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Shropshire Council

Shrewsbury North West Relief Road

Social and Distributional Impact Report

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Shrewsbury North West Relief Road

Social and Distributional Impact Report

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Introduction

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1 Introduction

1.1 Overview

1.1.1. This report details the findings of a Social and Distributional Impact (SDI) Appraisal undertaken for the Shrewsbury North West Relief Road (NWRR), hereby referred to as the 'scheme' for the purposes of this analysis.

1.1.2. This report should be read in conjunction with the Economic Dimension of the Full Business Case (FBC) that details the economic case for the scheme and the overall assessment of Value for Money (VfM). This report discusses the overall impact of the scheme and how costs and benefits are distributed across different social and vulnerable groups.

1.1.3. The NWRR scheme is located in the north-west of Shrewsbury. It will provide a new shorter and more direct link between the northern and western parts of Shrewsbury that are currently very poorly linked due to a lack of available highway infrastructure. It will comprise the following:

- A 7.3m wide single carriageway all-purpose 4.85km long road with 1.0m margins and a permitted speed limit of 60 mph, located in the north-west of Shrewsbury connecting the eastern end of the proposed Oxon Link Road (OLR) with the western end of the existing Battlefield Link Road that provides access to the Battlefield Enterprise Park
- The NWRR will include a shared 3m wide footway / cycleway along the length of its southern side, addressing the severance of a number of local roads, footpaths and Public Rights of Way (ProW)
- Construction of an equestrian culvert to divert the existing bridleway just to the east of the B4380 Holyhead Road Roundabout under the NWRR, maintaining connectivity for pedestrians, equestrians, mammals and bats
- A 15.5m wide viaduct, approximately 584m in length, crossing the River Severn and its floodplain
- Two additional flood storage areas will be provided as a result of the works impinging the existing flood plain
- Landscaping, drainage schemes, increased flood storage, planting, and environmental mitigation work including the acquisition of Hencott Pool to enable habitat improvements
- Provision of a new at-grade four arm roundabout located on the B5067 Berwick Road to provide an interface between the NWRR and the B5067 Berwick Road
- A vehicular bridge to carry the NWRR over the Shrewsbury to Chester railway line
- Construction of an overbridge to carry the Marches Way Footpath and Accommodation Track over the NWRR
- Replacement of the existing at-grade five-arm A528 Ellesmere Road roundabout with two at-grade four-arm roundabouts in a 'dumb-bell' configuration

1.1.4. The Shrewsbury transport modelling suite was developed for Shropshire Council by WSP to support the Outline Business Case (OBC) for the NWRR and consists of a SATURN

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highway assignment model combined with a Variable Demand Model in CUBE. The FBC uses the same transport modelling suite with updated forecasts, using the latest National Trip End Model (NTEM) forecasts, updated planning assumptions (from an updated uncertainty log) and latest scheme programme.

1.1.5. The SDI report makes extensive use of the model outputs to determine the overall impacts and how these impacts are distributed across different social and vulnerable groups. Where this is not the case, the SDI provides a qualitative assessment of social and distributional impacts, supplemented by quantitative measures, where appropriate.

1.2 Scheme Background

1.2.1. Shrewsbury is located 47 miles west of Birmingham, and 12 miles east of the border with Wales, and is the principal town and administrative centre of Shropshire. It is an historic market town, which serves as a cultural and commercial centre for Shropshire and a large area of mid-Wales. It lies at the intersection of the A5, A458 and A49 (south) which are all part of the Strategic Road Network (SRN). Shrewsbury is also the focal point for other principal roads including the A53 (north) and the A49 (north) that are part of the Major Road Network (MRN) and the A458 (east) the A488 (west). The surrounding area is rural and sparsely populated.

1.2.2. Shrewsbury's defining physical characteristic is an almost complete natural loop of the River Severn, within which the mediaeval town developed. The river loop now encloses the present-day town centre, which has just three main points of entry by road and a largely unaltered medieval street pattern.

1.2.3. Present day Shrewsbury extends over a much wider area, with suburban development, mainly from the 19th and 20th centuries, extending outward from the river loop. There are out-of-town supermarkets and shopping centres to the north and south. Some traditional industry remains to the north of the town and there are newer employment areas at Battlefield to the north and London Road to the south east.

1.2.4. The suburbs of Shrewsbury form a broad crescent from Harlescott in the north to Copthorne and The Mount in the west. Within this crescent lie the main schools, colleges, hospitals, and public and private sector employment areas.

1.2.5. By contrast, the north-west sector of Shrewsbury is generally undeveloped and is mainly comprised of agricultural land. Settlement is sparse, with small, isolated farmsteads and households (properties) scattered through the landscape. The River Severn meanders through this area, with steep wooded valley slopes and extensive floodplains, forming one of the main physical barriers dividing the landscape. The area is crossed by the Shrewsbury to Chester railway line, and by footpaths and other PRoW.

1.2.6. Currently, links between the northern and western parts of Shrewsbury are very poor with north-west corridor through traffic having to use one of five main route options involving one of two routes passing through the town centre, the inner distributor ring road, the existing A5 / A49 outer bypass, or unsuitable and narrow local roads to the north-west of the town.

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1.2.7.   Together with the A5 and A49 bypasses, the Battlefield Link Road and the planned OLR, the NWRR will provide the 'missing link', completing the full ring of the outer bypass of Shrewsbury.

1.2.8.   As north-west corridor through traffic transfers to this new route, the existing north-west corridor through route options will all experience lower flows and congestion levels, and other journeys within and around the town will also be able to transfer to more appropriate routes within the town's road hierarchy, reducing journey times and increasing the capacity and resilience of the local and strategic highway network.

1.2.9.   In addition, with the outer bypass ring complete, all long distance through journeys will be able to bypass the town completely and vehicles will have the choice of travelling in either direction around the outer bypass based on their optimal route, helping to smooth flows out during periods of peak demand, reducing congestion levels, improving journey times and enabling the entire transport network to operate more efficiently and reliably.

1.2.10. The NWRR aims to improve the quality of life for people in Shrewsbury through supporting the delivery of the Shrewsbury Big Town Plan[1] and boosting the economic competitiveness of Shrewsbury and Shropshire by providing better connectivity and accessibility for both businesses and communities. In particular, the transfer of north-west corridor through traffic from routes passing through the town centre to the NWRR will reduce traffic volumes and congestion on both the northern and western approaches and on the Station Gyratory and Smithfield Road within the town centre. This in turn will:

   ■ Reduce traffic noise and improve air quality in areas where people shop, work and live, and specifically within the town's Air Quality Management Area
   ■ Support the delivery of Shropshire's Bus Service Improvement Plan (BSIP) by making bus journeys quicker, more reliable and more attractive
   ■ Facilitate the potential road space reallocation required to deliver new active mode infrastructure, supporting the delivery Shropshire's Local Walking and Cycling Improvement Plan (LCWIP) and encourage further modal shift to active modes of travel
   ■ Improve road safety within the town centre
   ■ Increase the attractiveness of Shrewsbury town centre, encouraging further regeneration and inward investment to help Shrewsbury become a better place in which to live, visit and work

1.2.11. The new river crossing provided as part of the scheme will enhance the resilience and reliability of Shrewsbury's transport network as it will add a flood resistant route to the existing network which is prone to frequent significant flooding events. Not only would the

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[1] Shrewsbury Big Town Plan, 2018

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scheme provide a flood resistant route for north-west corridor traffic, by completing the outer bypass it would enable the outer bypass to operate more optimally during times of disruption with traffic able to utilise it in either direction to navigate around any blockages within the local road network.

1.2.12. The shared 3m wide footway and cycleway that will be provided adjacent to the southern side of the carriageway will provide a significant new addition to the areas active travel network, opening up new journey opportunities and helping to facilitate the increased use of active modes and address the severance of a number of local roads, footpaths and PRoW.

1.2.13. The proposed scheme also includes the diversion of the existing Marches Way Footpath and Accommodation Track onto a new overbridge over the carriageway and the diversion of the existing bridleway and footpath to the east of the B4380 Holyhead Road Roundabout underneath the new carriageway via an equestrian culvert, maintaining these key active travel links.

1.2.14. The specific, or intermediate, objectives of the scheme are:

- To improve connectivity and accessibility between the north and west of Shrewsbury for all modes
- To reduce traffic congestion across Shrewsbury
- To improve network efficiency, resilience and journey time reliability
- To reduce rat-running traffic on unsuitable rural roads to the north-west of the town
- To improve facilities for active transport
- To reduce the number of accidents and casualties on roads in Shrewsbury
- To minimise the greenhouse gas impacts associated with the scheme
- To improve local air quality in Shrewsbury town centre
- To support local economic growth and productivity
- To support the delivery of planned local housing growth and development

1.2.15. To improve the quality of life for people in Shrewsbury

1.2.16. Figure 1-1 shows the location of the scheme.

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Figure 1-1 – Scheme location
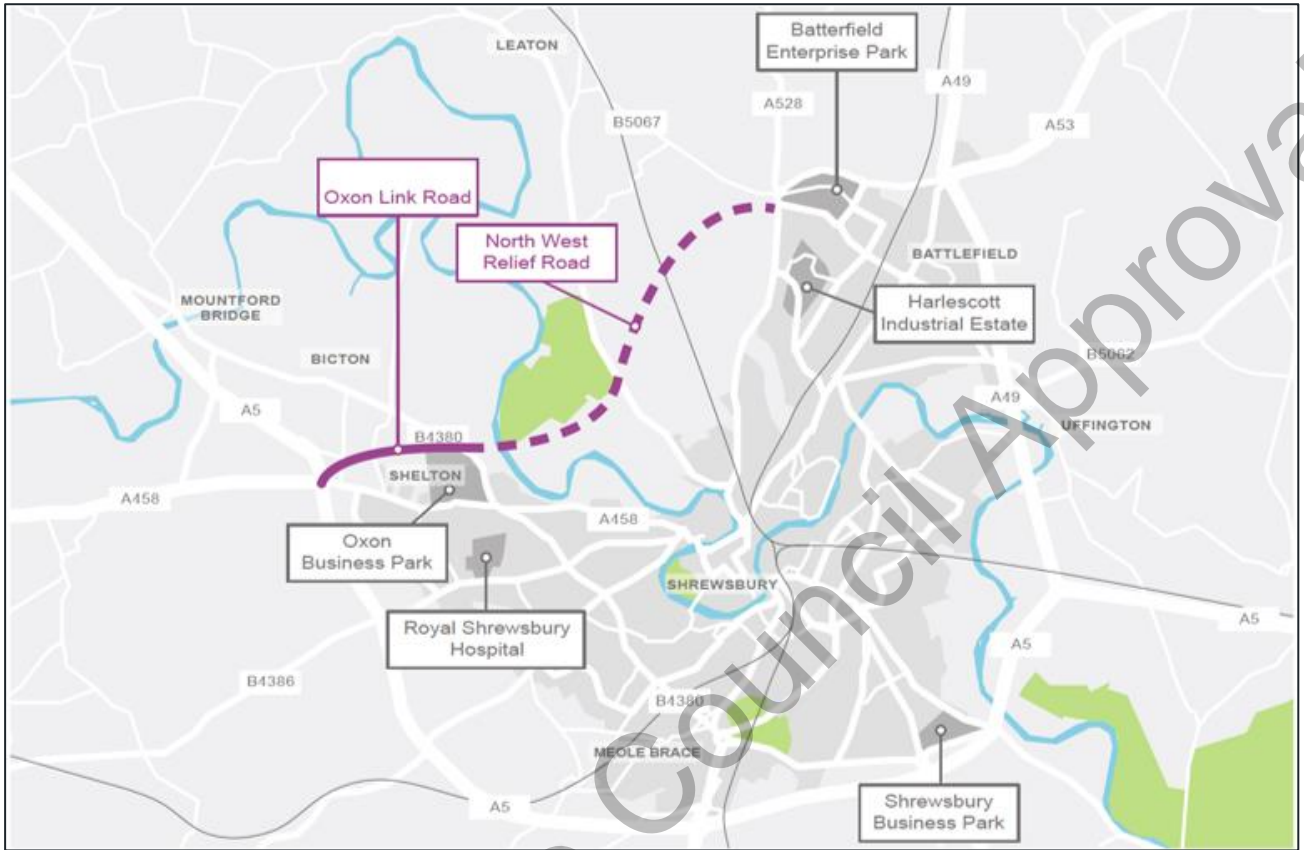
1.3 SDI Process

1.3.1. Social impacts consider the human experience of a transport intervention and its impact on social factors, while Distributional Impacts (DIs) consider the variance of impacts across different social and vulnerable groups. The analysis of Social and Distributional Impacts (SDIs) is undertaken in accordance with DfT Transport Analysis Guidance (TAG) Unit A4-1: Social Impact Appraisal (November 2022) and TAG Unit A4-2: Distributional Impact Appraisal (May 2024). The assessment is mandatory in the appraisal process and is a component part of the Appraisal Summary Table (AST).

