

Slough Mass Rapid Transit (SMaRT) Business Case

Distributional Impacts Full Appraisal – Final Report

16th June 2014

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1. Introduction

1.1 Purpose of Report

This report presents findings from the Distributional Impacts (DIs) appraisal for the Slough Mass Rapid Transit, and supports the SMaRT Business Case - June 2014

The appraisal has been undertaken in accordance with WebTAG guidance, published by DfT in **TAG Unit A4.2 (Distributional Impact Appraisal)**.

1.2 Background

1.2.1 What is a DI appraisal?

DfT has developed its understanding of Distributional Impacts through work over the last few years, including a detailed literature review of DIs in transport interventions, and consideration of current practice in appraisals.

'**Distributional**' impacts relate to the extent to which there are differences in the way impacts affect different groups in society. For example, the noise impacts of an intervention will affect different groups of households, with some experiencing increases, and others decreases. Depending on the geographical locations of different groups of people, these groups will each experience different impacts.

The January 2014 update of WebTAG replaced Unit 3.17 (Guidance on Social and Distributional Impacts) with two separate units, Unit A4.1 (Social Impact Appraisal) and A4.2 (Distributional Impact Appraisal). Unit A4.2 is the guidance now used to undertake DIs and is the basis for this report.

1.3 Overview of DI Process

The approach outlined in DfT's guidance ensures that the DI appraisal is proportionate to the scale of the issue and follows a degree of iteration in the initial steps to ascertain whether a full appraisal is required. Table 1.1 the process detailing each key point of decision-making illustrated by the three identified Steps (from Step 1 to Step 3).

Table 1.1 – Overview of DI Steps

Step	Description	Output
1	Screening Process: Identification of likely impacts for each indicator	Screening Proforma
2	Assessment: (a) Confirmation of the area impacted by the transport intervention (impact area); (b) Identification of social groups in the impact area; and (c) Identification of amenities in the impact area.	DIs social groups statistics and amenities affected within the impact area.
3	Appraisal of Impacts: (a) Core analysis of the impacts (b) Full appraisal of DIs and input into AST	Appraisal worksheets and AST Inputs

1.4 Scheme Overview

The A4 forms the spine of a 12km strategic public transport corridor that links Maidenhead, Slough and Heathrow and plays an important role in providing surface access to the airport. The western section of the Slough Mass Rapid Transit (SMaRT) project will provide segregated bus lanes fronting Slough Trading Estate. Bus lanes and other priority measures will be provided in

the central section between the estate, Slough town centre and eastwards to Junction 5 of the M4. The eastern section will at a later date extend the scheme from Junction 5 to the Borough boundary with the potential to provide a direct mass rapid transit connection to Heathrow. The eastern section does not form part of the project considered at present.

1.5 Scheme Objectives

The SMaRT scheme will alleviate a number of problems to bring benefits to the local population and businesses and to the wider economy. The major objectives are presented below in Table 1.2.

Table 1.2 Scheme P Objectives

Key Objectives of the SMaRT scheme	
1	Provide a high quality, safe, convenient and reliable alternative to the car and improve public perception of transport in Slough;
2	Alleviate the severe congestion on the A4 by allowing better flow of traffic;
3	Minimise the impact of noise and air pollution and greenhouse gases on the A4 corridor; and
4	Support economic development in Slough and Heathrow.

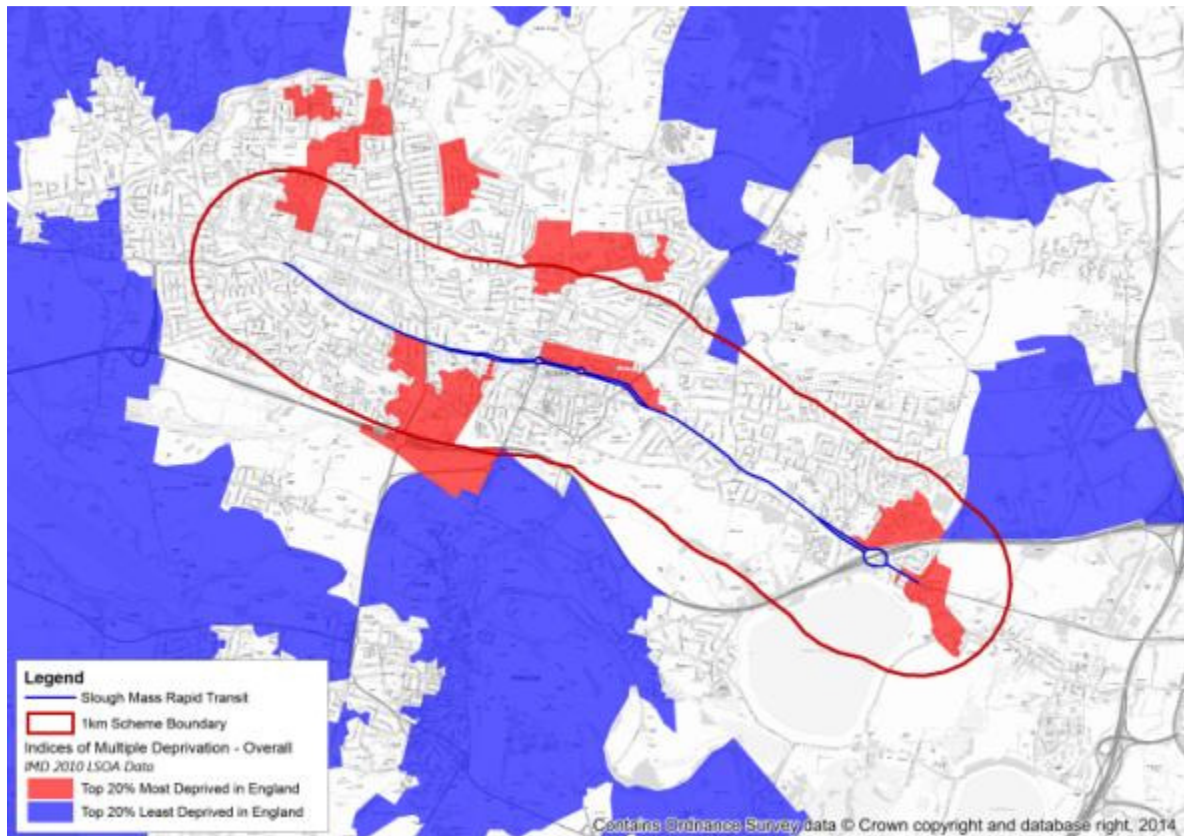
1.6 Scheme Corridor Overview

The scheme is located in an area alongside some of the most deprived areas in England as shown in Figure 1-1. These include areas east of Tuns Lane on the western extent of the scheme and the area north of Wellington St, between William Street and Wexham Road bounded by the rail line.

Appendix B provides a socio-demographic profile of a 1km buffer around the scheme alignment, with maps illustrating specific areas of higher proportions of vulnerable groups.

At the eastern end of the scheme alignment areas such as the Kennedy Park area and Slough Town Centre have lower than average levels of no car households. There are large pockets on the western extent of the scheme which also have a higher than average proportion of people claiming Job Seekers Allowance and higher proportions of young people.

Figure 1-1 – Deprivation levels by Super Output Area (Indices of Deprivation 2010)



1.7 Report Structure

Following on from this Introduction the remaining report is structured as follows:

- Chapter 2: Initial Screening Proforma outlines the key findings of the Step 1 screening process;
- Chapter 3: Full Appraisal (Steps 2 and 3) details the approach taken to assess each required DI indicator and the outputs from the appraisal; and
- Chapter 4: Summary of Findings describes the main outputs from the DI appraisal in a matrix and contains summary text to be included within an Appraisal Summary Table.

Appendix A presents the completed DfT Screening Proforma and Appendix B illustrates the socio-demographic profiling of the scheme area with data from the 2011 Census

2. Distributional Impact Appraisal

2.1 Initial Screening (Step 1) - Approach

The initial screening assessment considered the likely positive and negative impacts of the eight DI indicators on specific vulnerable groups, including children, older people, people with a disability, Black and Minority Ethnic (BME) communities, people without access to a car and people on low incomes.

A number of key questions were posed in a Proforma published by the DfT which were considered during the initial screening. The questions covered the following:

- Is the option being considered likely to have negative or positive impacts on specific groups of people, including children, older people, disabled people, Black and Minority Ethnic (BME) communities, people without access to a car and people on low incomes?
- Can the likely impacts be mitigated through re-design or amendment?
- Are the impacts either significant or concentrated?

2.2 Initial Screening (Step 1) - Key Findings

The findings from the initial screening are presented in the Proforma (see Appendix A) and are summarised in Table 2.1 below. The Proforma also contains recommendations, where appropriate, for further analysis through a full appraisal.

Table 2.1 - Summary of Proforma

Indicator	Likely DI Impact	Recommendations
User Benefits	Yes	Proceed to Step 2
Noise	Yes	Proceed to Step 2
Air Quality	Yes	Proceed to Step 2
Accidents	Yes	Proceed to Step 2
Security	Yes	Proceed to Step 2
Severance	Yes	Proceed to Step 2
Accessibility	Yes	Proceed to Step 2
Affordability	No	No further assessment

2.3 Assessment (Steps 2) – Approach

Following on from the initial screening (Step 1), the steps to complete a full DI appraisal are as follows.

Step 2a – Confirmation of impacted area by intervention

The initial screening provides a broad understanding of the areas likely to experience impacts as a result of the scheme. Within Step 2a, a more detailed examination is required to investigate the spatial impacts of the scheme. The area affected is likely to vary depending on the individual DI indicator being appraised.

Step 2b – Identification of the social groups in the impact area

Step 2b requires the analysis of socio-economic, social and demographic characteristics to develop a profile of:

- The **transport users** that will experience changes in travel generalised costs resulting from the scheme;
- The **people living in those areas** identified as likely to be affected by the scheme; and
- The **people travelling in areas** identified as likely to be affected by the intervention.

The analysis uses a common dataset of socio-demographic data and plots the proportions of vulnerable groups within the impacted area. Table 2.2 sets out the groups of people to be identified in the analysis for each indicator.

Table 2.2- Scope of Socio-Demographic Analysis for DIs (Step 2b)

Social Group	User Benefits	Noise	Air quality	Accidents	Security	Severance	Accessibility	Affordability
Income Distribution	✓	✓	✓				✓	✓
Children: proportion <16		✓	✓	✓	✓	✓	✓	
Young adults: proportion aged 16-25				✓			✓	
Older people: proportion aged 70+				✓	✓	✓	✓	
Proportion of population with a disability					✓	✓	✓	
Proportion of population of BME origin					✓		✓	
Proportion of households without access to a car						✓	✓	
Carers: proportion of households with dependent children							✓	

Step 2c – Identification of amenities in the impact area

The concentration of social groups is not only based on resident population but also what trip attractors/amenities are within the impact area. Using desktop analysis, the local amenities which are likely to be used by the identified social groups for each DI indicator are identified. Amenity data allows qualitative assessments / statements to be made to add value to the DI appraisal and provides a wider assessment than just that of the resident population.

The output of step 2 are summarised and presented in order to provide evidence for the appraisal of impacts in step 3.

2.4 Appraisal of Impacts (Step 3)

This step examines information collated in the previous steps to assess the potential impacts of the intervention on each indicator’s social groups.

Step 3a – Core analysis of impacts

An assessment score will be given for each indicator and each of the social groups under consideration. The seven-point scoring system follows the standard DfT appraisal measures:

- Large beneficial;
- Moderate beneficial;
- Slight beneficial;

- Neutral;
- Slight adverse;
- Moderate adverse; or
- Large adverse.

Step 3b: Full appraisal of DIs

The analysis undertaken in Step 3a provides an assessment score for each indicator and each of the social groups under consideration. In addition, a qualitative assessment will be provided for each indicator to describe the key impacts in each case. These will be summarised in the DI appraisal matrix.

The scores and qualitative assessment are summarised in the DI appraisal matrix of Social and/or Distributional Impacts with key findings presented in the “key impacts” column.

3. Assessment (Step 2) and Appraisal (Steps 3) – Findings

3.1 User Benefits Assessment

3.1.1 Introduction

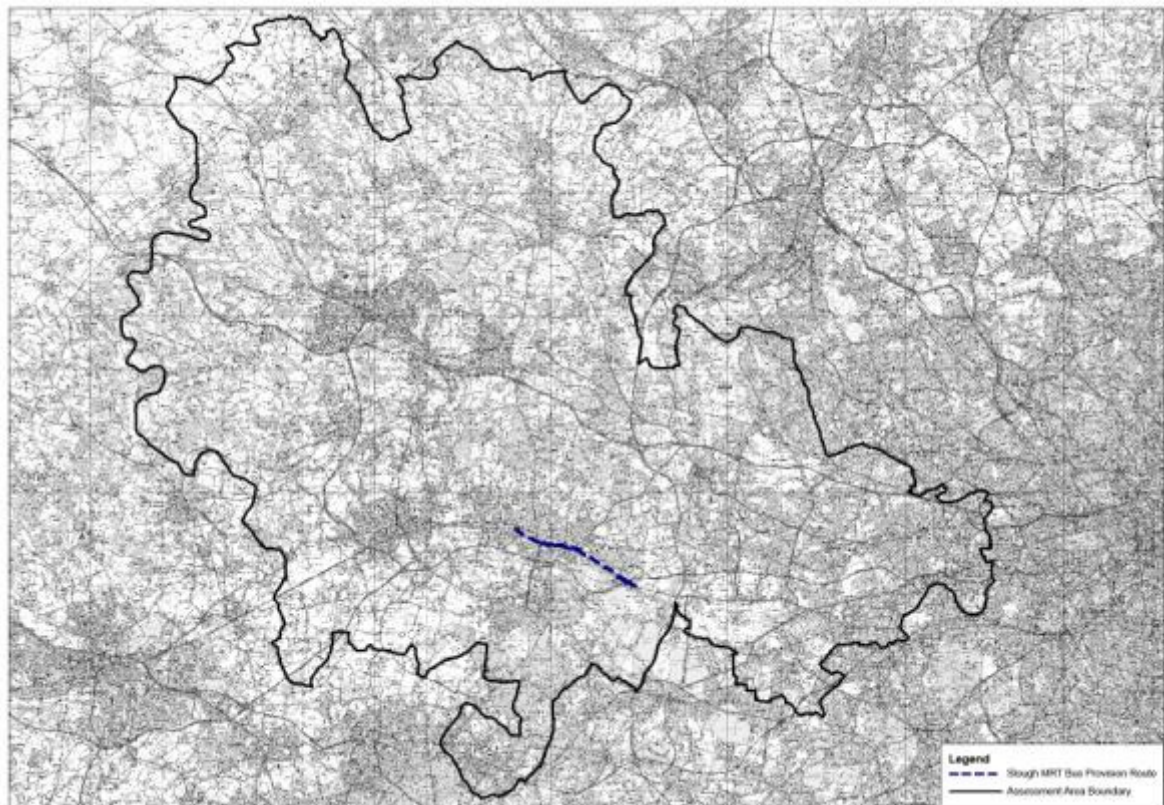
In the majority of cases, there are user benefits associated with a transport intervention but these are generally net outcomes. Within the net outcome, some people may experience disbenefits for example through longer journey times or lower public transport service frequencies.

