 8.5%), 99% of women return after maternity leave, compared with a national average of 47%, home based workers record 20% less absenteeism (1)
References	(1) Case Study: BT Flexible Working and Workstyle, British Telecom and National Business Travel Network, 2009 (2) Homeworking at BT - The Economic, Environmental and Social Impacts, Final Report June 15 2008

Sub-element	Eco-driving training / Improving vehicle use
Content	Eco-driving training courses provided to employees at all sites. Assuming that courses are partly subsidised through LSTF funding
Range of impact from evidence	"Eco driving can immediately reduce emissions from cars, and fuel consumption, by 8%" (1) "Over time, drivers could achieve efficiency savings of as much as 10-15%" (2) "The Driving Standards Agency found that eco-driving training yields immediate results, with an 8.5% improvement in fuel efficiency for drivers on a set course after two hours of training. In the recently launched Act on CO_2 campaign, DfT says that if all drivers in the UK followed the Smarter Driving tips, CO_2 emissions from cars could be cut by 8%". (3)
References	(1) UK Energy Efficiency Action Plan 2007, DEFRA (2) Ecodriving - Energy Saving Trust, 2005 (3) Anable & Bristow Transport and Climate Change: Supporting document to the CfIT report, Commission for Integrated Transport 2007 (4) DfT Carbon Reduction Strategy, 2009

Sub-element	Car clubs (workplaces)
Content	Car club cars provided to businesses to be used by staff for business travel during the day (as pool cars)
Range of impact from evidence	Impacts: - Potential mode shift for commuters who do not need to take their car to work to be able to use a car for business during the day "Streetcar for Business surveyed thousands of its corporate members and found that employees who use the service have reduced their reliance on a car for commuting by almost 50%. They've increased their use of public transport by 27%, cycling by 11% and walking by nine%, with private mileage and taxi use down by almost 20%." (1) - Lower emissions for business mileage as club cars are newer cars (and can be hybrid or electric vehicles) "On average, car club vehicles are typically 26% more efficient than the average UK car" (2)
References	(1) www.bmmagazine.co.uk/Car-clubs-drive-commuters-to-public-transport.933 (2) Carplus Annual Survey of Car Clubs 2009/2010

Sub-element	Car clubs (residential)
Content	Car club cars provided in city centres and residential areas for residents to use
Range of impact from evidence	37.7% of car club members (outside London) have reduced the number of vehicles owned by their household after joining a car club (1) Compared to the average person, car club members make more trips by public transport, walking or cycling and less by car (1) Scaling up survey results shows that 0.63 car is taken of the road for each new car club member and car club members mileage using a car from the club is lower than average car mileage for car owners (between 13 and 62% lower) (1) "On average, car club vehicles are typically 26% more efficient than the average UK car" (1)
References	(1) Carplus Annual Survey of Car Clubs 2009/2010