1.3.2. Beneficial and adverse impacts are considered, along with the identification of social and particularly vulnerable groups that are likely to be affected by scheme implementation. The indicators considered for social and distributional impacts are shown in Table 1-1 .

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Table 1-1 – Indicators considered for social and distributional impacts

Indicator	Social Impact	Distributional Impact
User benefits		✓
Noise		✓
Air quality		✓
Accidents	✓	✓
Physical activity	✓	
Security	✓	
Severance	✓	✓
Journey quality	✓	
Option values and non-use values	✓	
Accessibility	✓	
Personal affordability		✓

1.3.3. Figure 1-2 shows how different outcomes are measured and the comparison of different scenarios constructed for transport user benefits and costs, wider economic impacts and the qualitative appraisal of the social and environmental impacts.

Figure 1-2 – SDI methodology
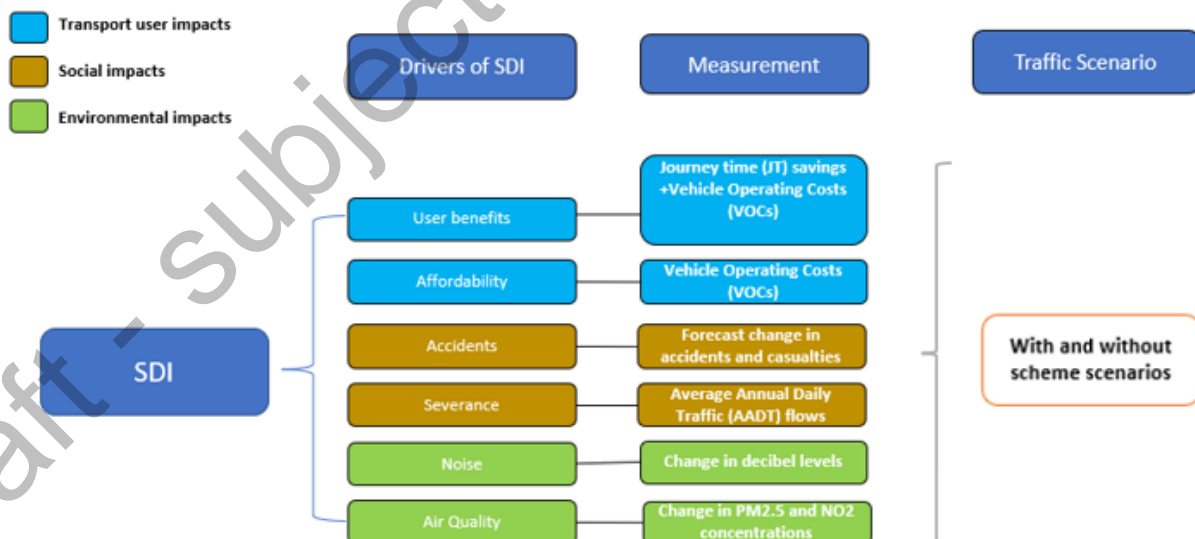
1.4 Social Impacts

1.4.1. Social impacts consider the overall impact of transport interventions on different indicators such as numbers of accidents, physical activity, security, severance, journey quality, option

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and non-use value and accessibility. The analysis is undertaken in accordance with TAG guidance Unit A4.1 and is a constituent of the Appraisal Summary Table (AST). Both beneficial and/or adverse impacts of transport interventions are considered, along with the identification of social groups likely to be affected.

1.5 Distributional Impacts

1.5.1. The appraisal of DI focuses on eight specific impacts, as detailed above, with more detail provided in Table 1-2.

Table 1-2 – The eight distributional impacts

TAG Unit	Summary of Importance
User Benefits (TAG Unit A4.2.2)	It is important to gain an understanding of the distribution of user benefits by social group and by area. This analysis assists in understanding how user benefits accrue to different groups in society and across a geographic area. Analysing a wider area outside of the immediate vicinity of the intervention is vital as user benefits are often generated significantly beyond the immediate area of the scheme Note that DI analysis is only applicable for individuals and not in-work trips experienced by businesses
Noise (TAG Unit A4.2.3)	It is important to understand the distributional effects of changes to noise generated by the transport intervention – both in terms of improvements and deterioration. Changes in noise levels resulting from the intervention will be experienced to varying extents in different areas and by different groups of people. It is therefore important to understand the noise-related social and distributional impacts of a scheme
Air Quality (TAG Unit A4.2.4)	Changes in emission levels resulting from the transport intervention will vary by location and social group. It is therefore important to understand the distribution of air quality changes – both in terms of improvements and deteriorations
Accidents (TAG Unit A4.2.5)	Transport schemes can have significant impacts on safety and accidents and as these issues can have varying impacts on different areas and social groups, it is important to understand the specific impacts of an individual scheme
Severance (TAG Unit A4.2.6)	Transport interventions can result in changes to levels of severance within the transport network through influencing traffic flows and providing new infrastructure. As severance issues impact on different social groups and areas to differing extents, it is important to analyse how individual scheme will alter levels of severance
Security (TAG Unit A4.2.7)	Transport schemes can have impacts on personal security (both real and perceived) and these benefits can differ according to area and social group. It is, therefore, important to gain an understanding of the social and distributional impacts of the transport intervention from the personal security perspective
Accessibility (TAG Unit A4.2.8)	Access to services often presents significant difficulties to certain social groups and those living remotely. Transport interventions can have an impact of the ability of people to access services they require
Personal Affordability (TAG Unit A4.2.9)	Changes in costs (both increases and reductions) need to be assessed in terms of understanding the social and distributional effects. Any changes in transport costs due to changes to the transport network could impact on the lower income groups

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1.5.2. Table 1-3 sets out the groups of people to be identified in the analysis for each of the indicators listed above.

Table 1-3 – Social groups and DI indicators

Dataset / Social Group	User Benefits	Noise	Air Quality	Accidents	Severance	Security	Accessibility	Personal Affordability
Income distribution	✓	✓	✓				✓	✓
Children (proportion of population aged under 16)		✓	✓	✓	✓	✓	✓	
Young adults (proportion of population aged 16 to 25				✓			✓	
Older People (proportion of population aged 70+)		✓	✓	✓	✓	✓	✓	
Proportion of population with a disability					✓	✓	✓	
Proportion of population of Black and Minority Ethnic (BME) origin						✓	✓	
Proportion of households without access to a car					✓		✓	
Carers (proportion of households with dependent children)							✓	

1.5.3. The distribution of impacts amongst different social groups is important due to the way they experience transport investment in infrastructure and services differently. For example, people with access to a car may experience less benefits to those without a car for an intervention that improves local public transport services.

1.5.4. It is important to consider vulnerable groups and demonstrate that they are not disadvantaged further by receiving a disproportionately low share of the scheme's benefits, or a disproportionately high share of the scheme's disbenefits.

1.6 Report Structure

1.6.1. This report is structured as follows:

- **Chapter 1:** Overview and Methodology for the SDI
- **Chapter 2:** Social Impact Appraisal, following guidance and the appraisal approach recommendations contained in TAG Unit A4-1
- **Chapter 3:** Distributional Impact Appraisal, following guidance and the appraisal approach recommendations contained in TAG Unit A4-2

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1.6.2. A three-step approach for the assessment of distributional impacts has been conducted across eight indicators that form the DI appraisal. This also follows guidance and is aligned with the process and methodology contained in TAG Unit A4-2

- **Step 1 – Screening Process**:

    - Identification of likely impacts for each indicator

- **Step 2 – Assessment:**

    - Confirmation of the area impacted by the transport intervention (impact area)
    - Identification of social groups in the impact area
    - Identification of amenities in the impact area

- **Step 3 – Appraisal of Impacts:**

    - Core analysis of the impacts
    - Full appraisal of DIs and input into the Appraisal Summary Table (AST)

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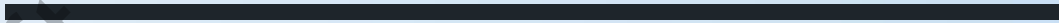
Social Impacts

2 Social Impacts

2.1 Accidents

2.1.1. The scheme can influence the number of accidents and resulting casualties and so it is important to examine changes in accidents and casualty levels as there are significant costs associated with accidents for individuals, the government and private businesses.

2.1.2. To appraise the safety impact of the scheme, DfT's COBALT (Cost and Benefit to Accidents Light Touch) accident appraisal software (v2.7 - June 2024) was used, with the appraisal being undertaken over a 60-year period.

2.1.3. Observed STATS19 Personal Injury Accident data was extracted from the Government website for 2016, 2017, 2018, 2019 and 2022 (the latest five years available, excluding the COVID-19 pandemic affected years of 2020 and 2021) and assigned to the appropriate links or junctions across the SATURN traffic model network.

2.1.4. The final COBALT assessment network included only roads where the SATURN traffic model predicted a significant change in flow (taken to be a change in flow of 10% or more). Local accident data was utilised, where available, and default accident rates (national average) provided in TAG Data Book v1.23 (May 2024) were used.

2.1.5. Across the five assessed years, within the modelled area there were 683 accidents, of which 12 were fatal, 144 were serious and 527 were slight. In total there were 920 casualties.

2.1.6. Figure 2-1 highlights that the majority of these accidents are located inside of, or around, the outer bypasses with clusters of accidents located in the vicinity of the main junctions on the A5 / A49 outer bypasses; on the A5112 / A5191 northern approach; on the B4386 western approach; and at Meole Brace, Reabrook and Heathgates Roundabouts on the B4380 / A5112 inner distributor ring road. There are also accident clusters within Shrewsbury town centre area.

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Figure 2-1 – Location and severity of the majority of accidents

2.1.7. The COBALT analysis found that, over the 60-year period, there is forecast to be a 256 less personal injury accidents with the scheme in place, resulting in 275 less casualties. This forecast accident and casualty reduction due to the scheme results in a net benefit of **£4.705m** in 2010 Present Values (2010 PV).

2.1.8. Additionally, the DfT's Active Mode Appraisal Toolkit (AMAT) (May 2024) has been used to assess the safety impacts associated with modal shift away from cars and taxis to walking and cycling. This is based on a reduction in distance travelled by motorised transport and the impact on accidents from this lower car usage.