Step 1, screening process, identifies the likely broad impact areas of the intervention and determines whether it needs to be appraised further. Step 2a investigates these spatial impacts in more detail. Step 2b reviews the demographic profile within the identified area, while Step 2c identifies amenities in the impact area of relevance. The outputs from Step 2 will feed into the core analysis of impacts (Step 3a) and the full appraisal of DIs (Step 3b).

3.1.2 Confirmation of impacted area (Step 2a)

The transport model SMMTM covers the whole of the UK, however for the purpose of the DI appraisal, the user Benefits analysis only requires the core modelled area to be assessed. The core modelled area has been defined as Slough, Buckinghamshire, parts of West London (Hounslow, Hillingdon and Ealing), and the Royal Borough of Windsor and Maidenhead – everything outside of these areas has been defined as “the rest of the UK” in the model sectoring system and so excluded. The assessment area is shown in Figure 3-1. The assessment considers the change in the cost of travel (including time and financial based costs) for users of the transport network, both for cars and for public transport.

Figure 3-1 – User Benefit Assessment Area



3.1.3 Identification of social groups in the area (Step 2b)

In the case of User Benefits, it is necessary to understand the income distribution of users within the scheme area. This has been undertaken by mapping variations in income deprivation using data from the Indices of Deprivation (ID 2010) Income Domain at Super Output Area level, according to their national rank.

Table 3.1 shows the distribution of user benefits across the population within the scheme area by national income deprivation quintile. Overall, 14% of residents within the assessment area are within the most deprived income quintile (quintile 1 – the 20% most deprived areas nationally), and a further 29% are within income quintile 2. Figure 1-1 in Chapter 1 geographically identifies the most and least deprived areas immediately surrounding the scheme.

3.1.4 Appraisal of User Benefits DIs – Step 3

83% of the population within the assessment area experience a benefit as a result of the scheme¹, and just 0.5% experience a disbenefit, as shown in Table 3.1. A slightly higher proportion in income quintiles 1 and 3 experience a benefit from the scheme compared to those the two least deprived income quintiles 4 and 5 experience

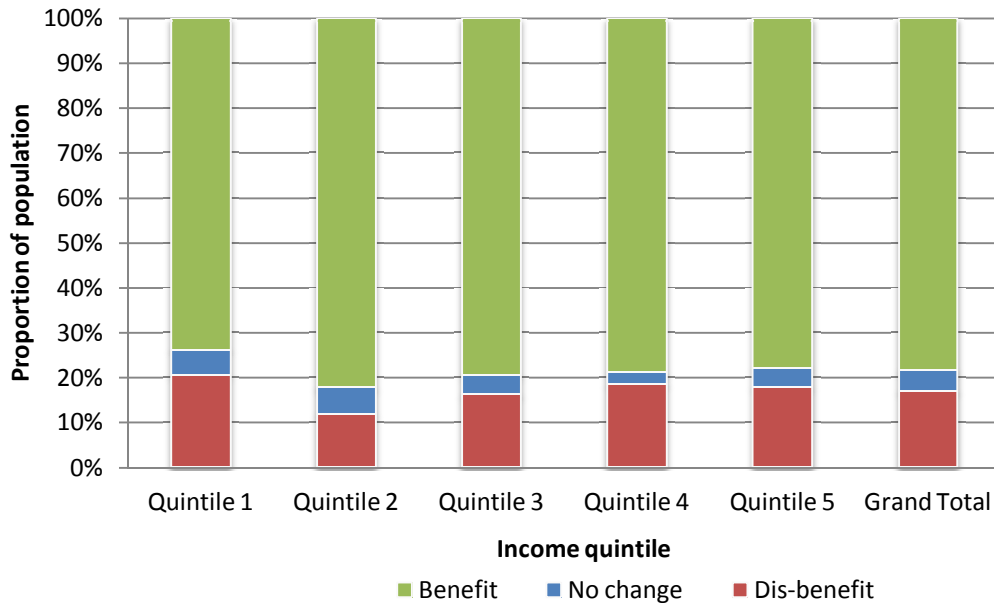
Table 3.1 - Distribution of user benefits across population by Income Deprivation Quintiles

	Benefit	No Change	Disbenefit	Grand Total
1- most deprived	161,182 (87.2%)	23,615 (12.8%)	0 (0.0%)	184,796 (14.0%)
2	319,179 (84.2%)	55,871 (14.7%)	4,051 (1.1%)	379,101 (28.7%)
3	235,848 (86.5%)	35,798 (13.1%)	1,167 (0.4%)	272,813 (20.6%)
4	150,374 (79.5%)	37,027 (19.6%)	1,691 (0.9%)	189,092 (14.3%)
5- least deprived	234,051 (78.9%)	62,761 (21.1%)	0 (0.0%)	296,811 (22.4%)
Total	1,100,634 (83.2%)	215,071 (16.3%)	6,909 (0.5%)	1,322,614

Figure 3-2 presents a graphical breakdown of the distribution of impacts across the five quintile groups for ease of interpretation.

¹ As modelled zones do not replicate SOA boundaries, outputs have been disaggregated to postcode level in order to be able to assign both a TUBA output and an IoD score. This therefore provides a benefit per head of the population based on postcode population statistics, and due to the disaggregation may differ slightly from the population spread included within the highway model.

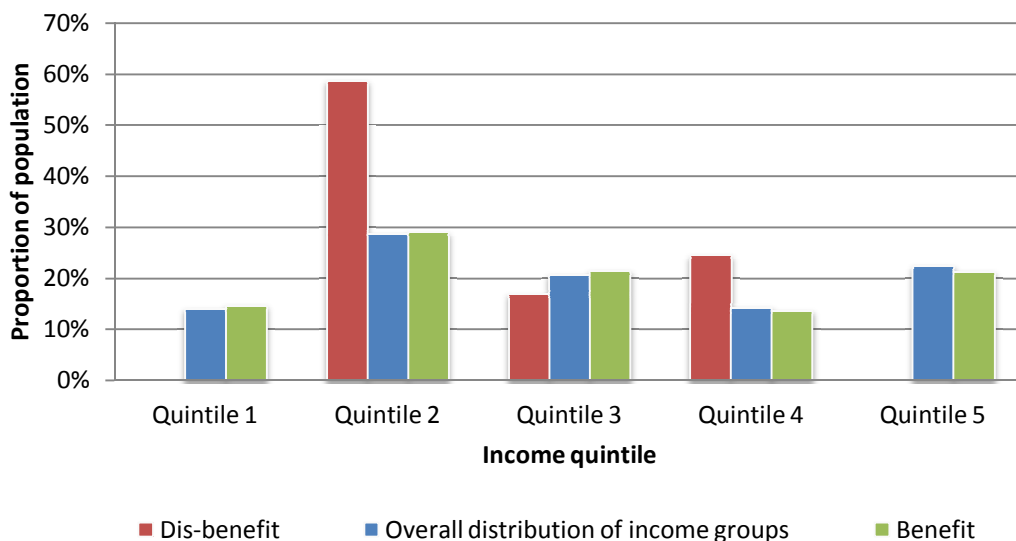
Figure 3-2 – Distribution of user benefits across the population by Income Deprivation Quintile



The DI appraisal demonstrates the winners and losers of user benefits as a result of the scheme. An examination of the distribution of benefits and disbenefits compared to what may be expected from the overall distribution of benefits across the populations within each income quintile is shown in Figure 3-3.

A proportionate distribution of benefits as a result of the scheme should see the benefits and disbenefits mirror the overall distribution of population proportions within each income group in the assessment area (blue column on Figure 3-3). In this instance, this is broadly the case for each income quintile with regards to benefits, but for disbenefits, quintiles 1 and 5 receive a far lower proportion than would be expected, and quintile 2 receives a far higher proportion than would be expected. It should be noted that the level of disbenefits overall is very low, so while quintile 2 does receive 59% of all disbenefits, it is only 1% of the population in quintile 2 receiving disbenefits.

Fig 3-3 – User Benefits – Distribution of benefits across the population by Income Deprivation Quintile, compared to expected distribution



Aggregating data across the income quintiles identifies whether the value of benefits and disbenefits are equally distributed across the five income quintiles as shown in Table 3.2.

Overall there are net benefits from the scheme. These are in the order of approximately £42.5million over the 60 year appraisal. Following the WebTAG Unit A4.2assessment criteria (as noted below), Table 3.4 outlines the assessment for each income quintile as follows:

- All of the income quintiles experience net user benefits overall;
- Quintiles 1, 3 and 4 are scored as moderate beneficial as the proportion of the population experiencing benefits within these quintiles is in line with the proportion of the population of the group overall (i.e. within +/-5%);
- Quintile 2 is scored as large beneficial as the proportion of the population experiencing benefits within this quintile is greater than the proportion of the population of the group overall (i.e. more than 5% greater);
- Quintile 5 is scored as slight beneficial as the proportion of the population experiencing benefits within this quintile is less than the proportion of the population of the group overall (i.e. more than 5% less);

As there are overall net benefits for all quintile groups and the most vulnerable groups within the assessment area experience a level of benefits at least in line with the overall population, the overall user benefits DI impact has been appraised as **moderate beneficial**.

Table 3.2 – Distribution of user benefit costs, by Income Deprivation Quintile

	Income Quintile					Total
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	
Total population	184,796	379,101	272,813	189,092	296,811	1,322,614
Overall net benefits	£7,338,254	£16,496,519	£9,950,414	£5,309,802	£3,413,836	£42,508,826
Total benefits	£7,338,254	£16,734,994	£10,005,635	£5,493,727	£3,413,836	£42,986,447
Total disbenefits	-	-£238,475	-£ 55,221	-£183,925	-	-£477,621
Share of user benefits	17.1%	38.9%	23.3%	12.8%	7.9%	-
Share of user disbenefits	0.0%	49.9%	11.6%	38.5%	0.0%	-
Share of overall net benefits	17.3%	38.8%	23.4%	12.5%	8.0%	-
Share of population in the impact area	14.0%	28.7%	20.6%	14.3%	22.4%	-
Assessment	✓✓	✓✓✓	✓✓	✓✓	✓	
Key to individual assessment of each Income quintile						
<i>Beneficial and 5% greater (or more) than the proportion of the group in the total population</i>					<i>Large Beneficial</i>	
<i>Beneficial and in line (+/-5%) with the proportion of the group in the total population</i>					<i>Moderate Beneficial</i>	
<i>Beneficial and 5% smaller (or less) than the proportion of the group in the total population</i>					<i>Slight Beneficial</i>	
<i>There are no user benefits or disbenefits experienced by the group</i>					<i>Neutral</i>	
<i>A disbenefit which is 5% smaller (or less) than the proportion of the group in the total population</i>					<i>Slight Adverse</i>	
<i>A disbenefit which is in line (+/-5%) with the proportion of the group in the total population</i>					<i>Moderate Adverse</i>	
<i>A disbenefit which is 5% greater (or more) than the proportion of the group in the total population</i>					<i>Large Adverse</i>	

3.2 Noise and Air Quality Assessment

3.2.1 Introduction

Any intervention that increases traffic levels and/or speeds or reduces physical gaps between people and traffic will give rise to noise and air quality impacts within a localised area. The noise and air quality DI assessment has identified a small number of highway links within the scheme area that are forecast to experience a 10% increase or decrease in traffic flow, between the do minimum and do something (2015) scenarios. Areas experiencing an increase of 10% or more in traffic would as a consequence be expected to experience an increase in noise and deterioration in air quality. Similarly, an area with a decrease of 10% or more in traffic flow would be expected to experience a noise reduction and an improvement in air quality.

Analysis on the demographic profile of areas likely to be affected has been completed through the examination of the Indices of Deprivation 2010 (ID) income domain population, proportions of children under 16 years of age from Census 2011 data and the locations of schools.

3.2.2 Confirmation of impacted area – Step 2a

Determining the area affected by noise level and air quality changes required an assessment of the existing transport corridors with changes in traffic levels (a 10% increase or decrease) within a 200m distance of the scheme alignment (as shown in Figure 3.4).