Sub-element	Travel to work support
Content	Support made available for those getting back into employment, at the interview stage and at the start of their new contract, to access their workplace. This would include, on a case by case basis: • travel information (personalised journey planning); as well as • the provision of bicycles (including refurbished second hand bikes and training to maintain them); • electric bikes; • scooters; • public transport tickets; • discounted car rental (e.g. JobCarz); • car club membership; • car share matching/travel buddy services; and • independent travel training.
Range of impact from evidence	• **Impacts** Evidence suggests that WorkWise beneficiaries are able to sustain their employment. In the West Midlands, for example, 80% are still in employment after 13 weeks and in Tyne and Wear 92% sustained employment. As well as sustaining employment, evidence shows that ex-WorkWise customers continue to use public transport after participating in the schemes, thereby promoting sustainable travel. More than 90% of beneficiaries from WorkWise in the West Midlands, for example, are still using public transport 12 months after starting work. (8) Workwise West Midlands - more than 80% of WorkWise customers said they would have struggled to get to new jobs or interviews without the free travel passes. (8) • **Savings achieved and scheme costs** Derbyshire Wheels to Work Scheme assessed to have saved the public purse £1,000/month per beneficiary through the end of benefits payments (accounting for Job Seekers Allowance, Income Support, Council Tax Benefit and Housing Benefit) (1) “The evaluation found that the costs in benefits can amount to over £639 per month for an unemployed person dependent upon their individual circumstances. There is also loss of earnings and associated National Insurance and tax contributions to the economy as well as overhead costs associated with Jobcentre Plus and other agency staff dealing with the unemployed” as well as reduced prescription charges. (2) Cost of scooter schemes between £1,500 and £3,000 per beneficiary (usually 6 to 9 months loans) (1) WorkWise schemes combine journey-planning support with free or discounted tickets and passes to reach interviews and work, including during the first crucial weeks of a new job when money can be particularly tight until the first pay packet arrives. The average cost of supporting a person into a new job through WorkWise is around £250. (6) • **Access to cars and access to work** Half of households in the bottom income bracket do not own a car, compared to a national average of 25% (10% of the top bracket). Nearly two-thirds of people claiming income support or jobseeker’s allowance (the main benefit for unemployed people seeking work) do not have access to a car and a licence to drive it. (6) Two out of five jobseekers say lack of transport is a barrier to getting a job. 38% of jobseekers say that transport (lack of personal transport or poor public transport) is a key barrier to getting a job. 12%of jobseekers claim that a lack of available transport has stopped them from attending interviews. 13% of people say they have not applied for a particular job in the last 12 months because of transport problems. This figure rises to 18% for people living in low-income areas, and 25% for 16–25-year-olds. 5% of people say they have been offered a job but turned it down in the last 12 months because of transport problems. For people living in low-income

	areas this figure is 10%. (7) One in four people say their job search is inhibited by the cost of travel to interviews and 14% of out-of-work lone parents say they can't afford the cost of transport to work. (7) • **Case studies** Over the course of 4 years, WorkWise in the West Midlands has helped over 4,200 people to get to interviews and over 4,300 people to travel to a new job. The average cost of supporting a person into a new job through WorkWise is just £200. To date, the scheme has issued over 6,000 day passes to get people to job interviews and almost 8,000 monthly passes to get people to work (8) WorkWise Merseyside distributed 2,800 travel tickets to help people access jobs, training and interviews between April 2007 and December 2008. (8)
Notes	Some schemes are already in place including: • JobCarz (car rental scheme for people starting a new job in East Durham) (3) • Access to Work (financial support for people with disability who are not able to use public transport to get to work – run by Job Centre Plus) (4) • Help with travel expenses when attending job interviews (run by Job Centre Plus) (5) • Nexus Travel 2 work project (2007/08), Tyne & Wear local authorities also have implemented various "back to work" schemes (9) Merseyside evidence applicability to Tyne & Wear is high. Comparison on key indicators between the two areas show very similar age profiles (Census 2001), distances travelled to work (Census 2001), travel to work mode split (Census 2001), socio economic status (ONS Annual Population Survey 2010, Census 2001 and Job Seekers Allowance data - ONS claimant count October 2011)
References	(1) Evaluation of Wheels to Work Derbyshire, Final Report, ERS, 2009 (2) Wheels to Work: the way forward, Commission for Rural Communities, 2005 (3) www.jobcarz.co.uk (4) www.direct.gov.uk/en/DisabledPeople/Employmentsupport/WorkSchemesAndProgrammes/DG_4000347 (5) www.direct.gov.uk/en/MoneyTaxAndBenefits/BenefitsTaxCreditsAndOtherSupport/Employedorlookingforwork/DG_10013908 (6) Transport, social equality and welfare to work, A joint report by Campaign for Better Transport and Citizens Advice, 2010 (7) Making the Connections: Final Report on Transport and Social Exclusion, Social Exclusion Unit, 2003 (8) WorkWise - a ticket to employment, PTEG Briefing, 2009 (9) Travel to Work Project - Evaluation Report, Nexus, 2008 and Best practice guide Tackling worklessness with public transport fare initiatives, Tyne & Wear Together, 2007