2.1.9. In line with TAG, the appraisal utilising the AMAT was undertaken over a 40-year appraisal period, and it forecast to be a negligible net accident saving of **£25** (2010 PV).

2.1.10. These impacts are not considered to double count those estimated in COBALT as the SATURN model does not account for modal shift to active modes, and the wider impacts of this.

2.1.11. Taking the above analysis into account, the overall impact on all social groups has been assessed as **Moderate Beneficial**.

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2.2 Physical Activity

2.2.1. TAG Unit 4-1 notes that transport and the physical environment both play a major role in the amount of physical activity that people are engaged in on a day-to-day basis. There is a recognised relationship between transport, environment, and health. Dedicated cycle and pedestrian routes are expected to encourage and promote physical activity by providing a safe and efficient route for active travel.

2.2.2. The NWRR includes a shared use path, providing segregation for pedestrians and cyclists, will be delivered as part of the scheme. This will promote the use of active modes, resulting in health benefits to local residents who use the path for some or all of their journey.

2.2.3. The Active Mode Appraisal User Guide (May 2022) sets out the benefits from increased physical activity attributable to active travel. This involves the estimation of reduced risk of premature death resulting from changes to the number of individuals that walk and cycle, as well as the improvement in general health of users that reduces the number of 'sick days' and increase economic activity.

2.2.4. The economic appraisal of physical activity captures the health benefits of any change in the number of people travelling by active modes and the ensuing benefits resulting from modal shift. These benefits are based on additional users linked directly to scheme induced demand estimated in paragraph 2.5.7. Over the 40-year appraisal period, the health benefits associated with the scheme were estimated by the AMAT at approximately **£0.155m** (2010 PV).

2.2.5. There are also wider measures as part of the scheme that improve active travel and equestrian provision on existing routes that have not been quantified as part of the assessment.

2.2.6. Overall, the physical activity impact has been assessed as **Slight Beneficial**.

2.3 Security

2.3.1. TAG Unit A4.1 identifies six indicators that should be considered as part of the security appraisal, including:

- Site perimeters, entrances and exits
- Formal surveillance
- Informal surveillance
- Landscaping
- Lighting and visibility
- Emergency call

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Table 2-1 – Security assessment table

Security Indicator	Relative Importance (High/Medium/Low)	Without Scheme (Poor/Moderate/High)	With Scheme (Poor/Moderate/High)
Site perimeters	Low	Low	Low
Entrances and exits	Low	Low	Low
Formal surveillance	Low	Low	Low
Informal surveillance	Low	Low	Low
Landscaping	Medium	Low	Moderate
Lighting and visibility	Medium	Low	Moderate
Emergency call	Low	Low	Low

2.3.2. The scheme includes additional planting and landscaping, and street lighting will be provided along its length which will enhance user security. However, the overall impact on security of the scheme is expected to be **Neutral**.

2.4 Severance

2.4.1. Community severance is defined in TAG Unit A4-1 as the separation of residents from facilities and services they use within their community because of significant changes in transport infrastructure or by changes in traffic flow.

2.4.2. Together with the A5 and A49 bypasses, the A5124 Battlefield Link Road and the planned OLR, the NWRR will provide the 'missing link', completing the full ring of the outer bypass of Shrewsbury and providing a new, more direct route between the northern and western parts of Shrewsbury. With the outer bypass ring complete, all long distance through journeys will be able to bypass the town centre, reducing flows and congestion levels within the town centre, thereby reducing severance for pedestrians.

2.4.3. In particular, the University Centre Shrewsbury campus, Severn Theatre and Frankwell Car Park see high volumes of pedestrian flow and are accessed via narrow footpaths, along the narrow roads within Frankwell. The main junctions in this area also have poor visibility for pedestrians crossing. Therefore, as traffic transfers to the scheme and flows decrease, levels of severance experienced in this area will fall significantly.

2.4.4. In addition, with the north and west of the town now linked by a shorter more direct route, movement between existing and planned residential and employment areas in the north and west will be much easier, reducing the level of severance.

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2.4.5. Based on the severance criteria in TAG A4.1, although there will be a significant fall in severance in parts of the town centre, such as Frankwell, across the remainder of the impact area of the scheme, severance levels will be impacted to a far lesser extent and so the overall severance impact is considered to be **Moderate Beneficial**.

2.5 Journey Quality

2.5.1. TAG Unit A4-1 suggests that in most cases, travel is derived demand that arises from the people's desire to access other services and engage in other activities. As such, a poor journey experience is easily noticed by travellers.

2.5.2. Journey quality impacts can be sub-divided into the following three groups:

- **Traveller care**. Aspects such as cleanliness, level of facilities, information and the general transport environment.
- **Traveller views**. The view and pleasantness of external surroundings in the duration of journeys.
- **Traveller stress**. This is based on frustration, fear of potential accidents and route uncertainty

2.5.3. TAG Unit A4-1 notes that, to arrive at an overall impact score for quality of journey, the analysis should use the following guidelines:

- **Neutral**, if the assessment for all or most of the sub-factors is neutral or if improvements on some sub-factors are balanced by a deterioration in others
- **Beneficial or Adverse** if the change in impact across sub-factors is on balance better or worse
- **Slight, Moderate, Large** where the number of travellers affected per day is low (less than 500), medium (500 to 10,000), or high (more than 10,000)

Vehicles

2.5.4. For vehicles, the scheme is expected have minimal impact of aspects of traveller care. However, those vehicles transferring to the NWRR will experience quicker and smoother journeys, reducing frustration levels. They will also no longer use the local narrow residential roads in the town centre that are not designed to modern standards and often given rise to potential conflicts with the high number of active mode users.

2.5.5. In addition, the segregated path for active modes and the additional infrastructure taking several existing ProW over or under the NWRR further reduces the potential for conflict with other modes.

2.5.6. The road hierarchy is also expected to operate more optimally once the scheme has opened and so, across the town, the road network is expected to operate more efficiently reducing driver frustration levels even for those drivers not using the scheme. As the network efficiency improves, route choice is expected to be less impacted by congestion levels and so become more predictable for drivers.

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2.5.7. The overall journey quality impact on vehicles has been assessed as **Large Beneficial** as, whilst traveller care is considered neutral, both travellers views and travellers stress are considered beneficial and they are both expected to impact well over 10,000 users daily, which equates to a large impact.

Active Modes

2.5.8. Over the 40-year appraisal period for the scheme, improvements to journey quality is estimated by the AMAT to be approximately **£1.074m** (2010 PV) for active mode users. This is driven by inclusion of the shared use path which results in increased segregation between vehicles and active modes and helps to reduce potential conflicts.

2.5.9. The provision of the new shared-use path will provide a clean, well-lit, high quality addition to the local active travel network, where users can enjoy their journey and the environment it passes to a far greater extent than would be experienced on most of the existing routes through and around the town centre, that require heightened awareness to avoid potential conflicts with vehicles or other active mode users.

2.5.10. This new path will also be supported by the additional infrastructure linking to and/or expanding existing ProW, further enhancing the active mode network and route options available.

2.5.11. As traffic transfers to the scheme, it will lead to flow reductions in the town centre which is expected to lead to less conflicts with vehicles. The lower flows will also facilitate the delivery of additional active travel infrastructure within the town, helping to reduce overcrowding and the potential for conflicts between the different active modes.

2.5.12. Therefore, traveller frustration and fear of potential accidents are considered to be moderate beneficial as they are expected to impact active mode users both on the scheme and within the town centre. However, the remaining benefits are expected to predominantly only influence the much lower number of users directly using the scheme and so the overall journey quality impact on active modes has been assessed conservatively as **Slight Beneficial**.

Summary

2.5.13. Table 2-2 presents a summary of the overall journey quality impact of the scheme.

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Table 2-2 – Classification of the journey quality impacts of the scheme

Factor	Sub-Factor	Impact of the Scheme for Different Users	
		Vehicles	**Active Modes**
Traveller care	Cleanliness	Neutral	Slight Beneficial
	Facilities	Neutral	Slight Beneficial
	Information	Neutral	Neutral
	Environment	Neutral	Slight Beneficial
Travellers' views		Large Beneficial	Slight Beneficial
Traveller stress	Frustration	Large Beneficial	Moderate Beneficial
	Fear of potential accidents	Large Beneficial	Moderate Beneficial
	Route uncertainty	Large Beneficial	Neutral
Overall		Large Beneficial	Slight Beneficial

2.6 Option Values and Non-Use Values

2.6.1. TAG Unit 4-1 requires that option values and non-use values are assessed if the scheme being appraised includes measures that substantially change the availability of transport services within the study area. As the scheme includes no changes to any public transport routes or services provided in the area, and no specific changes are currently being proposed to transport services after scheme opening, the option values and non-use values impact has been qualitatively assessed as **Neutral**.

2.7 Accessibility (Access to Services)

2.7.1. By better connecting the north and west of Shrewsbury, the scheme will improve access to services. In particular, accessibility to the Royal Shrewsbury Hospital will be enhanced with the new faster more direct route providing shorter journeys from the north of the town for ambulances, patients and visitors. For those whose fastest route to access the hospital will continue to be via the town centre, journey times will become faster and more reliable due to reduced congestion levels as traffic transfers to the scheme.

2.7.2. The reduced congestion within the town centre will also reduce journey times for those wishing to access the many services and facilities located within the town centre, including the University Centre Shrewsbury campus and Severn Theatre.

2.7.3. The scheme will also enhance the active travel network, thereby improving accessibility by active travel and overall, the accessibility impact has been qualitatively assessed as **Slight Beneficial**.

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2.8 Summary

2.8.1. Table 2-3 summarises the social appraisal of the scheme. It was considered proportionate in most cases to qualitatively assess specific social impacts, while in other cases valuation using quantitative evidence was used to inform the assessment scores along the seven-point scale.

Table 2-3 – Social impact assessment summary

Indicator	Assessment	Conclusion
Accidents	Moderate Beneficial	- Traffic flows change due to the scheme, leading to 256 less accidents and 275 less casualties and generating a net benefit of £4.705m (2010 PV) over the appraisal period - Safety impacts due to modal shift from vehicles to active modes generate a net benefit of £25 (2010 PV) over the appraisal period
Physical activity	Slight Beneficial	Scheme enhances existing active travel network and health impacts associated with modal shift from vehicles to active modes generate a net benefit of £0.155m (2010PV) over the appraisal period
Security	Neutral	Scheme includes additional planting and landscaping, and street lighting provided along its length, although this is expected to have a minimal impact on security
Severance	Moderate Beneficial	Scheme reduces severance between the north and west of the town by providing a shorter direct link and reduced flows in the town centre reduce severance for pedestrians on key junctions and roads within the Frankwell area of the town
Journey quality - vehicles	Large Beneficial	- Scheme reduces potential for conflict with active modes as vehicles transfer to it from narrow town centre roads - Scheme enables road hierarchy to operate more optimally, reducing frustration levels across the town
Journey quality – active modes	Slight Beneficial	- Scheme adds clean, well-lit, high quality shared-use path with reduced conflict potential, compared to existing narrow routes - Journey quality impacts associated with increased active mode segregation generate a net benefit of £1.074m (2010PV) over the appraisal period
Option values and non-use values	Neutral	No significant changes to bus routes or services included within the scheme design
Accessibility (access to services)	Slight Beneficial	- Scheme enhances access to services including the Royal Shrewsbury Hospital and reduced town centre congestion enhances access to services located in the town - Shared-use path enhances accessibility by active travel

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3

Distributional Impact Appraisal

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3 Distributional Impact Appraisal

3.1 Methodology

3.1.1. In accordance with the requirements set out in the TAG Unit A4-2, a three-step approach has been applied to conduct the DI appraisal, these are outlined in Table 3-1.