Figure 3-4 - Distribution of Traffic Impacts

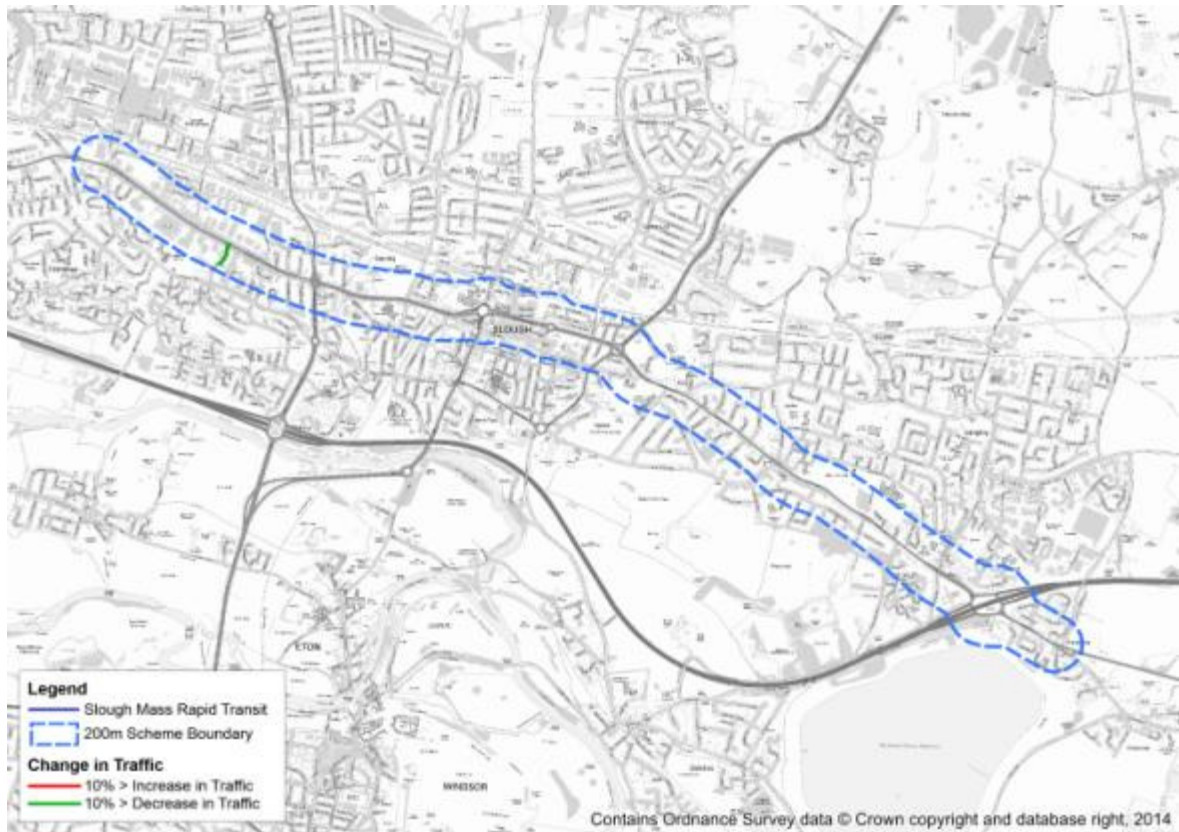


Figure 3-5 - Distribution of Traffic Impacts across Under 16 year olds

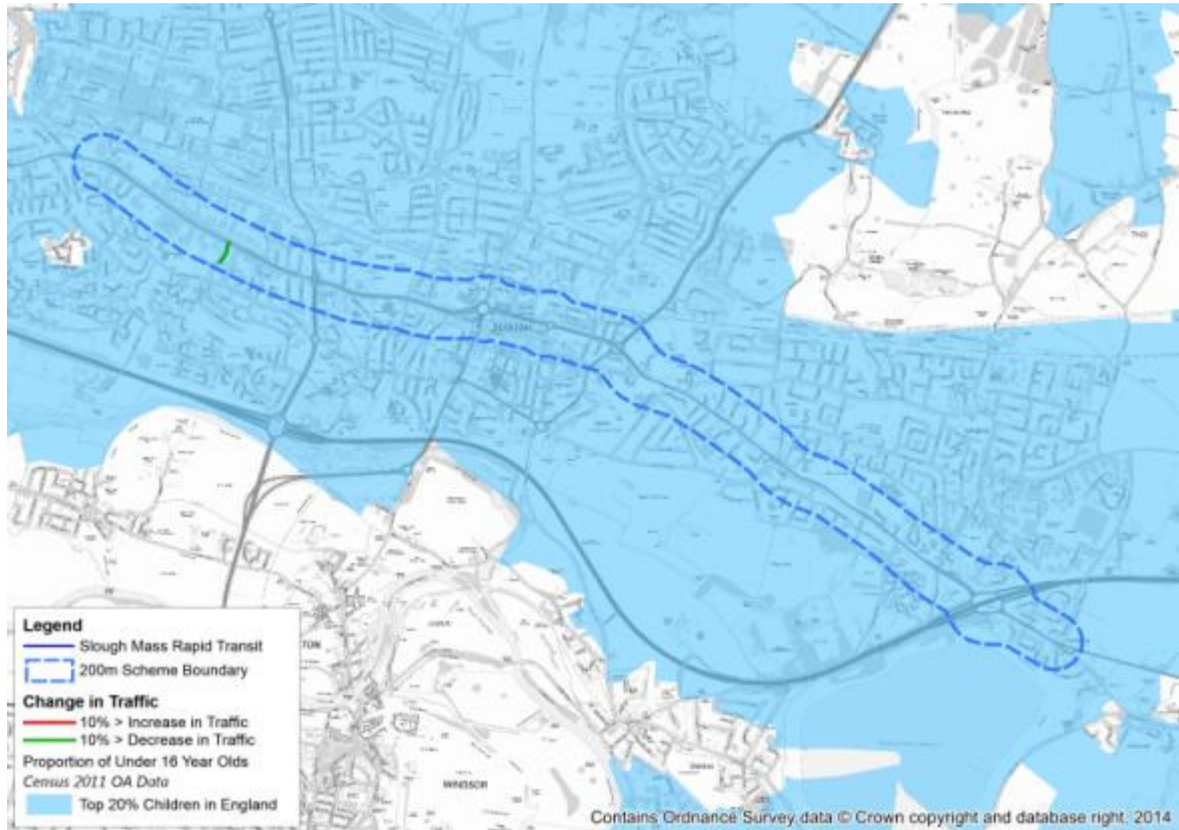
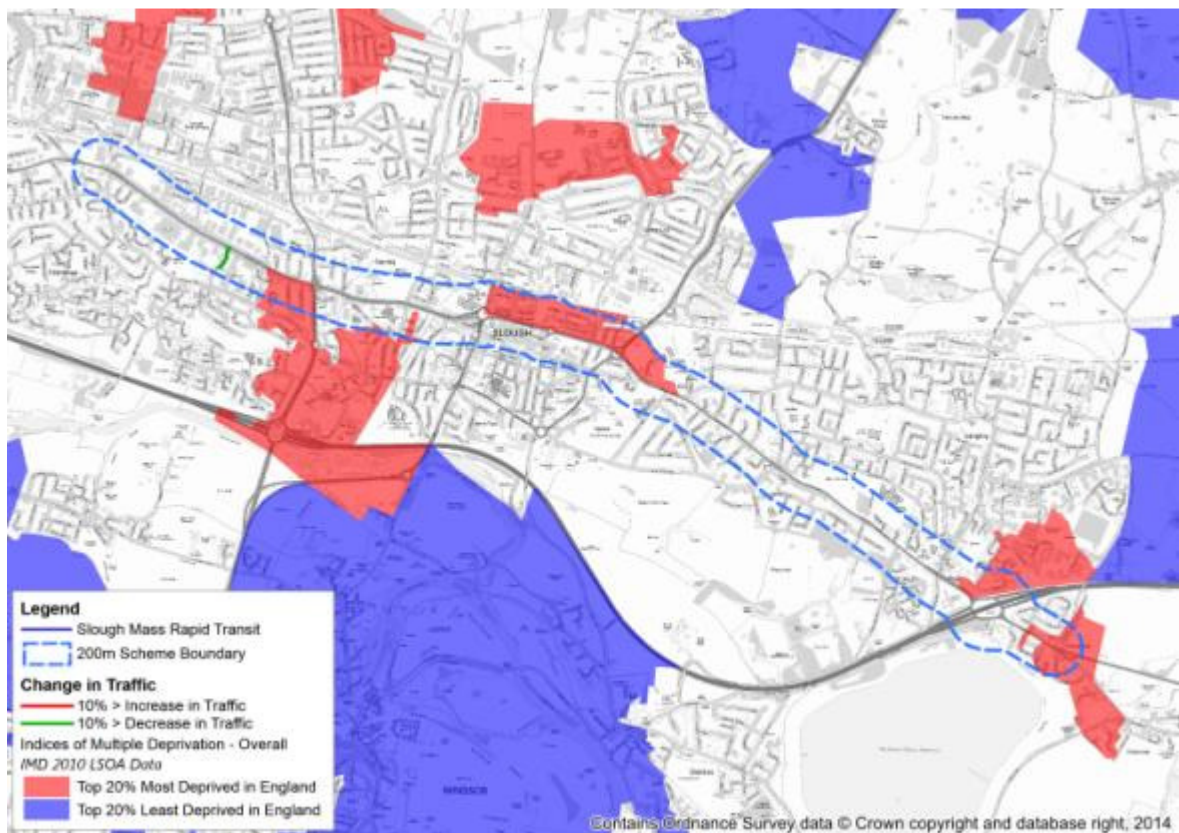


Figure 3-6 - Distribution of Traffic Impacts across Income Deprivation Quintiles



3.2.3 Identification of social groups in the area – Step 2b

In addition to the above population concentrations, there are five nursery schools, 29 primary schools and 11 secondary schools within a 1km buffer of the Scheme, indicating high levels of movement from children and their parents/carers around the locality.

3.2.4 Appraisal of Noise and Air DIs – Stage 3

The noise and air quality assessments have shown that within a 200m boundary of the scheme, there is only one link that is expected to have a decrease in traffic in excess of 10% (a decrease of 21%). However this link is not situated in an output area that is within 20% of the most or least deprived in England, but is within the top 20% of the highest proportion of under 16 year olds. Additionally it should be noted that there is a secondary school (Westgate School) south west of the link, which could have a beneficial impact as a result of a decrease in noise levels and an improvement in air quality.

Within 1km of the scheme route there are five links experiencing more than a 10% increase in traffic and six experiencing decreases of more than 10%. The largest increase in traffic is expected to be towards the west side of Cippenham (max increase of 55 vehicles per link), and the largest decrease to the east of Cippenham (max decrease of 36 vehicles).

The analysis has considered the likely population affected and, due to the small change in flows and affected links, it is considered that these areas suffer no benefits or disbenefits as a result of the scheme. The overall noise and air impacts assessment has therefore been appraised as **neutral**.

3.3 Accidents Assessment

3.3.1 Introduction

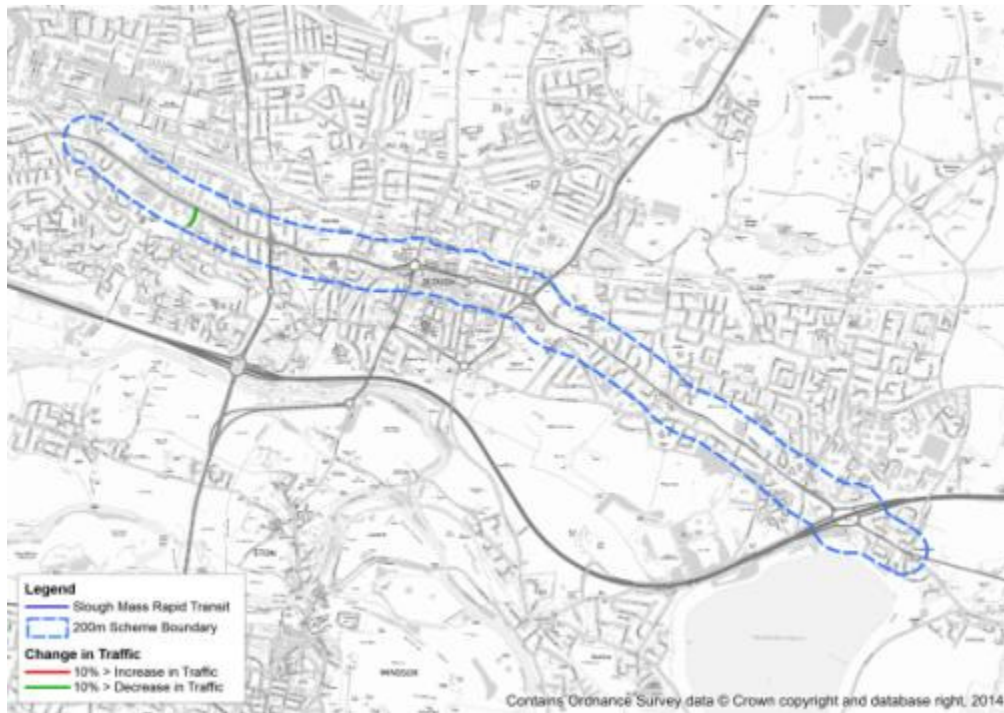
Any intervention that increases traffic levels and speeds or reduces physical separation between people and traffic can give rise to increases in accidents. Due to the absence of accident location data for the do something scenario, the accident assessment has been based on 10% increases or decreases in traffic flow for the do something scenario.

This included identifying network links that are expected to have a 10% increase or decrease in traffic flow, as a result of the scheme being implemented. Where there is a decrease in traffic, a reduction in personal injury accidents would be expected and where there is an increase in traffic, an increase in accidents would be expected.