Sub-element	Information, publicity and promotion (other than PT)
Content	**Information, publicity and promotion**, project management, monitoring and evaluation, batch journey planner facility
Range of impact from evidence	"General travel awareness campaigns could reduce car use by 0.1 or 1% overall" over a 10 year period (1)
References	(1) 'Smarter Choices – Changing the Way We Travel' campaigns, Cairns S, Sloman L, Newson C, Anable J, Kirkbride A & Goodwin P, 2004, Chapter 13 Projections and costs

Sub-element	Public transport information (incl. real time), publicity and ticketing
Content	**Public transport information, publicity and promotion**, **POP card promotion** (Nexus), extension of Newcastle City Council travel office, procurement of ticketing via Newcastle City Council travel office, **bus real time information** (Nexus)
Range of impact from evidence	Public transport information and marketing measures could reduce car driver mileage in urban areas outside London by 0.2% (low intensity scenario) or 0.9% (high intensity scenario) overall after ten years. In non-urban areas, car driver mileage could be reduced by 0.1% or 0.3% after the same period. (1) Modelling work "suggests that a package of (bus) soft factors could reduce car commuting by between 1% and 2%. This equates to an increase in bus demand of between 4% and 8%, based on the application of the 4 to 1 rule. In terms of changing bus demand, the largest source of potential future growth is likely to come from the existing car users market who switch to quality bus services" (2) Send text message with bus stop code and get return text with times of next buses (standard text rate applies): valued at 0.8 pence per journey; send text message with bus stop code and get return text with times of next buses and relevant delay information (standard text rate applies): valued at 1.1 pence per journey (3)
References	(1) 'Smarter Choices – Changing the Way We Travel' campaigns, Cairns S, Sloman L, Newson C, Anable J, Kirkbride A & Goodwin P, 2004, Chapter 13 Projections and costs (2) The role of soft measures in influencing patronage growth and modal split in the bus market in England, Final Report, DfT, 2009 (3) Values obtained from a multi-modal Stated Preference survey carried out in 2007. Bus Improvements And Benefit Values, Transport for London Business Case Development Manual Issued by TfL Investment Programme Management Office, May 2008

Sub-element	Cycling improvements (infrastructure)
Content	Improvements to existing cycle routes and lanes, new cycle routes and lanes, cycle parking facilities, cycle hub, bike rental scheme (including electric bikes)
Range of impact from evidence	Darlington Cycling Town project (in coordination with Sustainable Travel Town) achieved an increase in the proportion of children cycling to school from 0.9% in 2005 to 6.1% in 2008, the mode of travel to the town centre for all users had changed (39.2% by car in 2007 to 33% by car in 2008, with increases in bus, walk and cycle) (1) Delivery of Cycling Demonstration Towns-type interventions could result in up to 307,000 new cyclists, making 96 million trips per year, and lifting cycling mode share from 0.8% across the PTE areas to 2.4%. Benefits accrued to these new cyclists alone could total in the region of £716 million over a ten year period. Benefit to cost ratios could be as high as 3.2:1 (2) Improvements to cycle routes, provision of cycling facilities in workplaces and financial incentives to cycle to work can all substantially increase cycling's mode share. Across the six PTE areas, route improvements could increase cycling's mode share for work trips from 2.2% up to around 3.4%, with annual benefits valued at up to £2.6 million. The provision of indoor parking and showers alone could increase the percentage cycling to work to 2.7%, and a £1 per day incentive to cycle to work could result in 2.9% cycling mode share, with annual benefits valued at around £1 million and £1.6 million, respectively. Estimated benefit to cost ratios could be as high as 6:1 for improvements to commuting cycle routes, 5:1 for provision of cycling facilities at workplaces. However financial incentives for cycling to work alone represent modest value for money, with costs equal to total benefits. (2) Interventions to overcome perceived barriers to cycling to school could result in some additional 2.5 million trips to school by cycle each year, with a benefit of up to £1.4 million (2) Results for the first six cycling towns showed a mean increase in cycling levels