Table 3-1 – DI appraisal process

Step	Description	Output
1: Screening process	An initial screening exercise is undertaken to the establish the **broad** impacts of the scheme	Screening proforma
2: Assessment		- Study area/impact area - Social groups affected within the impact area - Amenities within the impact area
2a: Confirmation of areas impacted by the intervention	The impact area will vary for each of the eight indicators. The largest area is that covered by the SATURN modelled area, whereas some impacts tend to be more localised in nature, such as noise and air quality impacts	
2b: Identification of social groups in the impact area	Analysis of the socio-economic, social, and demographic characteristics of those living and working in the impact area.	
2c: Identification of amenities in the impact area	The concentration of social groups was not only based on resident population but also what 'attractors' or amenities are located within the impact area	
3: Appraisal of impacts		- Assessment score, using standard seven-point scale - Qualitative assessment that describes the key impacts across social groups - Input into the AST
3a: Core analysis of impacts	The standard seven-point scale (Slight, Moderate or Large Beneficial or Adverse, or Neutral), drawing on evidence and analysis from the DI appraisal. This assessment score follows the bespoke guidance for each of the indicators under consideration	
3b: Full appraisal of DIs and input into the AST	- The analysis undertaken in Step 3a provides an assessment score for each indicator and each social group under consideration - The distribution of benefits and costs is mapped across different social groups to identify 'winners' and 'losers' from scheme implementation - The assessment score and a summary of the key impacts has been included in the Appraisal Summary Table (AST) for the scheme	

Screening

3.1.2. An initial screening assessment has been undertaken to consider the likely positive and negative impacts on the eight DI indicators. The findings from the initial screening are

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presented in Screening Proforma in Appendix A which identifies which indicators should be appraised in more detail and provides recommendations for further analysis. The results are summarised in Table 3-2.

Table 3-2 – Summary of DI screening proforma

DI Indicator	Likely DI Impact	Recommendation
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	No	No further assessment required
Severance	Yes	Proceed to Step 2
Accessibility	Yes	No further assessment required
Affordability	Yes	Proceed to Step 2

3.1.3. The screening exercise identified that six of the eight indicators require further assessment. Security and accessibility were identified as not requiring further assessment as there are no planned changes to public transport waiting or interchange facilities as a result of the scheme.

Assessment

3.1.4. For each of the six indicators outlined in Table 3-2, a detailed spatial analysis was undertaken to identify the overall geographic area experiencing impact from scheme implementation, in accordance with the requirements of TAG Unit A4-2 and tailored to local conditions.

3.1.5. The DI assessment also requires the consideration of socio-economic, social and demographic characteristics of groups that are likely to be affected by the scheme. Data sources used for the purpose of the DI assessment and the identification of social groups in the impact area are included in Table 3-3 .

3.1.6. While the social impact appraisal considers the overall impact of the scheme on similar indicators, the distributional impacts consider the variance of impacts on different social groups to understand whether vulnerable groups are disproportionately affected as some vulnerable groups are more acutely affected than others by issues such as severance, air pollution and / or job accessibility, for example.

3.1.7. Socio-economic and demographic data from the 2021 Census has been used, as this provides the most recent dataset. The 2021 Lower layer Super Output Area (LSOA)

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boundaries have been considered in the DI assessment to estimate the proportion of the population with protected characteristics.

Table 3-3 – Socio-economic and demographic data sources

Group	Data Source
Resident population	Census 2021
Income deprivation	Index of Multiple Deprivation (IMD) 2019: Income Domain
Children (population aged under 16)	Census 2021
Young adults (population aged 16-25)	Census 2021
Older people (population aged over 70)	Census 2021
Population with a disability	Census 2021
No-car households	Census 2021
Carers (households with dependent children)	Census 2021

3.1.8. The concentration of social groups is also based on what attractors are located within the impact area. This may include schools, hospitals, care homes, bus stops, railway stations and other local amenities that are important to the assessment of different DI indicators under consideration. The DI assessment is based on the mapping of these attractors using Geographic Information System (GIS) analysis and desktop research.

Appraisal of Impacts

3.1.9. The DI appraisal (Step 3) for the scheme combines the information on the geographic extent of the impact area, the identification of social groups and amenities in the impact area and the magnitude of the effect for each social group under consideration.

3.1.10. Table 3-4 shows the thresholds for each of the scores on the seven-point scale (Large, Moderate and Slight Beneficial or Adverse, or Neutral). This is combined with the assessment of the proportion of vulnerable groups within the impact area, to ascertain which groups may be affected disproportionately from scheme implementation.

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Table 3-4 – Seven-point scale scoring system for distributional impacts

Impact	Assessment
Beneficial and the population impacted is significantly greater than the proportion of the group in the total population	Large Beneficial ✓✓✓
Beneficial and the population impacted is broadly in line with the proportion of the group in the total population	Moderate Beneficial ✓✓
Beneficial and the population impacted is smaller than the proportion of the group in the total population	Slight Beneficial ✓
There are no significant benefits or disbenefits experienced by the group for the specified impact	Neutral
Adverse and the population impacted is smaller than the proportion of the group in the total population	Slight Adverse ×
Adverse and the population impacted is broadly in line with the proportion of the group in the total population	Moderate Adverse ××
Adverse and the population impacted is significantly greater than the proportion of the group in the total population	Large Adverse ×××

Appraisal Scenarios

3.1.11. The assessment of the scheme compares the modelled scenarios with and without the scheme in place. Traffic modelling under these scenarios is used to understand the distribution of benefits and disbenefits within the impact area across different social groups, with a detailed appraisal of each of the six indicators included in the following sections.

3.2 User Benefits

Introduction

3.2.1. User benefits of transport schemes are experienced differently by different social groups geographically. Version 1.9.23 of the DfT's Transport User Benefit Appraisal (TUBA) software was used to calculate user benefits from the differences in travel times, vehicles operating costs (VOCs) and user charges between the with and without scheme modelled scenarios for all modelled time periods across the 60-year appraisal period. The outputs were then be used to identify spatially scheme impacts (benefits or disbenefits) per head of the population and assess the most significant scheme impacts in relation to the income distribution of people living within the scheme impact area.

Screening (Step 1)

3.2.2. The scheme results in changes in journey times and journey costs due to the introduction of a new link. An initial screening proforma was completed which assessed the TUBA user benefits using quantified outputs from a spatially disaggregated transport model.

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Assessment – Areas of Impact (Step 2a)

3.2.3. The user benefits are based on changes in journey times and VOCs. TAG Unit A4-2 suggests that only the distributional impacts of 'non-business' journeys should be taken into account because business journey impacts are experienced by businesses rather than individuals. As such, the DI assessment considers all modelled modes for commuting and other (leisure) trips.

3.2.4. The DI user benefit analysis is carried out at LSOA level and so the zonal benefits from TUBA have all been disaggregated, as necessary, to LSOAs in proportion to the population of the LSOAs within each model zone.

3.2.5. The DI impact area, shown in Figure 3-1, has been selected to include the immediate LSOAs around the scheme as this is considered a large enough area to capture the largest impacts expected from the scheme. Areas further away from the scheme where impacts are likely, but are expected to be relatively small, were excluded from the DI impact area.

Figure 3-1 – Assessment impact area
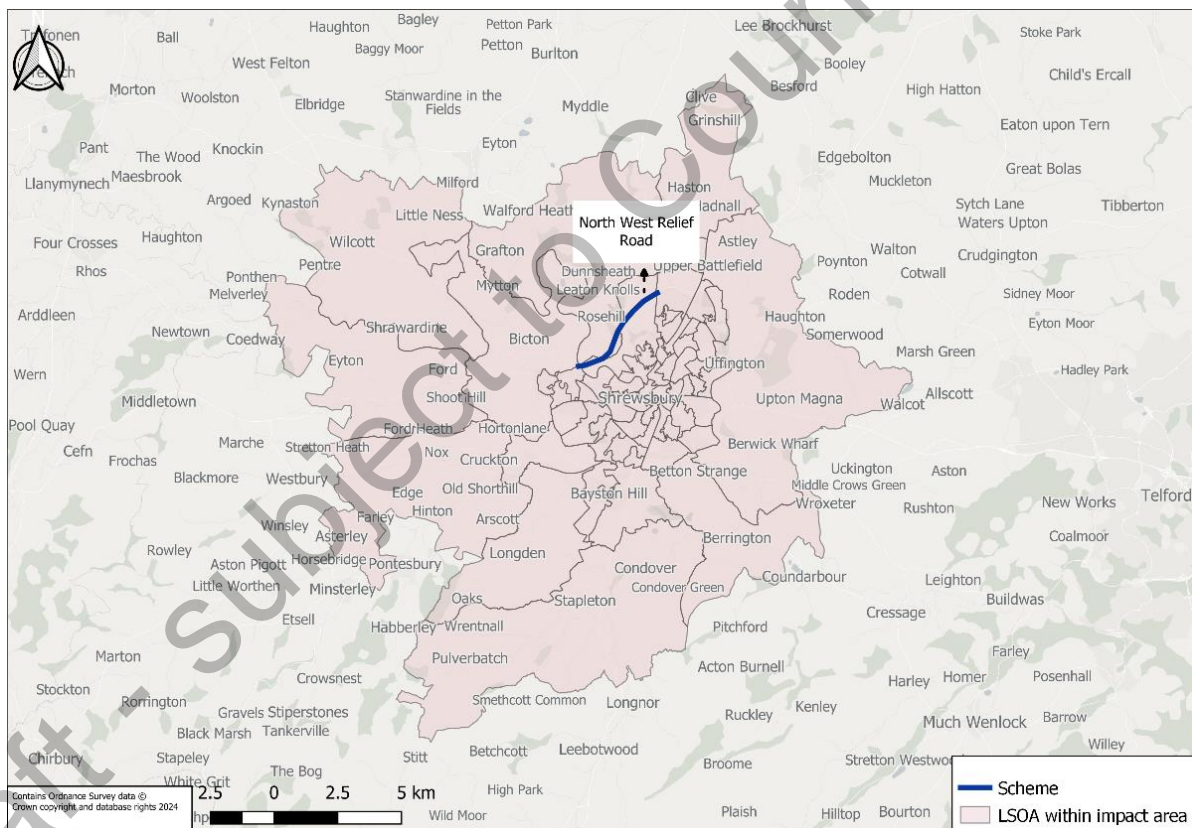
Assessment – Identification of Social Groups (Step 2b)

3.2.6. Step 2b requires the analysis of the socio-economic and demographic characteristics of:

- Transport users experiencing changes in travel costs as a result of the scheme
- Non transport users living in the impact area who are impacted by the scheme
- Travellers in the impact area likely to be affected by the scheme

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3.2.7. It is important to understand the distribution of user income within the impact area. As such, income quintiles from the IMD 2019 have been mapped at LSOA level across the scheme impact area. Figure 3-2 shows the distribution of multiple deprivation for LSOAs within the scheme impact area. The LSOAs are assigned a quintile rank which is the basis for the DI appraisal of user benefits.