3.3.2 Confirmation of impacted area – Step 2a

In order to identify the impacted area for the accident assessment, analysis was undertaken to identify all links on the modelled network with a change in traffic flow of +/- 10%, within a 200m boundary of the scheme route.

Figure 3-7 - Distribution of Traffic Impacts across Income Deprivation Quintiles



3.3.3 Identification of vulnerable groups in the area – Step 2b

There are several potential vulnerable groups in terms of accidents including children and younger people, young men (particularly as drivers) and older people, as well vulnerable road users such as pedestrians, cyclists and motorcyclists. There is also evidence that people living in more deprived areas are more vulnerable to accidents on the highway network.

Figures B-1, B-2 and B-4 in Appendix B highlight areas with the highest percentage of under 16s, young adults (16-25 years) and older people within a 1km buffer of the proposed scheme alignment. These figures show that within the 200m of the scheme route, there is only one link that is expected to experience a decrease of over 10% in traffic, which is located east of Cippenham. The whole route is within the top 20% of England for the proportion of children, and consequently they will be less at risk of being involved in an accident near areas where traffic is set to decrease.

The link experiencing a decrease in traffic of over 10% is not located within the most deprived 20% of output areas in England, and is therefore expected to have little or no impact on the most deprived population.

3.3.4 Identification of amenities in the impact area - Step 2c

There are six schools and one nursery near the scheme route, these include:

- Castleview Primary School;
- Langley Grammar School;
- Holy Family Catholic Primary School;
- St Bernard's Catholic School;
- Upton Court Grammar School;
- The Westgate Secondary School; and
- Teeny Boppers Montessori School.

The one link expected to have a decrease in traffic of over 10% (Twinches Lane) is located closest to Westgate Secondary School.

3.3.5 Appraisal of Accident DIs – Stage 3

Analysis has been undertaken to identify network links that are expected to have an increase or decrease of over 10% in traffic as a result of the scheme. Accidents involving vulnerable groups are more likely to occur on links experiencing no change or a reduction in accident numbers as a result of the proposed scheme. This scheme is only expected to decrease traffic over 10% on one link, hence 'accidents have been assessed as **slight beneficial**.

3.4 Severance Assessment

3.4.1 Introduction

Severance is often an unintended consequence of a measure intended to address other problems. Severance issues may be identified at an early stage and, in many cases, a design solution may reduce or eliminate impacts.

The severance assessment has examined the key links within the scheme area that are forecast to have a 10% increase or decrease in traffic flow, using the percentage difference between the do minimum and do something (2015) scenarios.

3.4.2 Confirmation of impacted area – Step 2a

The assessment area for severance includes any location with physical changes in road alignment or where links on the road network experience significant changes (>10%) in traffic flows². Although there are links outside of this boundary which may experience a change >10% in traffic flows, the assessment focuses on the local area only as this is where most concentrated impacts are likely to be experienced, as more general model noise may impact on links located further away from the scheme location.

3.4.3 Identification of vulnerable groups – Step 2b

Certain groups are particularly vulnerable to the effects of severance, including no car households, older people, children and people with disabilities. Analysis has been undertaken to assess the proportions of these vulnerable groups within the scheme area and in comparison to the Berkshire area and England as shown in Appendix B. The results of the analysis are shown in Table 3.10.

Table 3.3 - Concentration of Vulnerable Groups within Severance Impact Area

Vulnerable Group	% Scheme Area	% Berkshire	% England
Older People (Aged 70+)	4.1%	6.3%	7.7%
Children (People Aged Under 16)	23.4%	20.7%	18.9%
No Car Households	24.5%	16.7%	25.8%
Disability Living Allowance Claimants	6.5%	5.0%	7.8%

This indicates that the percentage of children living in the area is higher than in Berkshire and England, though the number of older people in the area is lower than regional and national rates. The percentage of people with disabilities in the area is higher than regional rates but lower than national rates. The percentage of no car households in the scheme area is in line with national rates but significantly higher than the regional rate.

3.4.4 Identification of amenities in the impact area – Step 2c

In addition to the above population concentrations, there are five nursery schools, 29 primary schools and 11 secondary schools within a 1km buffer of the Scheme, indicating high levels of movement from children and their parents/carers around the locality.

² Links with 10% change traffic flows Do Something against the Do Minimum

3.4.5 Appraisal of Severance DIs – Step 3

The impacted area for severance demonstrates a very small number of roads experiencing an increase and decrease in traffic flows as a result of the proposed scheme. The severance assessment has shown that within a 1km boundary of the scheme, there are only six links that are expected to have a decrease in traffic in excess of 10% (a max decrease of 36 vehicles) and five experiencing increases of more than 10% (a max increase of 55 vehicles).

The links experiencing more than a 10% decrease or increase in traffic are not situated in output areas that are within 20% of No Car Households in England or within the top 20% of older people in England. However a number of these links border output areas which fall into these two categories.

Figure 3-8 - Distribution of Traffic Impacts across No Car Households

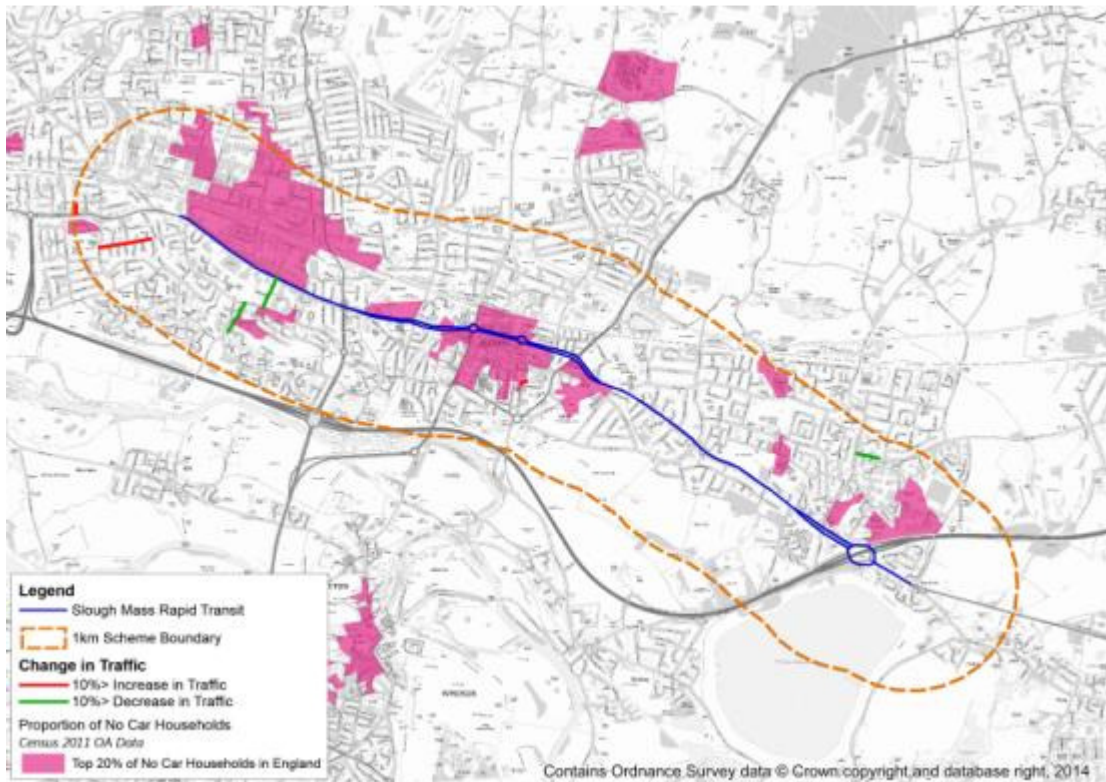
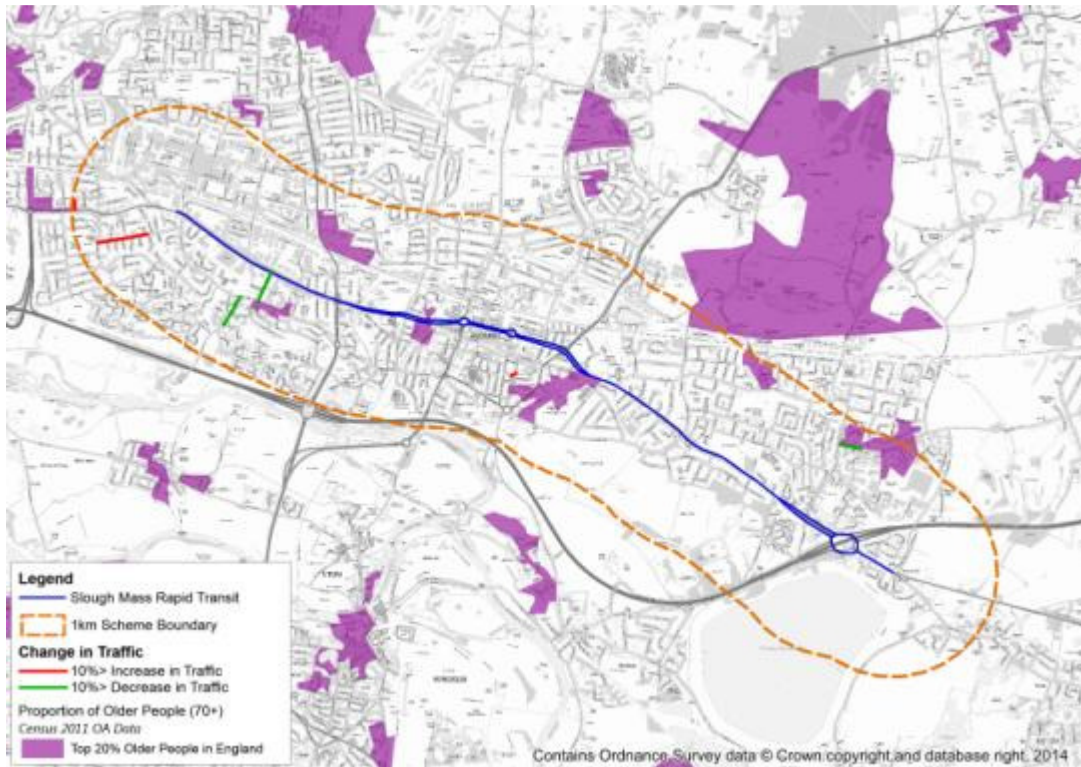
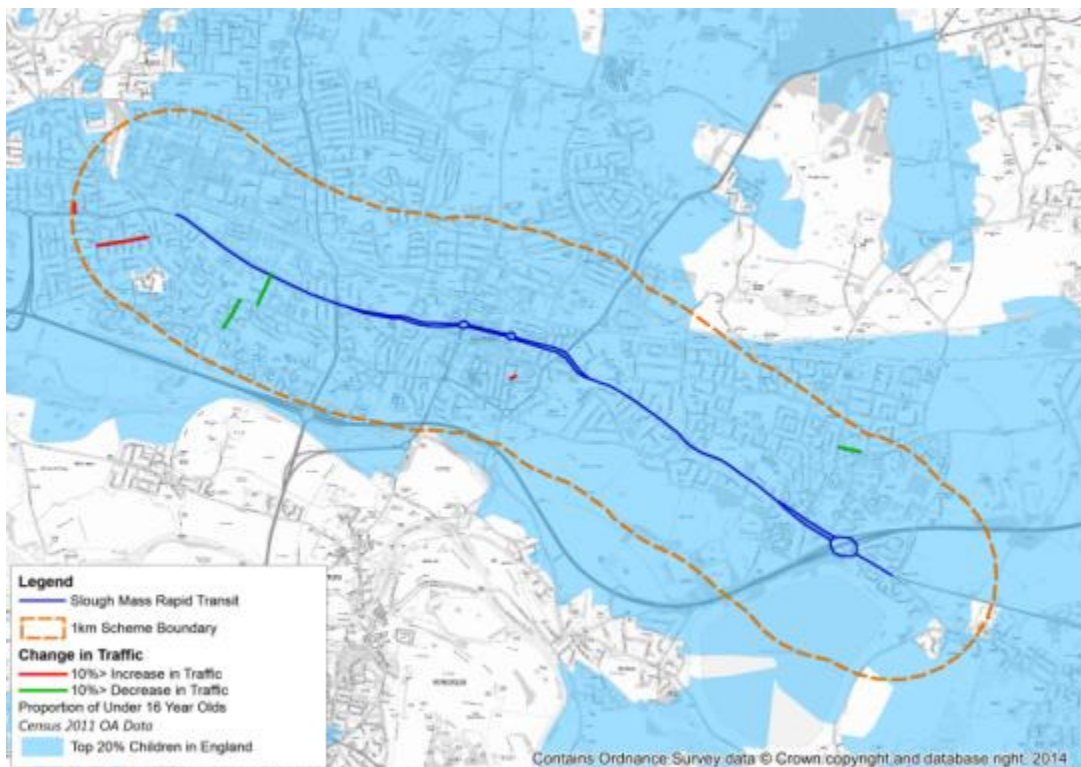


Figure 3-9 - Distribution of Traffic Impacts across Older People



All links experiencing increase and decreases are located in output areas that have the highest proportion of under 16 year olds within the top 20% in England.

Figure 3-10 - Distribution of Traffic Impacts across Under 16 year olds



The links showing a traffic flow reduction are in residential areas, Twindchers Lane and Weekes Drive to the west of the alignment, and Parlant Road which will potentially provide benefits to these communities through reduced severance caused by traffic volumes. Additionally it should be

noted that there is a secondary school (Westgate School) south west of Twindchers Lane and Weekes Drive, which could see benefits as a result of a decrease in traffic flow.

However there are a few areas that experience an increase in traffic flow and therefore a potential increase in severance. The largest increase in traffic is expected to be towards the west side of Cippenham, and the largest decrease to the east of Cippenham, on Bower Way.