	across all six towns of 27% between 2005 and 2009 (based on data from automatic cycle counters) for an investment of approx. £500k/year per city (3)
References	(1) Darlington Cycling Town Review 2005 - 2009 (2) Cycling in the city regions, Annex 1: Modelling the Impact of Step Changes in the Delivery of Measures to Support Cycling in PTE Areas: Technical Report, April 2011, Sustrans for PTEG (3) Sloman L, Cavill N, Cope A, Muller L and Kennedy A (2009) Analysis and synthesis of evidence on the effects of investment in six Cycling Demonstration Towns Report for Department for Transport and Cycling England

Sub-element	Walking improvements (infrastructure)
Content	Improvements to existing walking routes, pavements, crossings, new walking routes
Range of impact from evidence	Analysis from Portland Oregon indicated that car mileage for households in highly pedestrian friendly environments were less than half than in pedestrian hostile neighbourhoods. The analysis suggested that the adoption of pedestrian-orientated design features would result in a 10% decline in local car mileage per household. (1) The propensity to walk is influenced not only by distance, but also by the quality of the walking experience. Good sightlines and visibility towards destinations and intermediate points are important for way-finding and personal security. Pedestrian routes need to be direct and match desire lines as closely as possible, including across junctions, unless site-specific reasons preclude it. Pedestrian networks need to be connected. Where routes are separated by heavily-trafficked routes, appropriate surface-level crossings should be provided where practicable. Pedestrians should generally be accommodated on multifunctional streets rather than on routes segregated from motor traffic. In situations where it is appropriate to provide traffic-free routes they should be short, well-overlooked and relatively wide. Obstructions on the footway should be minimised. Street furniture on footways can be a hazard for vulnerable people. There is no maximum width for footways; widths should take account. (2)
References	(1) Dierkers et al (2005) CCAP Transportation Emissions Guidebook Part One: Land Use, Transit and Travel Demand Management, Centre for Clean Air Policy, as quoted in UK ERC Impact database (2) Manual for Streets 1

Sub-element	Bus services improvements and new services (Kickstart)
Content	Improvements to existing bus services frequency and timetable, development of new bus routes (to match new employment patterns and residential areas)
Range of impact from evidence	Kickstart has been successful in uplifting marginal commercial services to new levels of revenue and patronage, and in establishing their long term viability. The vast majority of schemes funded in 2003 will be commercially viable or sustainable at the end of Kickstart funding. We anticipate a similar pattern with those schemes funded in 2005 in England and Scotland. In summary, what has Kickstart achieved: - Growth in patronage on marginal or new services of on average over 20% in the first year of operation and over 10% in year two for the 2003 Kickstart round. This in an overall market that is still declining. - Modal shift at a level comparable with Quality Bus Partnership achievements on key corridor schemes. Modest modal shift has been achieved in less promising territory. - Benefits to users in terms of frequency enhancements and more accessible vehicles. - Value for public money with the median level of revenue support per passenger across the 2003 schemes in year one being £0.12 and £0.76 per new passenger. This compares well with standard supported services