Figure 3-2 – IMD income domain distribution by quintile
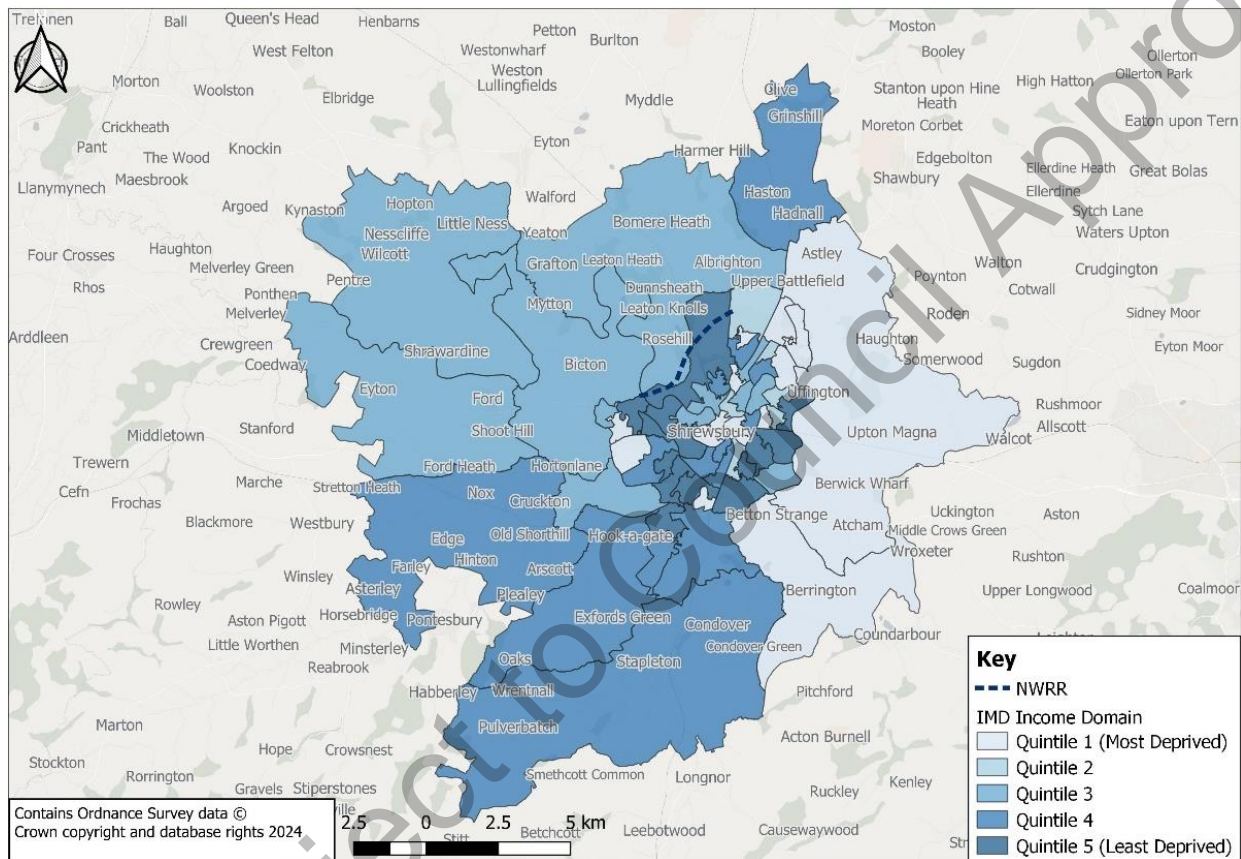
3.2.8. The distribution of income groups within the scheme impact area compared to the distribution across England is summarised in Table 3-5.

Table 3-5 – Share of total population in scheme impact area by income quintiles

Income Quintile	England	Population in the Impact Area
1 (most deprived)	20%	23%
2	20%	9%
3	20%	20%
4	20%	24%
5 (least deprived)	20%	23%
Total	100%	100%

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Assessment – Identification of Amenities (Step 2c)

3.2.9.   The identification of amenities for user benefits is not required for the DI appraisal of user benefits, according to TAG.

Appraisal of Impacts (Step 3)

3.2.10.   Table 3-6 presents the distribution of total user benefits across the population within the scheme impact area by income quintile, identifying where there are differences between the distribution of user benefits and population, and including the outcome of the assessment based on the seven-point scale and the criteria or thresholds outlined earlier in Table 3-4.

Table 3-6 – Distribution of total user benefits by income quintile

| | IMD Income Quintile | | | | | Total |
| | **Most Deprived** | | **<------------------>** | | **Least Deprived** | |
	1 **(0%-20%)**	**2** **(20%-40%)**	**3** **(40%-60%)**	**4** **(60%-80%)**	**5** **(80%-100%)**	
Total user benefit (£'000s)	26,477	11,428	15,293	13,857	32,938	99,993
Share of user benefit in the impact area	26%	11%	15%	14%	33%	100%
Population	23,336	9,306	20,494	24,117	22,830	100,083
Share of population in the impact area	23%	9%	20%	24%	23%	100%
Difference (share of benefit – share of population)	3%	2%	-5%	-10%	10%	
Assessment	Moderate Beneficial ✓✓	Moderate Beneficial ✓✓	Slight Beneficial ✓	Slight Beneficial ✓	Large Beneficial ✓✓✓	

3.2.11.   Table 3-6 shows that all income quintiles receive user benefits from the scheme, with the total user benefit experienced across the scheme impact area being approximately **£99.993m** (2010 PV).

3.2.12.   The largest share of user benefits are received by Quintile 5 (the least deprived) and Quintile 1 (the most derived) at 33% and 26% respectively. The other three quintiles each receive a similar but lower share of user benefits at between 11% and 15%.

3.2.13.   Quintile 2 has the lowest share of user benefit and the lowest share of population. However, not all benefits are distributed proportionally as Quintile 4 has the highest share of population but the second lowest share of user benefits, and Quintile 5 has the highest share of user benefits by far, but only the third highest population.

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3.2.14. Figure 3-3 shows the overall distribution of user benefits by LSOA, across the scheme impact area.

Figure 3-3 – Spatial distribution of overall user benefits amongst LSOAs
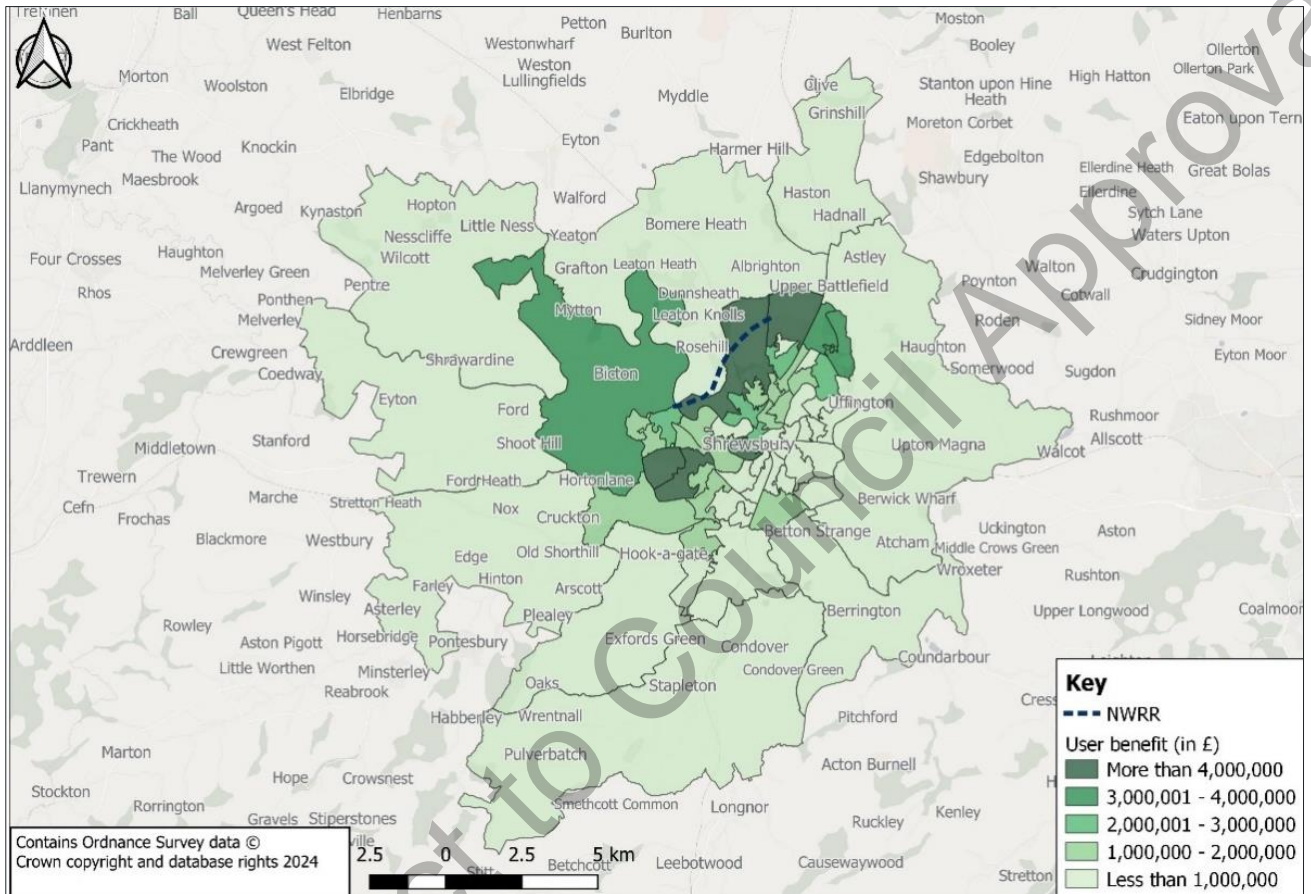
3.3 Noise

3.3.1. The noise analysis for the distributional impact (DI) assessment has been undertaken for the 2042 Design Year and compares the with and without scheme scenarios, in line with the guidance contained within the Distributional Impact Appraisal TAG Unit A4.2.

Screening (Step 1)

3.3.2. The outcome from the screening process included in Appendix A shows that there is expected to be a noise impact from scheme implementation. These are anticipated to be both positive and negative. As such, analysis has proceeded to Step 2, in order to identify the likely area of impact and the social groups and amenities present in the impact area.

Assessment – Areas of Impact (Step 2a)

3.3.3. TAG Unit A4-2 states that noise impacts are likely to occur where a transport intervention results in changes to traffic flows or speeds. The study area for operational road traffic noise

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was defined based on guidance from the Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration guidance.

3.3.4. As per DMRB LA 111, an operational study area defined based on the following criteria can be sufficient for most projects, but it can be reduced or extended to ensure it is proportionate to the risk of likely significant effects:

1) the area within 600m of new road links or road links physically changed or bypassed by the project

2) the area within 50m of other road links with potential to experience a short term change in basic noise level (BNL) of more than 1.0db(a) as a result of the project

3.3.5. The study area in this assessment represents a deviation from the guidance set out within DMRB LA 111 as it has been taken to be 300m from the scheme, due to the urban nature of the scheme. In the study area there are 8580 residential households and so, based on an average household size of approximately 2.3 people, the estimated population is 19,734.