As shown by Table 3.4 the overall SDI assessment has appraised the impact on severance as **neutral** to the vulnerable groups within the scheme area give the likely population affected and the small change in traffic flows as a result of the scheme.

Table 3.4 - Summary of the Scheme Severance DI Impacts

Impact	Older People	Children	No car Households	People with disabilities
Large Beneficial				
Moderate Beneficial				
Slight Beneficial				
Neutral	✓	✓	✓	✓
Slight Adverse				
Moderate Adverse				
Large Adverse				

3.5 Personal Security Assessment

3.5.1 Introduction

Some schemes may introduce perceived or real security risks that affect transport choices by different groups of people. Where choices are constrained by concerns regarding security and especially where those affected do not have access to a car, access to certain places or travel at desired times may be denied to members of these groups.

Step 2a in the assessment involved the identification of the area experiencing impacts on personal security, followed by a review of the demographic profile within the identified area (Step 2b). Step 2c identifies amenities in the impact area of relevance. The outputs from Step 2 feed into the core analysis of impacts (Step 3a) and the full appraisal of DIs (Step 3b) of the impacts on personal security.

3.5.2 Confirmation of impacted area – Step 2a

For the initial screening a broad understanding of the areas on which the transport scheme was likely to have an impact was used. Highway schemes are likely to impact on a wide range of users and therefore the definition of a scheme area is inappropriate. However, schemes relating to public transport, walking and cycling should consider the specific location where the scheme improvements are being made as well as the catchment area for walking to the scheme location.

The area used for the security analysis has therefore focused on a 1km buffer of the scheme alignment in order to assess the impact on pedestrians who live and/or work in the area or will use the scheme to access a wider range of destinations.

3.5.3 Identification of vulnerable groups in the area – Step 2b

There are certain groups that have particular concerns about their personal security including older people, children, women, black and minority ethnic residents and people with disabilities. Table 3.5 shows the concentration of each of these vulnerable groups compared to local and national levels.

Table 3.5- Concentration of Vulnerable Groups in Personal Security Impacts Area

Vulnerable Group	% Scheme Area	% Berkshire	% England
Older People (Aged 70+)	4.1%	6.3%	7.7%
Children (People Aged Under 16)	23.4%	20.7%	18.9%
Women	49.5%	50.3%	50.8%
Disability Living Allowance Claimants	6.5%	5.0%	7.8%
Black and Minority Ethnic (BME) Residents	58.5%	20.0%	14.6%

This above table shows that the scheme area contains a significantly higher proportion (nearly 60%) of Black Minority Ethnic residents compared to both regional and national rates. The proportion of children within the personal security analysis area is also higher than the Berkshire area and national averages.

The socio-demographic maps in Appendix B of this report provide an overview of the concentration and location of these groups within the scheme area. These include high concentrations of:

- BME residents living along the entire length of the scheme alignment, which are among the top 20% BME population in output areas in England.
- Children aged under 16 also living along the entire length of the scheme alignment; and
- Older people in the area around Yew Tree Road.

The socio-demographic maps also indicated that there are no LSOAs near the scheme within the top 20% highest DLA claimants within an output area.

3.5.4 Identification of amenities in the impact area – Step 2c

The proportion of children within the security analysis area is higher than the Berkshire area and national averages. There are five nursery schools, 29 primary schools and 11 secondary schools within a 1km buffer of the scheme.

3.5.5 Appraisal of Security SDIs

Police crime maps³ show that for March 2014 the majority of the criminal incidents along the proposed route were classified as anti-social behaviour, shoplifting, or violence/sexual offences. Geographically there were higher numbers of criminal incidents towards the town centre. Points of particularly high crime were in and around the supermarket on Wellington Street where there were 36 crime counts, 21 of which were shoplifting offences.

The scheme does not propose any new facilities such as CCTV, real time passenger information (RTI is currently available at approx. ¼ of stops), or high standard of lighting. The vehicles themselves are assumed to be the current fleet, though these do provide good levels of accessibility, security, information and comfort as they are equipped with CCTV such that the driver can see CCTV images of all passenger areas.

There are some alterations to bus timetables as a result of the scheme with improved frequencies and changes to the headway on routes 58, 78, 81 and 77. This should improve the overall reliability of the bus services along the scheme route and have a positive impact on personal security as people have a reduced wait time between buses.

Overall the assessment demonstrates a **slight beneficial** impact on security across the impacted area as a result of the scheme.

³ <http://www.police.uk>

3.6 Accessibility Assessment

3.6.1 Introduction

Transport scheme options will often have differentiated impacts on accessibility as experienced by different groups of people. This reflects a range of social and distributional factors including differences in travel needs and places of residence.

Step 2a of the accessibility assessment process has identified the area for which public transport accessibility impacts are likely to occur. Step 2b examined the socio-demographic profile within this area to identify the implications on these vulnerable groups. Step 2c identifies amenities in the impact area of relevance. Step 3 used these outputs to determine overall impacts based upon any changes the scheme would bring about to the public transport network.

3.6.2 Confirmation of impacted area – Step 2a

For the initial screening a broad understanding of the areas on which the proposed scheme was likely to have an impact was used. Limited data is currently available on the proposed revisions to timetables of public transport services as a consequence of the scheme. Therefore for the purpose of this analysis a qualitative approach has been used to determine likely impacts based on existing data.

It is recognised that accessibility improvements are likely to impact on more than just those people living within close proximity to new services because interchange options provide links to other services across the area. However, as the scheme does not propose any new services, the impacted area is taken to be 1km buffer around the scheme alignment.

3.6.3 Identification of vulnerable groups in the area – Step 2b

There are certain groups that are particularly vulnerable to the effects of poor accessibility. These groups include no-car households, young people, older people, black and minority ethnic communities and people with disabilities.

Analysis has been undertaken to identify the impacts on accessibility of these groups compared to the national figures as shown in Table 3.6.

Table 3.6 - Proportions of Vulnerable Groups

Vulnerable Group	% Scheme Area	% Berkshire	% England
Children: aged <16	23.4%	20.7%	18.9%
Older people: aged 70+	4.1%	6.3%	7.7%
Disability Allowance Claimants	6.5%	5.0%	7.8%
No Car Households	24.5%	16.7%	25.8%
Women	49.5%	50.3%	50.8%
Black and Minority Ethnic	58.5%	20.0%	14.6%

Table 3.6 demonstrates the proportions of vulnerable groups residing within the scheme area, which shows a slightly lower proportion of those with a disability and without access to a car compared with national levels, though higher than regional rates. However there are far higher BME residents and children under the age of 16 within the area compared with national and regional figures.

These groups are more likely to be users of public transport services and therefore the impacts of the proposed scheme on bus service accessibility will disproportionately impact on these vulnerable users.

3.6.4 Identification of amenities in the impact area – Step 2c

Slough Town Centre is a core employment and retail destination, while Slough Retail Park and Bath Road Shopping Park are also important retail areas.

Thames Valley University is located within the town centre and along the scheme alignment and there are five nursery schools, 29 primary schools and 11 secondary schools within a 1km buffer of the scheme.

Lough Community Leisure Centre is located east of Tuns Lane and Salt Hill Park is located north of Bath Road between Farnham Road and Stoke Poges Lane.

3.6.5 Appraisal of Accessibility DIs – Stage 3

The proposed changes to the bus services would not be effectively measured using accessibility modelling - Accession, hence the accessibility appraisal of DIs follows a qualitative assessment.

There are some alterations to bus timetables as a result of the scheme with improved frequency and changes to the headway on routes 58, 78, 81 and 77. Journey time data from the traffic suggests that there could be savings of up to 4 minutes in the peak.

Although it is not possible for the qualitative appraisal to show any change in accessibility levels, the scheme demonstrates an improved service frequency and thus was appraised as **slight beneficial**.

4. Summary of Findings

4.1 Appraisal Outputs

Table 4.1 Distributional Impacts : Output Summary Step 2

Social group and amenities indicators		User Benefits	Noise	Air quality	Accidents	Security	Severance	Accessibility	Affordability	Local Authority	England
Resident population in the impact area	Income distribution quintiles	0-20%	14%	N/A	N/A				N/A	6.7%	20%
		20-40%	29%	N/A	N/A				N/A	23.2%	20%
		40-60%	21%	N/A	N/A				N/A	20.6%	20%
		60-80%	14%	N/A	N/A				N/A	24.7%	20%
		80-100%	22%	N/A	N/A				N/A	24.7%	20%
	Children (<16)		23.4%	23.4%	23.4%	23.4%	23.4%	23.4%		20.7%	18.9%
	Young people		2.5%	2.5%	2.5%			2.5%		2.5%	2.5%
	Older people				4.1%	4.1%	4.1%	4.1%		6.3%	8.6%
	People with a disability				6.5%	6.5%	6.5%	6.5%		5.0%	7.8%
	Black Minority Ethnic							58.5%		20.0%	14.6%
No car households						24.5%	24.5%		16.7%	25.8%	
Households with dependent children							39.1%		32.5%	29.1%	
Indicator population in the impact area		81,884	81,884	81,884	81,884	81,884	81,884	81,884	N/A	861,870	5,301,2456
Amenities present within the impact area	Schools / nurseries		✓	✓	✓	✓	✓	✓	✓	-	-
	Playgrounds		✓	✓	✓	✓	✓	✓	✓	-	-
	Parks and open spaces		✓	✓	✓	✓	✓	✓	✓	-	-
	Hospitals		-	-	-	-	-	-	-	-	-
	Care homes / day centres		✓	✓	✓	✓	✓	✓	✓	-	-
	Community centre		-	-	-	-	-	-	-	-	-

Table 4.2 presents a summary of the key distributional impacts for inclusion in the Appraisal Summary Table and Table 4.3 contain the DI appraisal matrix.

Table 4.2 - Summary of Key Impacts

Assessed Indicator	Summary of Key Impacts	Seven Point Scale Assessment
User Benefits	<p>Overall there are net benefits from the scheme. These are in the order of approximately £42.5million over the 60 year appraisal.</p> <p>As there are overall net benefits for all quintile groups and the most vulnerable groups within the assessment area experience a level of benefits at least in line with the overall population, the overall user benefits DI impact has been appraised as moderate beneficial.</p>	Moderate Beneficial
Noise and Air Quality	<p>The scheme will result in one link within a 200m buffer of the scheme experiencing a 10% change in flows. However this link is not situated in an output area that is within 20% of the most or least deprived in England, but is within the top 20% of the highest proportion of under 16 year olds.</p> <p>Additionally it should be noted that there is a secondary school (Westgate School) south west of the link, which could have a beneficial impact as a result of a decrease in noise levels and an improvement in air quality.</p> <p>The scheme has been assessed as neutral on all vulnerable groups.</p>	Neutral
Accidents	<p>Accidents involving vulnerable groups are more likely to occur on links experiencing no change or a reduction in accident numbers as a result of the proposed scheme. This scheme is only expected to decrease traffic over 10% on one link, hence 'accidents have been assessed as slight beneficial.</p>	Slight Beneficial
Personal Security	<p>The scheme does not introduce any new features to impact on personal security issues, however the forecasted improvements in reliability of bus services enables a slight beneficial assessment on all vulnerable groups.</p>	Slight Beneficial
Severance	<p>The scheme will result in a small number of links experiencing a 10% change in flows. The links experiencing more than a 10% decrease or increase in traffic are not situated in output areas that are within 20% of No Car Households in England or within the top 20% of older people in England.</p> <p>The scheme has been assessed as neutral on all vulnerable groups.</p>	Neutral
Accessibility	<p>The scheme will result in improved service frequencies and journey times along the scheme route and thus appraised as slight beneficial.</p>	Slight Beneficial
Affordability	<p>Scoped out of appraisal.</p>	N/A

Table 4.3 - SDI Matrix

Distributional Impact Appraisal Matrix – Step 3

	Distributional impact of income deprivation					Are the impacts distributed evenly?	Key impacts - Qualitative statements				
	0-20%	20-40%	40-60%	60-80%	80-100%						
User benefits	14%	29%	21%	14%	22%		Overall there are net benefits from the scheme. These are in the order of approximately £42.5million over the 60 year appraisal. As there are overall net benefits for all quintile groups and the most vulnerable groups within the assessment area experience a level of benefits at least in line with the overall population, the overall user benefits DI impact has been appraised as moderate beneficial .				
Noise	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Air quality	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Affordability	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Accessibility	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
AST entry											
Impact	Social groups						User groups				Qualitative statement (including any impact on residential population AND identified amenities)
	Children & young people	Older people	Carers	Women	Disabled	BME	Pedestrians	Cyclists	Motor-cyclists	Young male drivers	
Noise and Air Quality	0										The scheme will result in one link within a 200m buffer of the scheme experiencing a 10% change in flows. However this link is not situated in an output area that is within 20% of the

										<p>most or least deprived in England, but is within the top 20% of the highest proportion of under 16 year olds.</p> <p>Additionally it should be noted that there is a secondary school (Westgate School) south west of the link, which could have a beneficial impact as a result of a decrease in noise levels and an improvement in air quality.</p> <p>The scheme has been assessed as neutral on all vulnerable groups.</p>	
Accidents	✓✓	✓✓					✓✓	✓✓	✓✓	✓✓	<p>Accidents involving vulnerable groups are more likely to occur on links experiencing no change or a reduction in accident numbers as a result of the proposed scheme. This scheme is only expected to decrease traffic over 10% on one link, hence 'accidents have been assessed as slight beneficial.</p>
Personal Security	✓	✓		✓							<p>The scheme does not introduce any new features to impact on personal security issues, however the forecasted improvements in reliability of bus services enables a slight beneficial</p>

											assessment on all vulnerable groups.
Severance	0	0	0		0						<p>The scheme will result in a small number of links experiencing a 10% change in flows. The links experiencing more than a 10% decrease or increase in traffic are not situated in output areas that are within 20% of No Car Households in England or within the top 20% of older people in England.</p> <p>The scheme has been assessed as neutral on all vulnerable groups.</p>
Accessibility	✓	✓	✓	✓	✓	✓					<p>The scheme will result in improved service frequencies and journey times along the scheme route and thus appraised as slight beneficial.</p>

Key: ✓✓✓ = Large Beneficial

✓✓ = Moderate Beneficial

✓ = Slight Beneficial

0 = Neutral

x = Slight Adverse

xx = Moderate Adverse

xxx = Large Adverse

Appendix A – Initial Screening Proforma

Distributional Impact Appraisal Screening Proforma

Scheme description: Slough Mass Rapid Transit Business Case

Brief description of scheme: A key objective of the Thames Valley Berkshire's Strategic Economic Plan is to improve urban connectivity by linking residential areas to mainline railway stations, employment, leisure, learning and retail centres. For Slough, a mass rapid transit solution is proposed, using dedicated rather than shared highway space. These systems will use smart technology as it becomes available at reasonable cost, and will be developed in phases.