	and will fall over the life of each scheme. (5 – including seven schemes in the North East) The evidence is limited but modal shift between 2% and 25% has been achieved (6). A study using multiple regression to determine effects of car ownership and mode choice on land use characteristics based on data from the UK National Travel Survey collected in 1989/91 and 1999/2001 identified that areas with bus services every 15 min are associated with a 4% decrease in the share of distance travelled by car compared with areas with buses every 30 min, and a 13% decrease compared with areas with less than one bus per hour. The study also found that areas over 13 minute walking distance to the nearest bus stop are associated with a 9% increase in the share of distance travelled by car compared with areas within 7-13 minutes to the nearest bus stop. (1) Journey time savings are assumed to be achieved through investment in bus priority, namely bus lanes. In general a 2km stretch of bus lane is assumed to result in a 5% journey time saving while a 10% saving may be achieved if half the route has a bus lane along it. (Note: this generally results in longer journey times for car users) (2) A survey commissioned by DfT indicated that integrated smart tickets have the potential to attract as many as 25% of current non-public transport users onto the system and that a pre-pay smartcard with a daily 'cap' could increase some individuals' trip rates by over 14%. (3) Research commissioned by DfT shows that soft factors can have an influence on bus use and transfer from cars, with results showing the following elasticities (4): • Provision of audio announcements resulting in - 0.15% car demand transferring to bus • Provision of CCTV at bus stops resulting in - 0.31% • CCTV on buses resulting in - 0.39% • Climate control resulting in -0.15% • New bus shelters resulting in - 0.13% • New bus with low floor resulting in - 0.27% • New interchange facilities resulting in - 0.33% • On-screen displays resulting in - 0.11% • Real time passenger information resulting in - 0.21% • Simplified ticketing resulting in- 0.25% • Trained drivers resulting in - 0.34%
References	(1) Dargay, Land Use and Mobility in Britain, 2009 as quoted in Committee on Climate Change October 2009 Progress Report (2) CfIT, 2002 (3) DfT news “£20M for smart ticketing in our cities within five years” (15/12/2009) (4) The Role of Soft Measures in Influencing Patronage Growth and Modal Split in the Bus Market in England, AECOM, 2009 (5) Improving Public Transport Research – Monitoring Kickstart Schemes (UG589) Final Report February 2007 Transport Studies Group, Loughborough University STAR Independent Consultants Ltd (6) Bristow et al., 2002; TAS, 2001 as quoted in Kickstarting growth in bus patronage: Targeting support at the margins Abigail L. Bristow, Marcus P. Enoch, Lian Zhang, Clare Greensmith, Norman James, Stephen Potter, 2008

Sub-element	Improved access to public transport (metro stations)
Content	Improvements to existing cycling and walking routes, pavements, crossings to access public transport stops (mainly focused on Metro stations)
Range of impact from evidence	Interventions to improve cycle access at suburban and commuter stations could substantially reduce the pressure on parking and local road networks. Interventions to encourage those who currently drive to the station but would like to cycle to do so by investing in improved facilities at suburban rail stations could replace up to 3,000 park and ride trips across the six PTE areas every day, with potential benefits in the region of £959,000 and an estimated benefit to cost ratio in the region of 12:1 (1) Generally good signs between bus and Underground services, but additional signs would make it easier to find the way: valued at 2.8 pence per journey; Excellent signs giving a direct route between bus and Underground services: valued at 5.5 pence per journey; Walkway between Underground station and bus stop well lit throughout valued at 3.2 pence per journey; Entire walkway covered/sheltered between the Underground station and bus stop valued at 1.9 pence per journey (2) Bus routes and stops should form key elements within walkable neighbourhoods. Bus services are most viable when they follow direct and reasonably straight routes, avoiding long one-way loops or long distances without passenger catchments. Bus stops should be high-quality places that are safe and comfortable to use and highly accessible by all people, ideally from more than one route. Stops should be provided close to specific passenger destinations (schools, shops etc.) (3)
References	(1) Cycling in the city regions, Annex 1: Modelling the Impact of Step Changes in the Delivery of Measures to Support Cycling in PTE Areas: Technical Report, April 2011, Sustrans for PTEG (2) Values obtained from a multi-modal Stated Preference survey carried out in 2007. Bus Improvements And Benefit Values, Transport for London Business Case Development Manual Issued by TfL Investment Programme Management Office, May 2008 (3) Manual for Streets 2