Figure 3-4 – Noise assessment impact area with the receptors
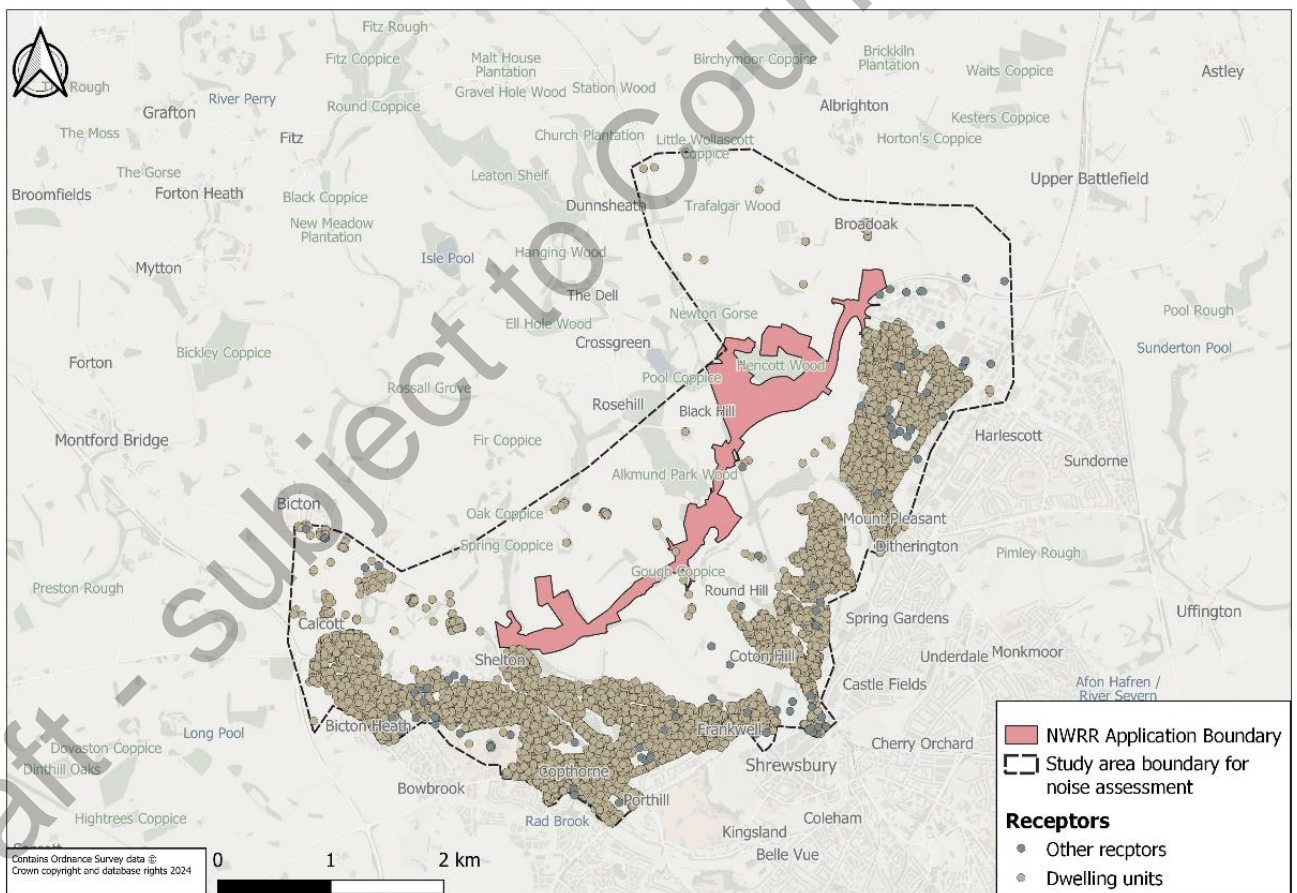
Assessment – Identification of Social Groups (Step 2b)

3.3.6. The changes in noise level across the study area have been calculated for each household in the future year (2042), with and without the scheme in place.

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3.3.7. A noise model has been used to predict receptor specific noise levels at a height of 4 metres. The façade subject to the greatest magnitude of change has been used in this analysis, in line with DMRB LA 111 guidance.

3.3.8. TAG unit A4.2 requires the impacts of noise on the following social groups to be assessed:

- Income distribution
- Children: proportion of population aged less than 16 years
- Older people: proportion of population aged 70 years or older

3.3.9. The LSOAs that intersect with the study area are identified in Figure 3-4. There are 20 LSOAs that are wholly or partially within the study area and these areas are each categorised into one of five groupings (quintiles) based on the Income Deprivation ranking.

3.3.10. Details of the LSOAs within the study area are given in Table 3-7.

Table 3-7 - Details of affected LSOAs

| | IMD Income Quintile | | | | |
| | Most Deprived | | <---------------> | | Least Deprived |
	1 (0-20%)	2 (20-40%)	3 (40-60%)	4 (60-80%)	5 (80-100%)
Number of LOSAs	2	1	7	5	5
LSOA reference	E01028934 E01028957	E01028958	E01028970 E01028971 E01028933 E01028931 E01028973 E01035061 E01028943	E01028956 E01028930 E01028951 E01035065 E01035066	E01028929 E01028972 E01028942 E01028953 E01028974
Affected households within the noise impact area	832	763	2747	1599	2639
Affected population	10%	5%	36%	25%	23%
Affected population of children under 16	12%	6%	28%	31%	23%

Assessment – Identification of Amenities (Step 2c)

3.3.11. Table 3-8 provides the numbers of the different amenities that are likely to attract large numbers of people from different income groups. The locations of the amenities are shown in Figure 3-5.

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Figure 3-5 – Amenities within the area of noise impact

Figure 3-5 – Amenities within the area of noise impact
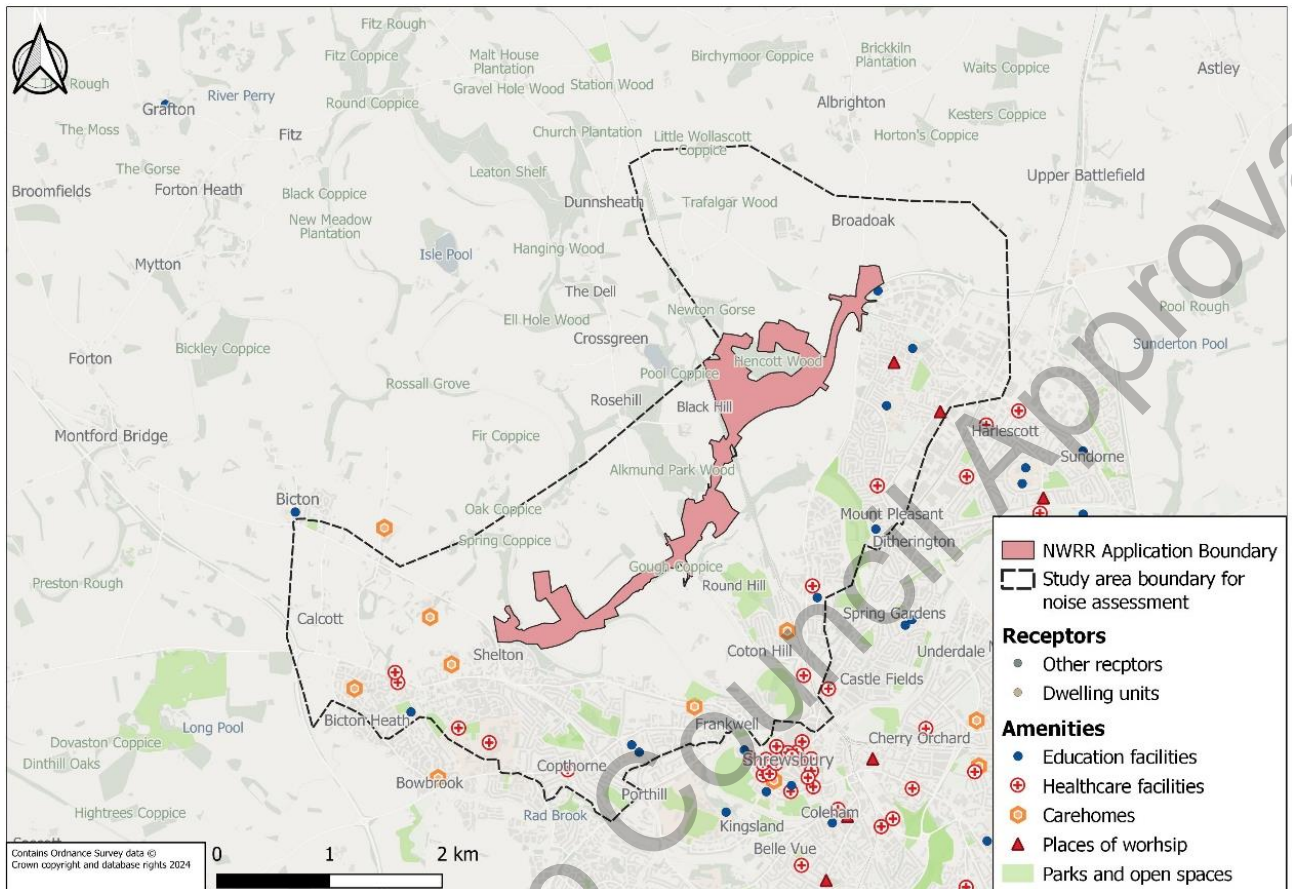
Table 3-8 – Amenities in the noise impact area

Type of Amenity	Number in Noise Impact Area
Schools / Nurseries	8
Hospitals	7
Care Homes / Day centres	5
Transport – bus stops	441

Appraisal of Impacts (Step 3a)

3.3.12. Changes in noise levels are likely to occur as a result of vehicles re-routing or changes in traffic speed and flows. This DI appraisal considers the population affected by significant change in noise levels.

3.3.13. Table 3-9 presents the relative numbers of households in different income groups experiencing change in noise levels. The overall assessment shows the grading of distributional impacts for each social group under investigation according to a seven-point scale (large, moderate, slight beneficial or adverse, plus neutral).

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Table 3-9 – Change in noise levels by income quintile

| | IMD Income Quintile | | | | | Total |
| | Most Deprived <------------------> Least Deprived | | | | | |
	1 0-20%	2 20-40%	3 40-60%	4 60-80%	5 80-100%	
Households with increased noise [A]	472	624	1127	697	1769	4689
Households with decreased noise [B]	0	0	417	164	81	662
Households with no change in noise level [C]	360	139	1204	738	789	3230
Net number of winners - losers in each group [D] = [B] – [A]	-472	-624	-710	-533	-1688	
Total number of winners - losers across all groups [E] = ∑[D]						-4027
Net winners - losers as % of total [F] = [D] / [E]	12%	15%	18%	13%	42%	
Share of total households within the noise impact area	10%	9%	32%	19%	31%	
Assessment	Moderate Adverse ××	Large Adverse ×××	Slight Adverse ×	Slight Adverse ×	Large Adverse ×××	

3.3.14. As shown in Table 3-9, overall the scheme will have an adverse impact on the study area.

3.3.15. Quintile 1 (the most deprived) contains 10% of the households in the study area. However, as the net winners - losers as a percentage of the total is in line with the share of households in the study area (at 12%), the assessment score for quintile 1 is **Moderate Adverse**.

3.3.16. Quintiles 2 and 5 contain 9% and 31% of the households in the study area respectively. For both, the net winners - losers as a percentage of the total is significantly higher than their share of households at 15% and 42% respectively. Therefore, the assessment for Quintiles 2 and 5 is **Large Adverse**.

3.3.17. Quintiles 3 and 4 contain 18% and 13% of the households in the study area respectively. For both, the net winners - losers as a percentage of the total is significantly lower than their

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share of households at 32% and 19% respectively. Therefore, the assessment score for Quintiles 3 and 4 is **Slight Adverse**.

3.3.18. The study area includes eight schools, most of which are located within LSOAs categorized under the 1st, 4th, and 5th quintiles. These quintiles represent varying levels of impact: Quintile 1 is classified as Moderate Adverse, Quintiles 2 and 5 as Large Adverse, and Quintiles 3 and 4 as Slight Adverse. This distribution suggests that students attending schools within these areas are likely to experience varying degrees of vulnerability, with those in the 5th quintile potentially facing the most significant challenges.