The SMaRT scheme will alleviate a number of problems to bring benefits to the local population and businesses and to the wider economy. The major problems in the area and objectives defined to address them are presented below.

Scheme Objectives:

- Provide a high quality, safe, convenient and reliable alternative to the car and improve public perception of transport in Slough;
- Alleviate the severe congestion on the A4 by allowing better flow of traffic;
- Minimise the impact of noise and air pollution and greenhouse gases on the A4 corridor; and
- Support economic development in Slough and Heathrow.

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
User benefits	The TUBA user benefit analysis software or an equivalent process has been used in the appraisal; and/or the value of user benefits Transport Economic Efficiency (TEE) table is non-zero.	Yes. Providing high quality links will encourage the use of more sustainable modes of travel and help alleviate congestion. User benefits will be gained from such modal shift.		Yes.
Noise and Air Quality	Noise: Any change in alignment of transport corridor or any links with significant changes (>25% or <-20%) in vehicle flow, speed or %HDV content. Also note comment in TAG Unit A3. Air Quality:	Yes. Improving access to public transport and the integration of public transport services will help encourage modal shift from private vehicles. This supports the objective of a	Analysis needs to be undertaken to assess whether the key vulnerable groups will experience better or worse air quality as a result of the scheme. Air quality poses a risk to health, for certain groups in particular children under 16. There is a higher than	Yes. Need to assess the outputs from the air quality assessment to ascertain the distribution of impacts across income groups and children in the area. Indices of Deprivation 2010

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
	<p>Any change in alignment of transport corridor or any links with significant changes in vehicle flow, speed or %HDV content:</p> <ul style="list-style-type: none"> • Change in 24 hour AADT of 1000 vehicles or more • Change in 24 hour AADT of HDV of 200 HDV vehicles or more • Change in daily average speed of 10kph or more • Change in peak hour speed of 20kph or more • Change in road alignment of 5m or more 	<p>greener and safer transport system which also helps to improve the quality of life in the community.</p>	<p>average number of under-16s in the Scheme catchment.</p>	<p>and Census 2001 data will be used.</p>
Accidents	<p>Any change in alignment of transport corridor (or road layout) that may have positive or negative safety impacts, or any links with significant changes in vehicle flow, speed, %HGV content or any significant change (>10%) in the number of pedestrians, cyclists or motorcyclists using road network.</p>	<p>Yes.</p>	<p>Accident risk is more significant for children, young adults and older people. The area has a higher than average number of under 16s.</p>	<p>Yes.</p> <p>Further work is required to examine the existing accident clusters and explore how modelled changes in traffic levels will impact on accident levels in these locations.</p> <p>This will be combined with an assessment of the proportions and locations of children, older people and young adults in the scheme area.</p>
Security	<p>Any change in public transport waiting/interchange facilities including pedestrian access expected to affect user perceptions of personal security.</p>	<p>Yes.</p>	<p>Very limited design features have been incorporated to ensure that security issues are considered for pedestrians, cyclists and motor vehicle uses.</p> <p>Security impacts are likely to be concentrated in areas where there is a change in traffic levels</p>	<p>Yes.</p> <p>Further work is required to assess the locations of vulnerable users and identify scheme measures that will enhance the security of such users.</p>
Severance	<p>Introduction or removal of barriers to pedestrian movement, either through changes to road crossing provision, or through introduction of new public transport or road corridors. Any areas with significant changes (>10%) in vehicle flow, speed, %HGV content.</p>	<p>Yes.</p>	<p>Improving access to public transport and the integration of public transport services will help encourage modal shift from private vehicle. This supports the objective of a greener and safer transport system and improved safety along corridors which</p>	<p>Yes</p> <p>Further work is required to assess the locations of vulnerable users and the key facilities and destinations that are important to them within the local areas surrounding the</p>

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
			<p>also helps to improve quality of life in our communities.</p> <p>Severance impacts are likely to be concentrated along the scheme location where an increase in severance could occur or in local areas where reduced traffic means that severance is potentially reduced.</p>	<p>scheme.</p> <p>This information can then be used to identify scheme measures that will impact on severance levels in the local area.</p>
Accessibility	<p>Changes in routings or timings of current public transport services, any changes to public transport provision, including routing, frequencies, waiting facilities (bus stops / rail stations) and rolling stock, or any indirect impacts on accessibility to services (e.g. demolition & re-location of a school).</p>	<p>Yes.</p> <p>There are likely to be benefits in accessibility for public transport users due to journey time improvements and frequency improvements as a result of dedicated rather than shared highway running.</p>	<p>Accessibility is relevant to all vulnerable groups and as the area has a high level of BMEs (58.5%) and a number of deprived areas (in the 20% most deprived). It is important to understand the impact of the overall improvement to accessibility levels for these groups.</p> <p>The introduction of the Scheme and associated journey time reductions to bus services using the new route will likely improve access times to key services along the alignment.</p> <p>It is likely that any impacts will be concentrated in areas adjacent to the Scheme's route.</p>	<p>Yes.</p> <p>Further work is required to assess the locations of vulnerable users and identify scheme measures that will enhance the security of such users. This will make use of socio-demographic data.</p>

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Affordability	In cases where the following charges would occur; Parking charges (including where changes in the allocation of free or reduced fee spaces may occur); Car fuel and non-fuel operating costs (where, for example, rerouting or changes in journey speeds and congestion occur resulting in changes in costs); Road user charges (including discounts and exemptions for different groups of travellers); Public transport fare changes (where, for example premium fares are set on new or existing modes or where multi-modal discounted travel tickets become available due to new ticketing technologies); or Public transport concession availability (where, for example concession arrangements vary as a result of a move in service provision from bus to light rail or heavy rail, where such concession entitlement is not maintained by the local authority[1]).	There are no specific changes identified to fare structures that are likely to affect personal affordability.	No further steps required as scheme unlikely to have an impact.	No

Appendix B – Socio-demographic Assessment Figures

1. Proportion of Children (aged under 16 years) – Census 2011
2. Proportion of Young People (aged 16-25) – Census 2011
3. Proportion of Young Males (Aged 16-25) – Census 2011
4. Proportion of Older People (aged 70 and over) – Census 2011
5. Proportion of Black Minority Ethnic Population – Census 2011
6. Proportion of Non-car Households – Census 2011
7. Disability Living Allowance Claimants – April 2014
8. Proportion of Job Seekers Allowance Claimants – April 2014
9. Proportion of Women – Census 2011
10. Proportion of Households with Dependent Children – Census 2011