Sub-element	Improved signage (walking and cycling)
Content	Improved signage for cycles and pedestrians
Range of impact from evidence	Generally good signs between bus and Underground services, but additional signs would make it easier to find the way: valued at 2.8 pence per journey; Excellent signs giving a direct route between bus and Underground services: valued at 5.5 pence per journey (1) A study by Research Business International (2002) found that 66% of travelers said they would consider walking instead, after being shown a walking map. (Among tourists it's as high as 80%, and even among city wise commuters the figure was 60 %.) These findings are supported by a MORI study for the London Borough of Islington, which reported in 2005 that 49% of respondents had seen and used map-based signs, and of these 83% were satisfied that the signs had helped them find their way. Maps had assisted 66% with their journey, with 47% saying that the maps had 'encouraged' them to walk. Only 5% said that they did not find them useful. What this suggests is that an integrated signage and information strategy to support the needs of walkers can be expected to deliver substantial dividends. (2)
References	(1) Values obtained from a multi-modal Stated Preference survey carried out in 2007. Bus Improvements And Benefit Values, Transport for London Business Case Development Manual Issued by TfL Investment Programme Management Office, May 2008 (2) As quoted in Best Practice In Pedestrian Wayfinding Within Urban Areas Dr John Grant (JA Grant + Associates) & Bruce Herbes (Visualvoice), 2007

Sub-element	Parking management (resident parking schemes)
Content	Introduction of resident parking schemes near employment sites to discourage staff from using their car to get to work (and park on neighbouring streets)
Range of impact from evidence	Even modest parking fees can affect vehicle travel patterns. Price elasticity of travel with respect to parking price, ranges from -0.1 to -0.3 (a 10% increase in parking charged reduces trips by 1-3%). Pricing that applies to commuter parking tends to be particularly effective at reducing peak-period travel. An international evaluation on parking restrictions conducted across the city centre of Salzburg, Austria in 1991 identified that the large scale parking management scheme (reduced spaces, time limits and fees) had the effect of reducing car traffic by 11% (compared with no recorded change in other areas of the city or other cities) and also there were also recorded increases in cycling (115%), local bus (5%), regional bus (20%) and regional train (48%) in the area. However, the evaluation found that pedestrian activity in the central area had declined as well as some level of car traffic displacement to other roads. (2) Evidence from surveys of office development in London showed that the provision of car parking is a significant factor in the choice of transport to work (3) Finding a parking space is a deterrent to car use, but not necessarily an encouragement to the use of alternative modes. The RAC reported that 29% of principal motorists have given up their journeys and gone home because they couldn't find a parking space on at least one occasion (4) According to Litman, free parking tends to increase traffic and associated costs (traffic congestion, accidents, energy consumption, pollution emissions, etc.) by about 20% compared with charging motorists directly for the parking facilities they use; more efficient parking management can significantly reduce parking requirements, vehicle travel and sprawl, and the various associated costs, providing significant sustainability benefits. (5) Much research has demonstrated the importance of parking costs to travel choices although the extent of the impact may vary. A combination of parking charges and reducing or restricting parking availability is likely to be most effective in encouraging behavioural change. (6)
References	(1) VTPI (citing Vaca and Kuzmyak, 2005) as quoted in UK ERC Impact database (2) as quoted in Impacts of Better Use Transport Interventions: Review of the Evaluation Evidence Base, Independent Social Research, October 2009 (3) Department of the Environment and Department of Transport, 1993 as quoted in Controlling the Environmental Impacts of Transport: Matching Instruments to Objectives, M Acutt and J Dodgson, 1997 (4) Parking in Transport Policy, RAC, 2005 as quoted in Parking Measures and Policies Research Review TRL Limited, May 2010 (5) Recommendations for Improving LEED Transportation and Parking Credits, T Litman, Victoria Transport Policy Institute, 2008 as quoted in Parking Measures and Policies Research Review TRL Limited, May 2010 (6) Parking Measures and Policies Research Review TRL Limited, May 2010