3.3.19. Similarly, hospitals in the study area are primarily located within LSOAs categorized under the 3rd, 4th, and 5th quintiles. This distribution suggests that healthcare facilities in these areas may be subject to noise impacts ranging from Slight to Large Adverse. Such exposure could potentially affect the acoustic environment within these facilities, potentially impacting patient care, recovery conditions, and staff well-being.

Appraisal Outcome (Step 3b)

3.3.20. Based on the assessment, it can be concluded that the scheme has an overall adverse impact across all income groups, with the 2nd and 5th quintiles experiencing the most significant effects. While the scheme has contributed to reducing existing traffic levels, its placement in an area that initially had minimal activity has resulted in increased daytime traffic and noise. This rise in noise levels disproportionately affects vulnerable populations, amplifying the adverse impacts of the scheme.

3.4 Air Quality

Introduction

3.4.1. The appraisal of air quality distributional impacts considers the predicted changes in nitrogen dioxide (NO_2) and fine particulate matter ($PM_{2.5}$) concentrations from the scheme and how these impacts different income groups located within 200m of the affected road network (ARN). It also identifies the proportion of children aged under 16 in the impact area and the local amenities or 'attractors' of interest to this particular social group. The appraisal has been undertaken in accordance with TAG Unit A4-2 and draws on results from the TAG Local Air Quality Impact workbook developed as part of the OBC Economic Dimension.

Screening (Step 1)

3.4.2. The screening exercise for air quality impacts suggests that there is expected to be a positive and negative impact on local air quality, in terms of NO_2 and $PM_{2.5}$ concentrations, from the scheme.

Assessment – Areas of Impact (Step 2a)

3.4.3. The air quality impact area is defined by a 200m buffer area around the ARN. The scope of the ARN and impact area has been determined using the DMRB LA 105 scoping criteria:

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- Change in annual average daily traffic (AADT) flow of 1,000 vehicles or more
- Change in AADT flow of heavy-duty vehicles of 200 or more
- Change in road alignment of 5m or more

3.4.4. Within the study area there were 16,762 households that will experience a change in ambient concentrations of NO_2 and $PM_{2.5}$, as a result of the scheme. Figure 3-6 shows the location of different households or 'receptors' within 200m of the ARN. There are also shown to be 13 amenities or attractors within the study area that could be affected by changes in local air quality. Overall, there are 23 LSOAs crossed by the air quality impact area.

Figure 3-6 – Air quality assessment impact area
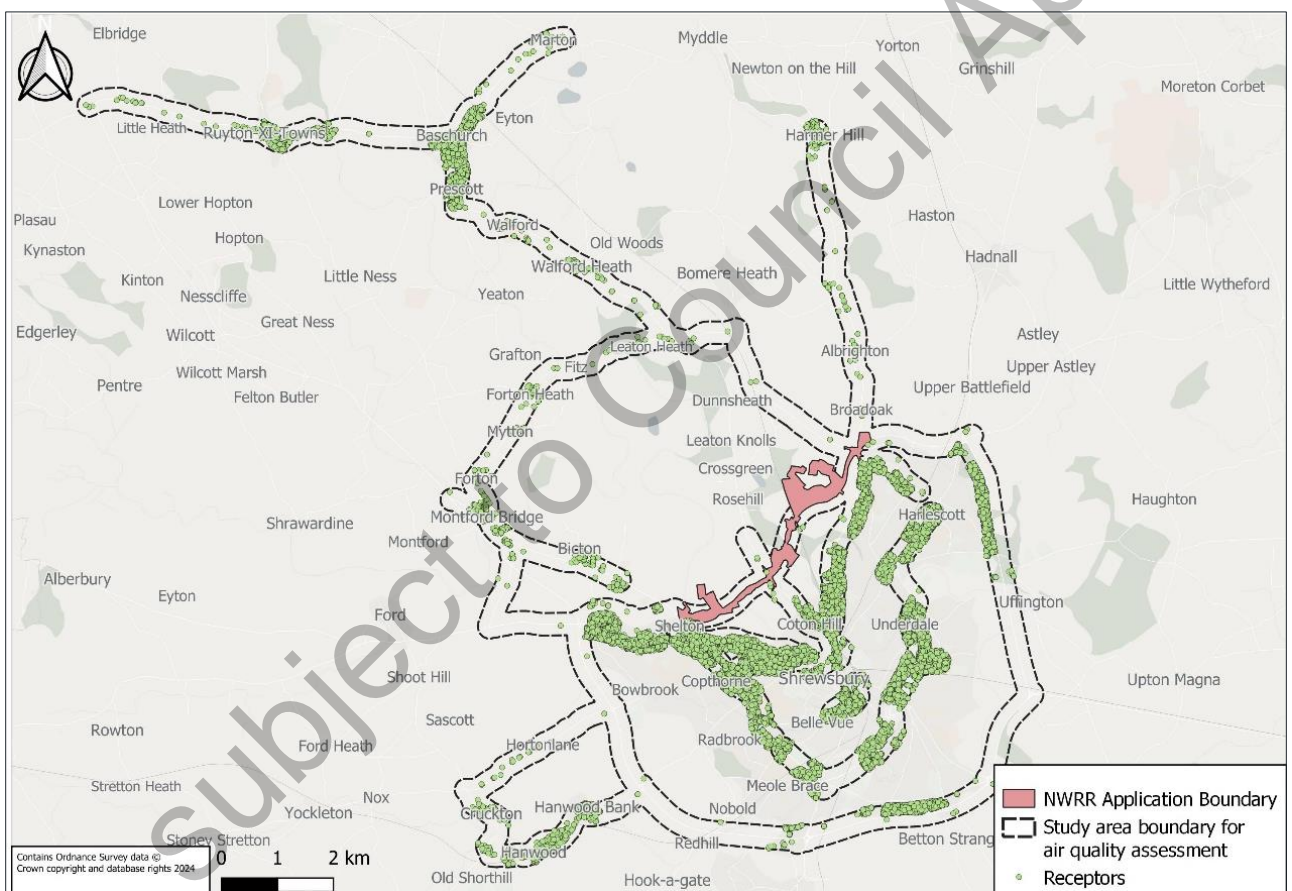
Assessment – Identification of Social Groups (Step 2b)

3.4.5. Air pollution can have significant adverse effects on public health. Long-term exposure to air pollution can cause chronic conditions, such as cardiovascular and respiratory diseases. Children and infants are particularly vulnerable to the effects of poor air quality and therefore concentrations of children under 16 years of age and the locations of schools within the assessment area have been considered to assess the likely impacts on this group. In addition, the appraisal of air quality DIs also requires an examination of impacts across income quintiles.

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3.4.6. Table 3-10 shows the proportion of each income quintile and the percentage of children under 16 in the air quality impact area, compared with national averages.

Table 3-10 – Share of total population by income quintile and children aged under 16

Income Quintile / Group	England	Air Quality Impact Area
Quintile 1	20%	9%
Quintile 2	20%	16%
Quintile 3	20%	22%
Quintile 4	20%	34%
Quintile 5	20%	20%
Children under 16	17%	17%

3.4.7. The methodology set out in TAG Unit A4.2 also considers social groups in terms of household income. Each LSOA is ranked according to IMD income quintiles and the distribution of these income quintiles within the air quality study area.

3.4.8. Details of the affected LSOAs, including numbers of households affected and proportion of the population under the age of 16, are given in Table 3-11.

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Table 3-11 – Details of affected LSOAs

	IMD Income Quintile				
	Most Deprived		**<------------------>**		**Least Deprived**
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**
Number of LSOAs	5	10	10	19	11
LSOA reference	E01028934 E01028957 E01028962 E01028967 E01028983	E01028933 E01028945 E01028948 E01028955 E01028958 E01028965 E01028968 E01028982 E01028984 E01028989	E01028931 E01028938 E01028940 E01028941 E01028943 E01028944 E01028863 E01028959 E01028973 E01028988	E01028913 E01028919 E01028930 E01028936 E01028939 E01028946 E01028947 E01028860 E01028862 E01028951 E01028952 E01028956 E01028966 E01028970 E01028971 E01028981 E01028985 E01028986 E01028987	E01028929 E01028932 E01028942 E01028949 E01028953 E01028954 E01028963 E01028964 E01028972 E01028974 E01028976
Affected households within the air quality impact area	794	2901	21281	5431	3534
Affected population	9%	16%	22%	34%	20%
Affected population of children under 16	25%	18%	15%	16%	17%

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Assessment – Identification of Amenities (Step 2C)

3.4.9. Table 3-12 provides the numbers of the different amenities that are likely to attract large numbers of people from different income groups. The locations of these amenities are then shown in Figure 3-7.

Table 3-12 – Number of amenities in the air quality impact area

Type of Amenity	Number in Air Quality Impact Area
Schools / nurseries	44
Playgrounds	3
Parks and open spaces	8
Hospitals / medical and dental surgeries / health centres	30
Care homes / day centres	26
Community centres / village halls	24

Figure 3-7 – Amenities within air quality impact area

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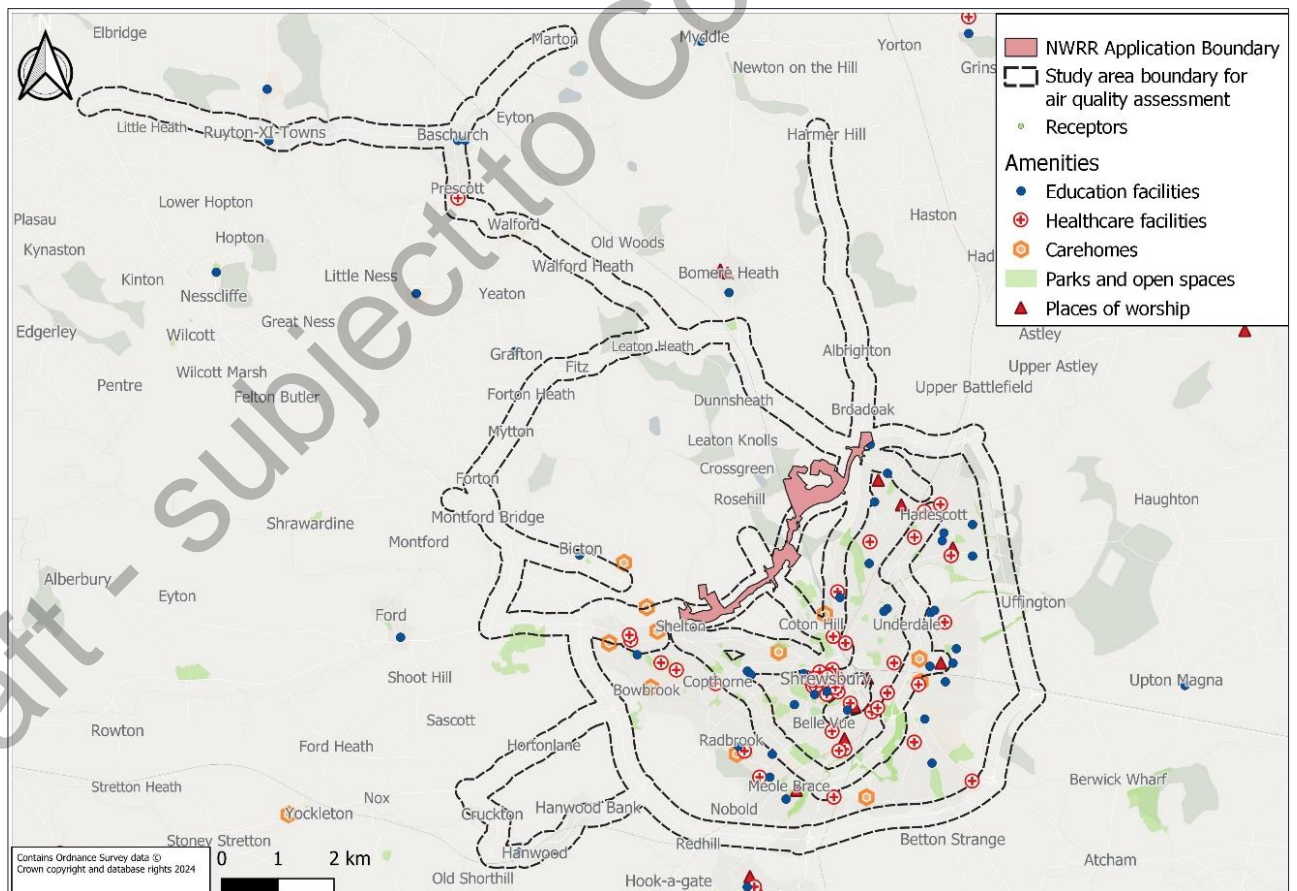
Appraisal of Impact (Step 3a)

3.4.10. The appraisal of distributional impacts has considered the changes in air quality due to the scheme in terms of annual mean concentrations of NO_2 and $PM_{2.5}$ at residential dwellings in the opening year of 2027 and design year of 2042. The findings are presented in Table 3-13 to Table 3-16.