Figure 1 - Proportion of Children (aged under 16 years) – Census 2011

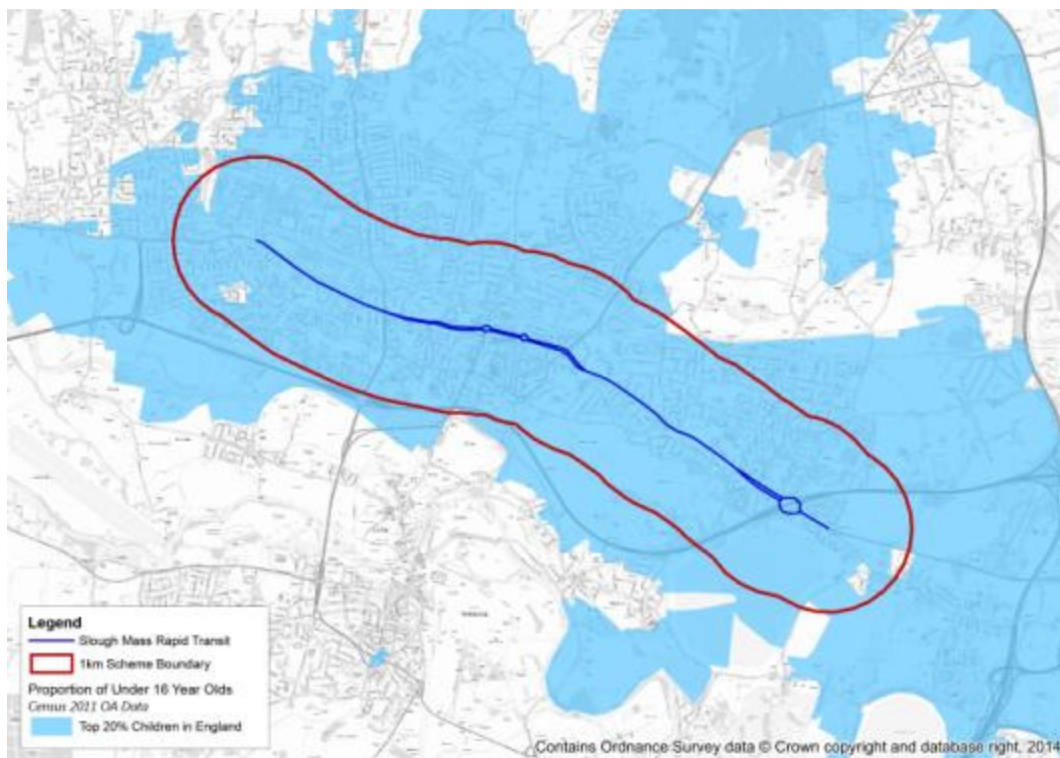


Figure 2 - Proportion of Young People - (aged 16-25) – Census 2011

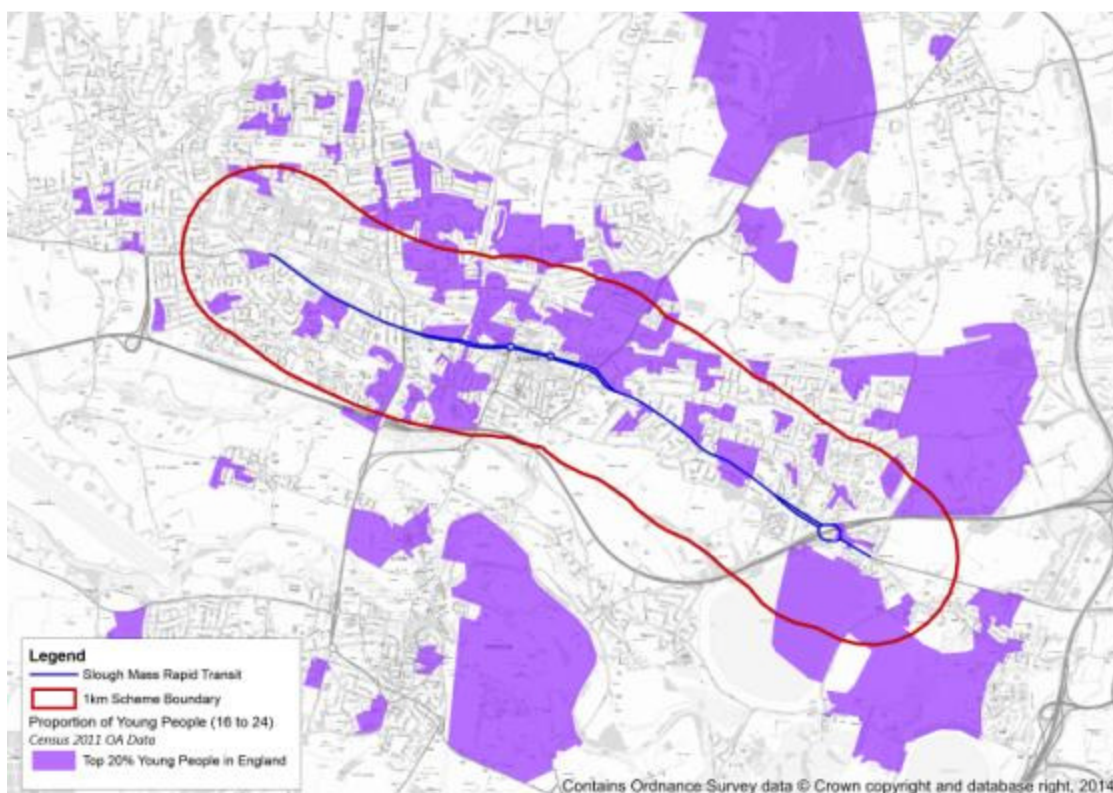


Figure 3 - Proportion of Young Males (aged 16-25) – Census 2011

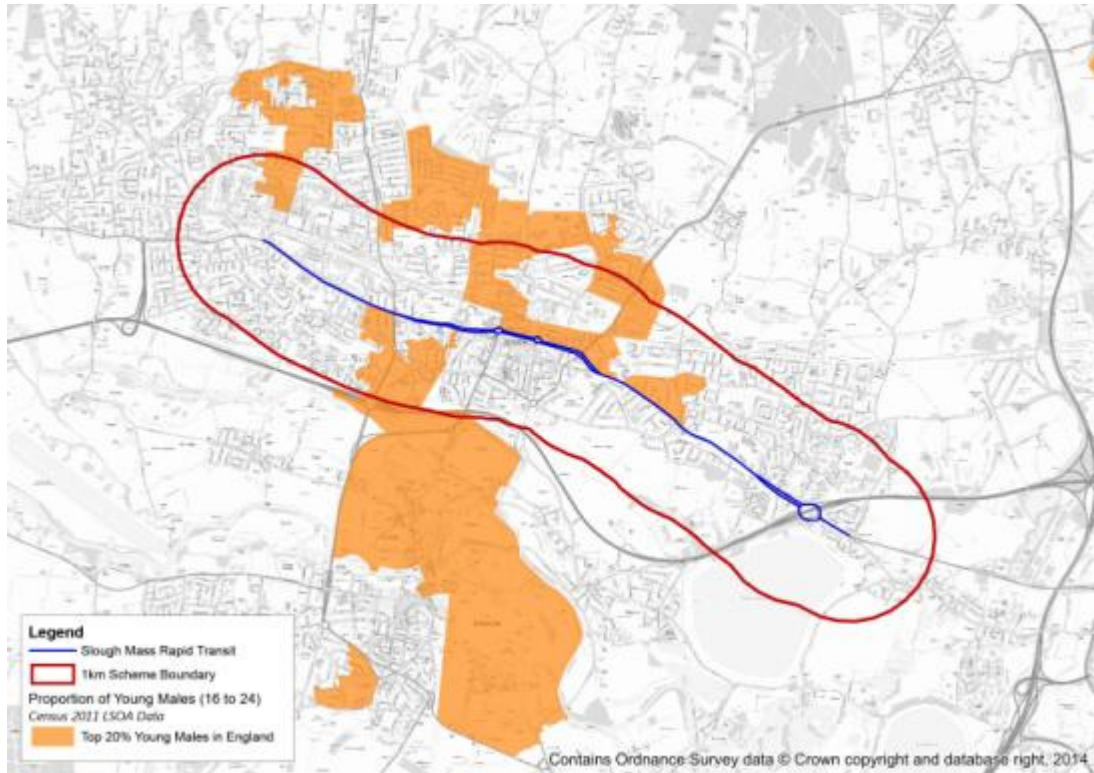


Figure 4 - Proportion of Older People (aged 70+) – Census 2011

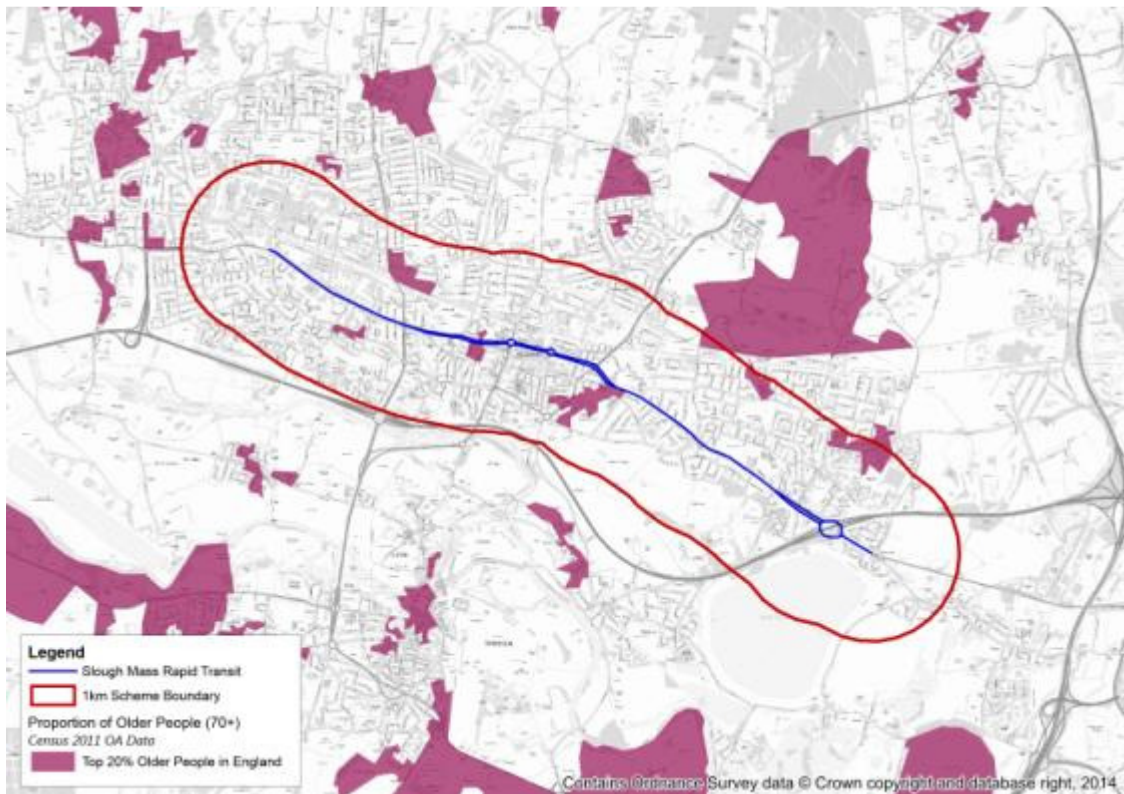


Figure 5 - Proportion of Black Minority Ethnic Residents - Census 2011

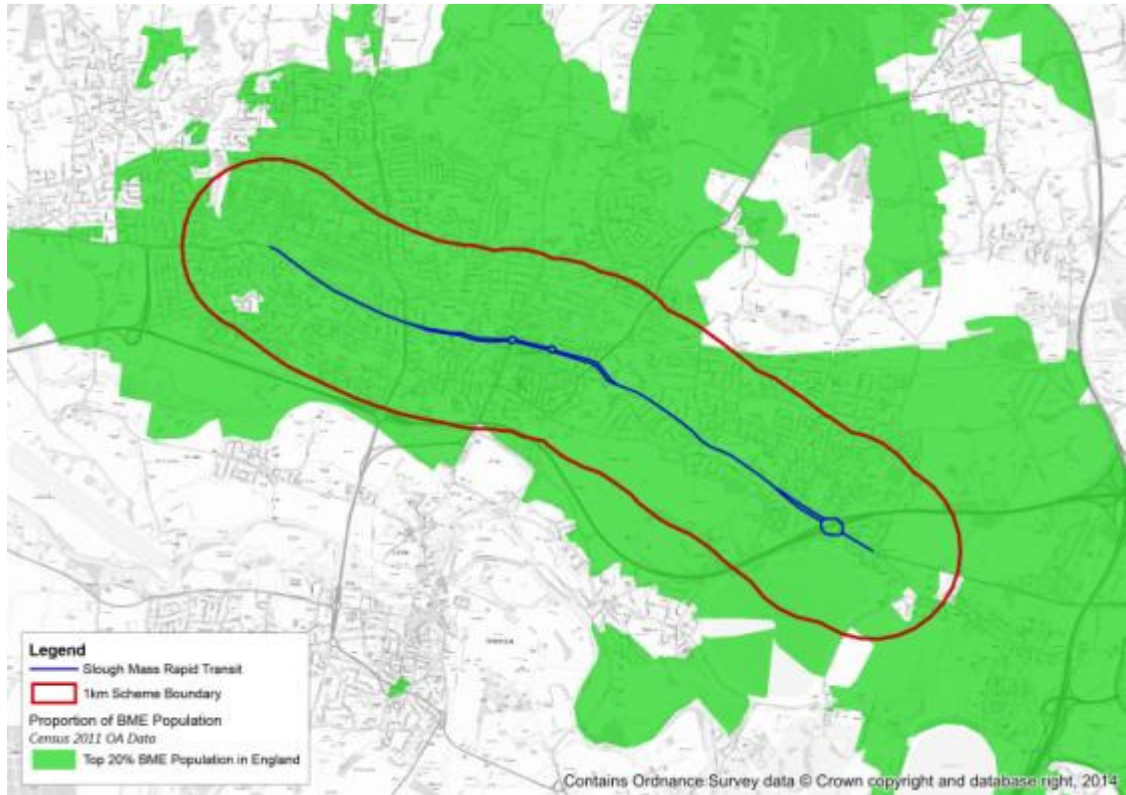


Figure 6 - Proportion of Households with No Car - Census 2011

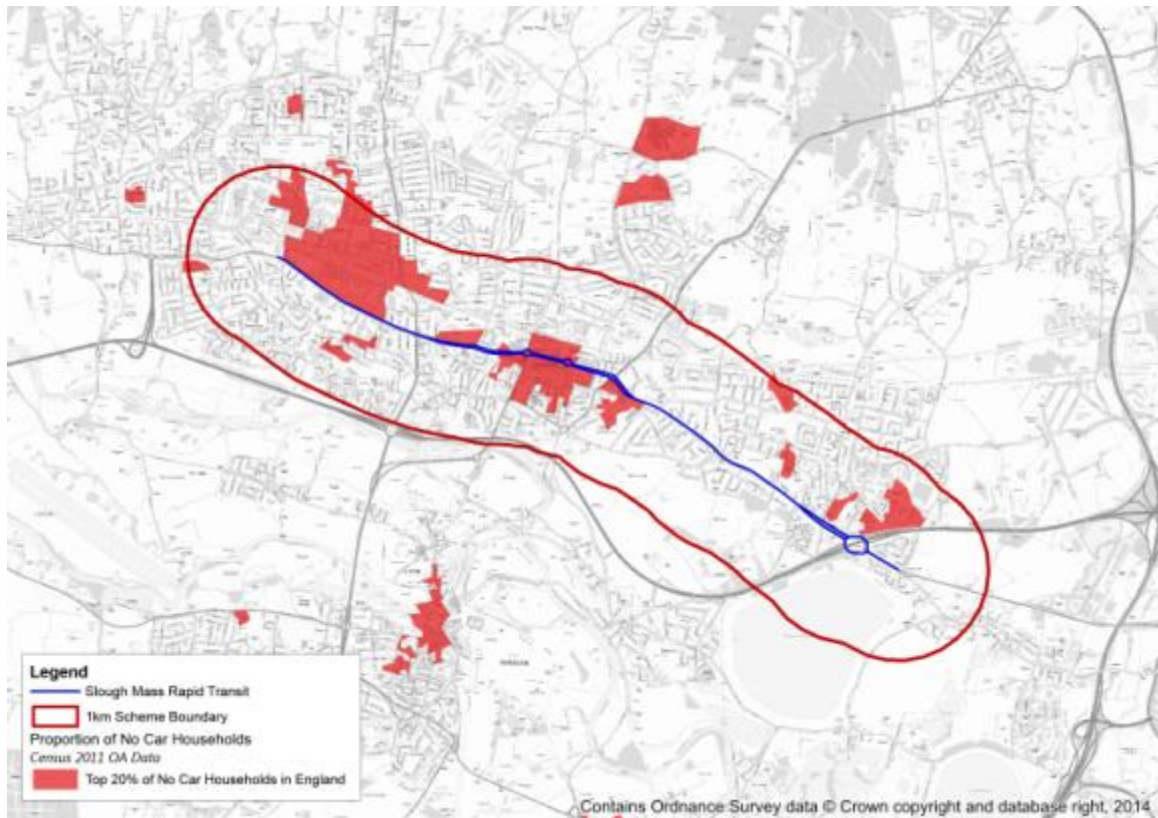


Figure 7 - Proportion of Population Claiming DLA

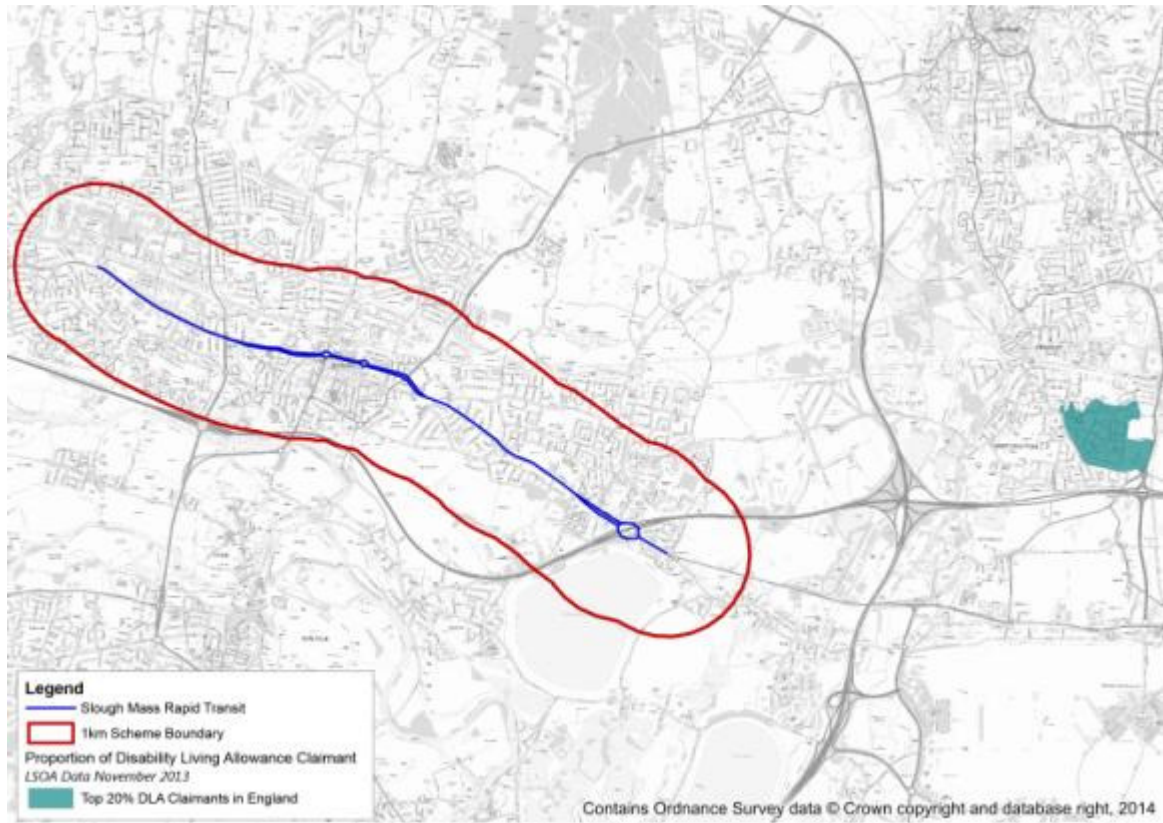


Figure 8 - Proportion of Population Claiming Job Seekers Allowance

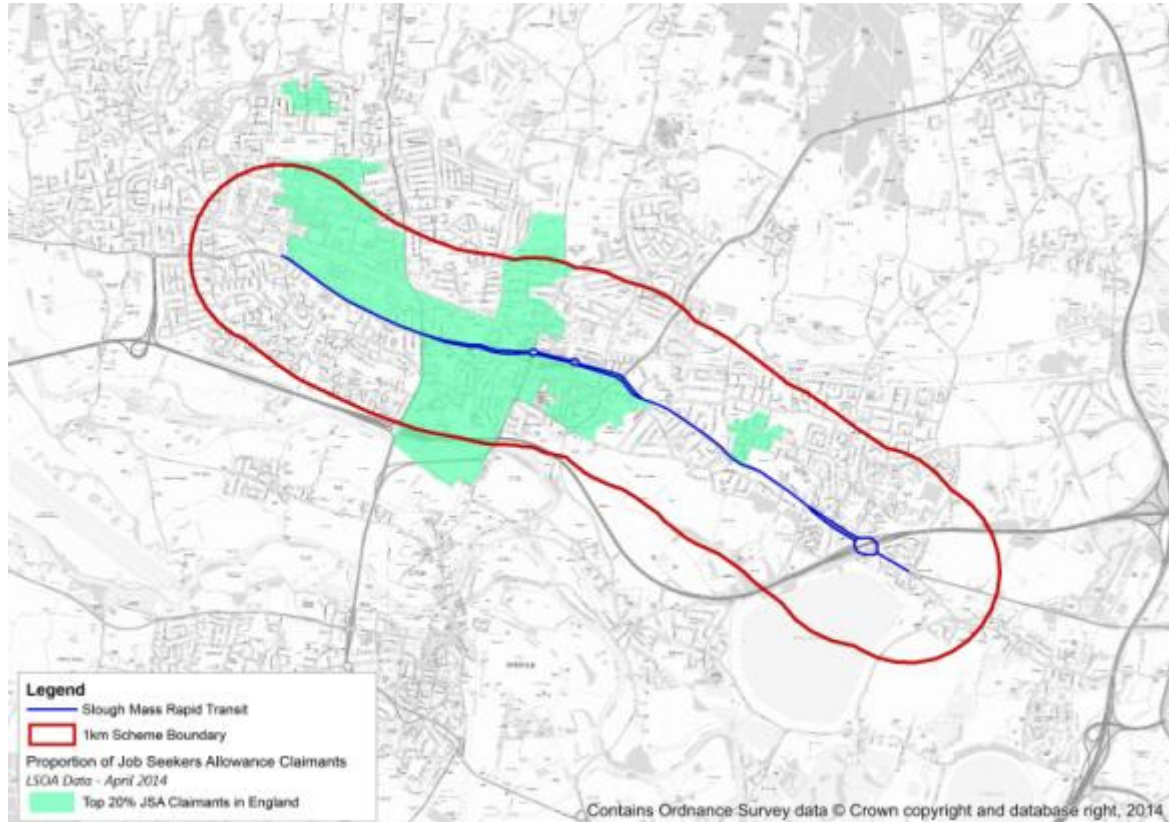


Figure 9 - Proportion of Female Population – Census 2011

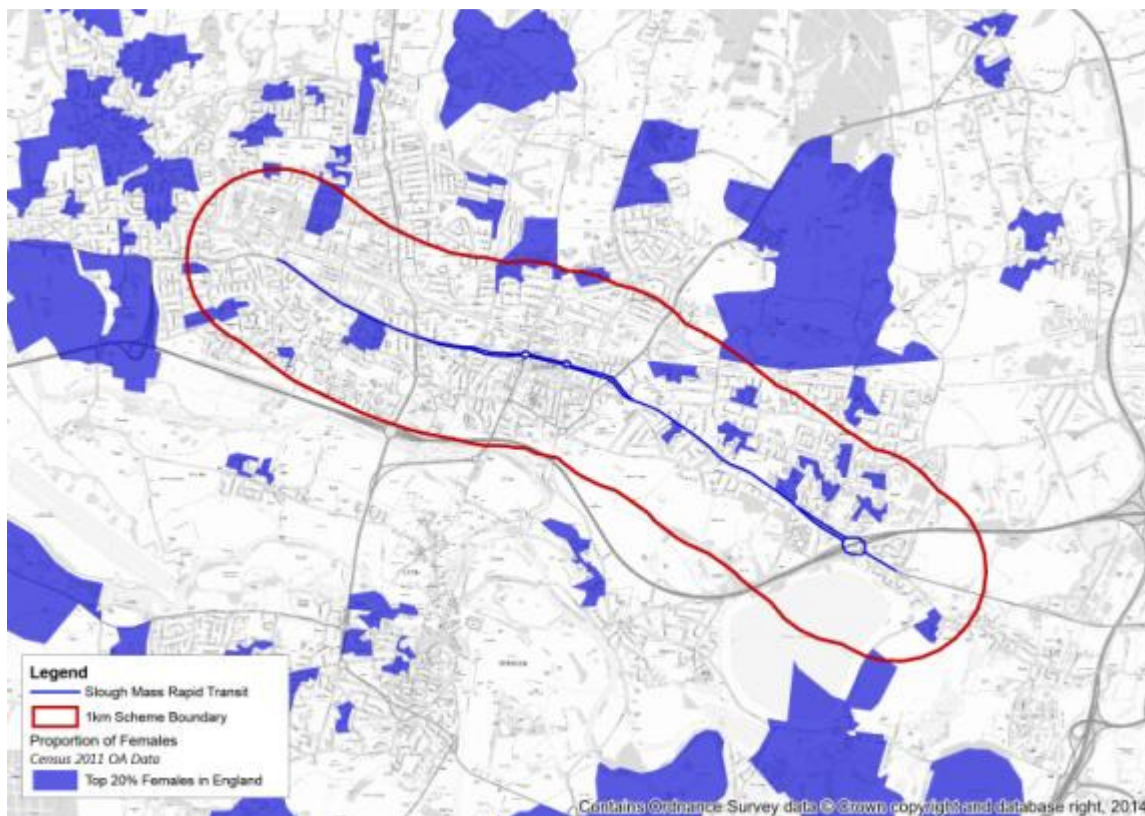


Figure 10 - Proportion of Population with Dependent Children – Census 2011

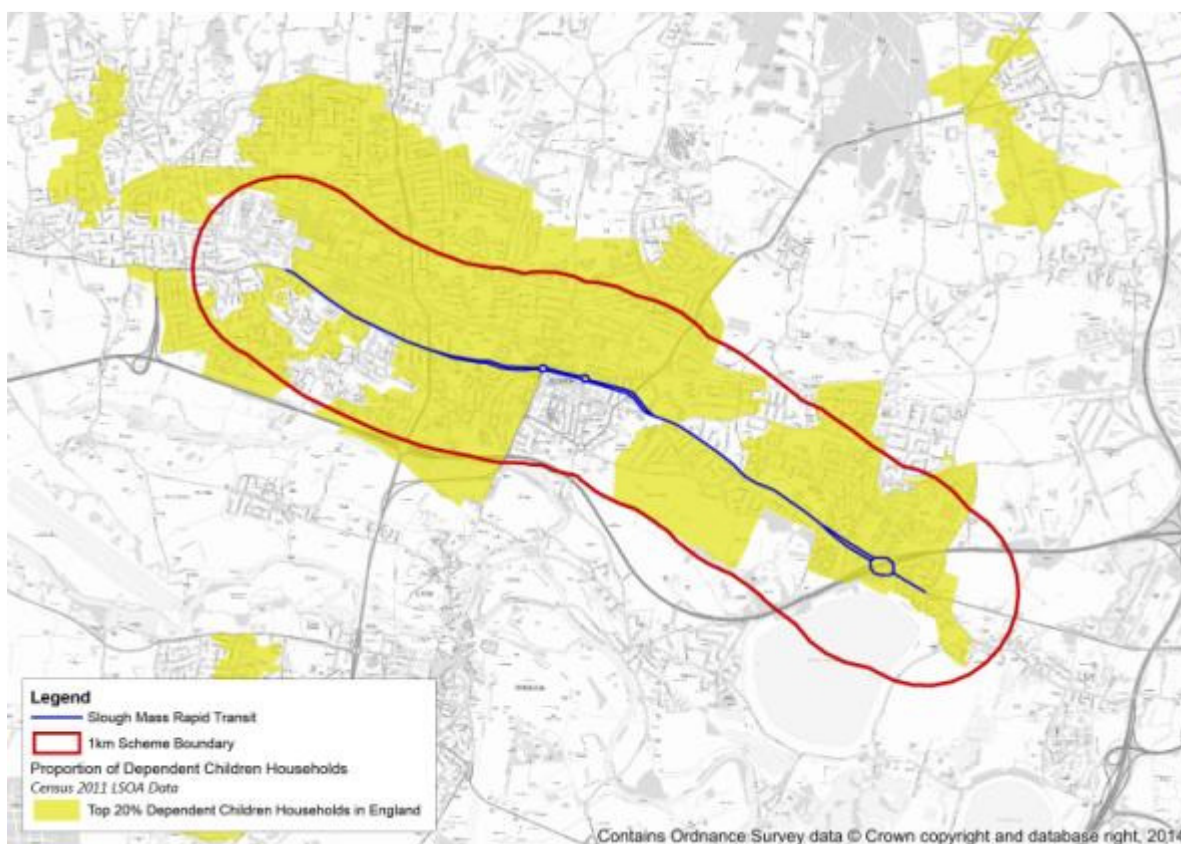


Figure 11 - Distribution of Overall Deprivation Groups – Indices of Deprivation 2010

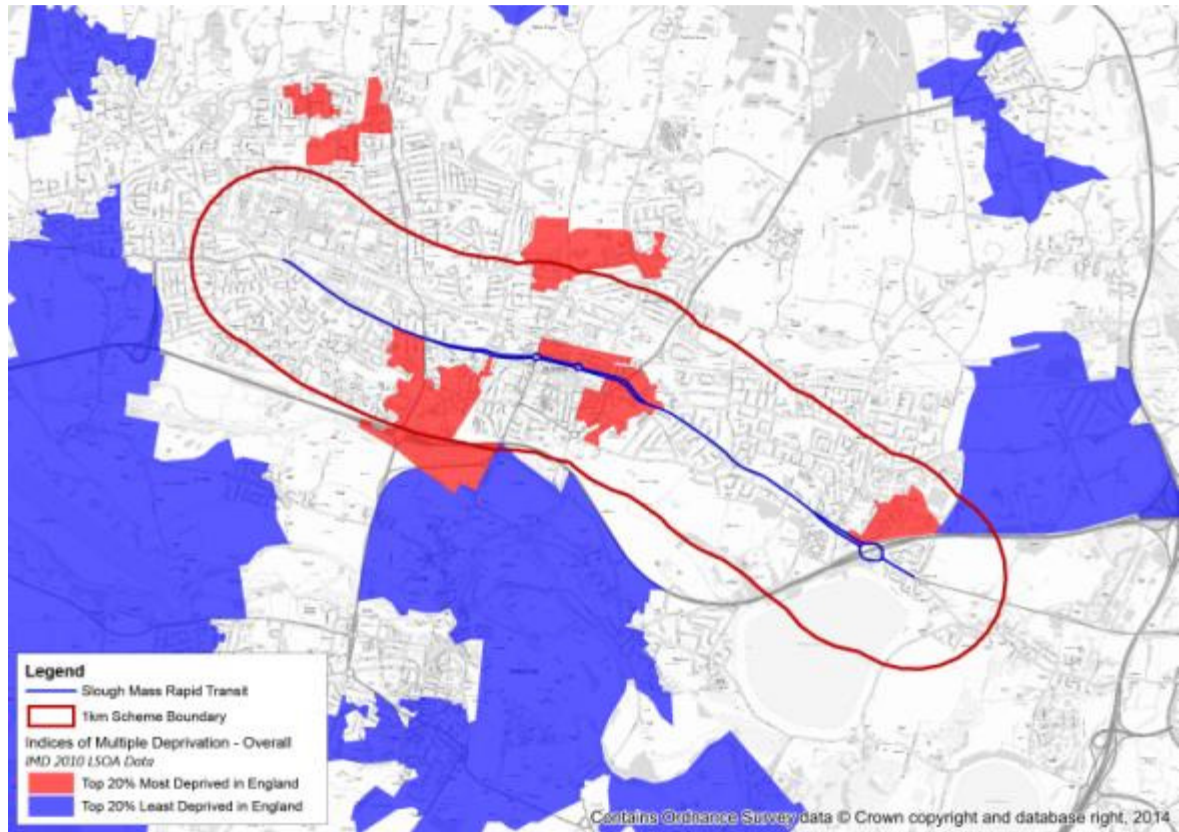


Figure 12 - Distribution of Income Deprivation Groups – Indices of Deprivation 2010