Table 3-13 – Distributional impacts for 2027 due to changes in annual mean NO_2

	IMD Income Quintile					Total
	Most Deprived		<------------------>		Least Deprived	
	1 0-20%	2 20-40%	3 40-60%	4 60-80%	5 80-100%	
Number of households with improved air quality [A]	58	301	1488	915	222	2984
Number of households with no change in air quality [B]	736	2411	2416	4087	3112	12762
Number of households with worse air quality [C]	0	189	198	428	200	1015
Number of net winners - losers [D] = [A] – [C]	58	112	1290	487	22	
Total number of winners - losers across all groups [E] = ∑[D]						1969
Net winners - losers in each area as percentage of total [F] = [D] / [E]	3%	6%	66%	25%	1%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Moderate Beneficial ✓✓	Slight Beneficial ✓	Large Beneficial ✓✓✓	Slight Beneficial ✓	Slight Beneficial ✓	

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Table 3-14 – Distributional impacts for 2042 due to changes in annual mean NO$_2$

	IMD Income Quintile					Total
	Most Deprived		<------------------>		**Least Deprived**	
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**	
Number of households with improved air quality [A]	0	0	221	121	1	343
Number of households with no change in air quality [B]	794	2864	3870	5243	3528	16299
Number of households with worse air quality [C]	0	37	11	66	5	119
Number of net winners - losers [D] = [A] – [C]	0	-37	210	55	-4	
Total number of winners - losers across all groups [E] = ∑[D]						224
Net winners - losers in each area as percentage of total [F] = [D] / [E]	0%	-17%	94%	25%	-2%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Neutral	Moderate Adverse ××	Large Beneficial ✓✓✓	Slight Beneficial ✓	Slight Adverse ×	

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Table 3-15 – Distributional impacts for 2027 due to changes in annual mean $PM_{2.5}$

	IMD Income Quintile					Total
	Most Deprived		<------------------>		**Least Deprived**	
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**	
Number of households with improved air quality [A]	0	0	21	1	0	22
Number of households with no change in air quality [B]	794	2901	4081	5427	3534	16737
Number of households with worse air quality [C]	0	0	0	2	0	2
Number of net winners - losers [D] = [A] – [C]	0	0	21	-1	0	
Total number of winners - losers across all groups [E] = ∑[D]						20
Net winners - losers in each area as percentage of total [F] = [D] / [E]	0%	0%	105%	-5%	0%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Neutral	Neutral	Large Beneficial ✓✓✓	Slight Adverse ✗	Neutral	

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Table 3-16 – Distributional impacts for 2042 due to changes in annual mean PM$_{2.5}$

	IMD Income Quintile					Total
	Most Deprived		<------------------>		**Least Deprived**	
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**	
Number of households with improved air quality [A]	0	0	19	1	0	20
Number of households with no change in air quality [B]	794	2901	4083	5420	3534	16732
Number of households with worse air quality [C]	0	0	0	9	0	9
Number of net winners - losers [D] = [A] – [C]	0	0	19	-8	0	
Total number of winners - losers across all groups [E] = ∑[D]						11
Net winners - losers in each area as percentage of total [F] = [D] / [E]	0%	0%	173%	-73%	0%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Neutral	Neutral	Large Beneficial ✓✓✓	Large Adverse ✗✗✗	Neutral	

3.4.11. In the opening year of 2027 for NO$_2$, shown in Table 3-13, Quintile 3 (accounting for 24% of the households in the impact area) would experience large benefits from the scheme, whilst Quintile 1 (accounting for 5% of households in the impact area) would experience moderate benefits and Quintiles 2, 4 and 5 (accounting for 17%, 32% and 21% of households in the impact area respectively) would experience slight benefits.

3.4.12. In the future year of 2042 for NO$_2$, shown in Table 3-14, Quintile 3 would again experience large benefits and Quintile 4 slight benefits from the scheme. However, Quintile 1 would now experience neutral benefits, whilst Quintiles 2 and 5 would now experience moderate adverse and slight adverse impacts respectively.

3.4.13. In the opening year of 2027 for PM$_{2.5}$, shown in Table 3-15, Quintile 3 would experience large benefits, whereas Quintile 4 would experience slight adverse impacts. The remaining three quintiles would experience neutral impacts. These impacts are mirrored in the future year of 2042 across all quintiles with the exception of Quintile 4 which would experience large adverse impacts.

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3.4.14. As shown earlier in Table 3-11, the quintile with the largest population of children under 16 is Quintile 1 with 25% of total population of children under 16 and this quintile experiences a neutral impact in both 2027 and 2042 for $PM_{2.5}$ and a moderately beneficial impact for NO_2 in 2027 which falls to a neutral impact in 2042.

3.4.15. Quintile 3 has the lowest population of children under 16 at 15%, but they experience large benefits from the scheme for both $PM_{2.5}$ and NO_2 in both 2027 and 2042.

3.4.16. The population of children under 16 in Quintiles 2 and 5 is 18% and 17% respectively and they both experience neutral impacts from the scheme for $PM_{2.5}$ in both 2027 and 2042. However, for NO_2 Quintile 5 changes from experiencing a slight beneficial impact in 2027 to a slight adverse impact in 2042, whilst Quintile 2 experiences slight benefits in 2027, but large adverse impacts in 2042.

3.4.17. Quintile 4, with 16% of children under 16, experiences a slight beneficial impact in 2027 and 2042 for NO_2. However, for $PM_{2.5}$ concentration it experiences a slight adverse impact in 2027, but a large adverse impact in 2042.

3.4.18. There are 44 schools within the study area, with the majority located in Quintile 5, while Quintile 3 and 4 contain relatively fewer schools. The concentration of NO_2 in Quintile 5 has remained neutral over the years. However, the concentration of $PM_{2.5}$ has shown an upward trend, shifting from a slight beneficial impact to a slight adverse impact. This change is of particular concern as it could affect students, who are considered a vulnerable population.

3.4.19. In contrast, schools in areas classified under the 3rd quintile experience consistent and significant benefits across both parameters (NO_2 and $PM_{2.5}$) over the years, ensuring large beneficial impacts. For schools in Quintile 4, the NO_2 levels are projected to have a slightly beneficial effect, but $PM_{2.5}$ concentrations may range from slight to significantly adverse impacts, raising potential concerns for these locations.

3.4.20. Hospitals are primarily located in Quintile 1, concentrated around the Shrewsbury town area. Few of the hospitals are scattered across Quintile 3, 4 and 5. Hospitals within the LSOAs of Quintile 1 are expected to experience neutral to moderate beneficial impacts from the proposed scheme when considering both NO_2 and $PM_{2.5}$ levels. Hospitals in other quintiles are less centralized, and their impacts may vary based on specific local conditions.

Appraisal Outcome (Step 3b)

3.4.21. The air quality assessment reveals notable disparities in NO_2 and $PM_{2.5}$ levels across different income quintiles, underscoring the socio-environmental inequities in pollutant exposure in 2027 and 2042. While NO_2 concentrations generally remain neutral or beneficial across all quintiles except 2nd and 5th quintile in 2042, $PM_{2.5}$ also shows a concerning upward trend in Quintile 4 from 2027 to 2042, transitioning from slight adverse to large adverse impacts. Quintile 3 demonstrates consistent benefits across both years.

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3.5 Accidents

Introduction

3.5.1. Most transport related accidents occur on the road network. People living in deprived areas are more vulnerable to accidents (according to TAG A4.2). DI analysis needs to consider social groups in areas who are likely to be more vulnerable to accidents such as children and older people. Some types of road users are also classed as vulnerable to accidents such as pedestrians, cyclists and motorcyclists.

3.5.2. Any intervention that results in changes to traffic levels or speeds, or the physical separation between people and traffic can give rise to a change in accidents.

3.5.3. The scheme has introduced a new shorter, direct connection between the northern and western parts of Shrewsbury which, as north-west corridor through traffic transfers to it, will reduce the traffic volume and congestion levels on existing roads within the town centre.

3.5.4. In addition, all north-west corridor through freight traffic is expected to transfer to the scheme, significantly reducing freight vehicle flows through the town centre.

3.5.5. As the existing roads that make up north-west corridor routes through the town centre are not designed to modern standards, as vehicles transfer away from these routes to the scheme, the potential for accidents on these town centre roads is expected to decrease, making the town a safer place to live, work and visit.

Screening (Step 1)

3.5.6. Step 1 is a screening process to identify whether a full assessment should be undertaken. As the scheme adds a new shorter link between the west and north of Shrewsbury to the local road network, it is expected to result in changes in vehicle flows, speeds and Heavy Duty Vehicle (HDV) use across various roads within the local road network. Therefore, a full distributional accident assessment is considered appropriate.

Assessment – Area of Impact (Step 2a)

3.5.7. Step 2a involves confirmation of area impacted by the scheme. Scheme accident benefits have been calculated using COBALT, based on the total number, location and severity of historical accidents across the area of impact that occurred over the five years of 2016 - 2019 and 2022, noting that the years 2020 and 2021 were excluded due to the impact of the COVID-19 pandemic.

3.5.8. COBALT uses this historical data, along with road network characteristics, to assess changes in the number and severity of accidents over the 60-year appraisal period.

3.5.9. COBALT estimates the number of accidents for each road link and sums, over the 60-year appraisal period, the product of the accident rate, the road length and the forecast 2050 Annual Average Daily Traffic (AADT) using relationships contained in the program to take account of changes in accident and casualty rates over time. It calculates a severity split using standard factors which estimate the number of accidents classified by injury severity,

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either fatal, serious, or slight and it then applies the appropriate costs per accident to establish the economic cost of accidents over the appraisal period both with and without the scheme.

3.5.10. With flow changes expected across the town, as north-west corridor through traffic transfers to the scheme, the remaining traffic redistributes more optimally across the existing road network. Therefore, a wider than normal accident impact area was taken encompassing the area bounded the outer bypasses, as shown on Figure 3-8.

Figure 3-8 – Change in 2050 AADT flows due to the scheme within and surrounding the accident impact area
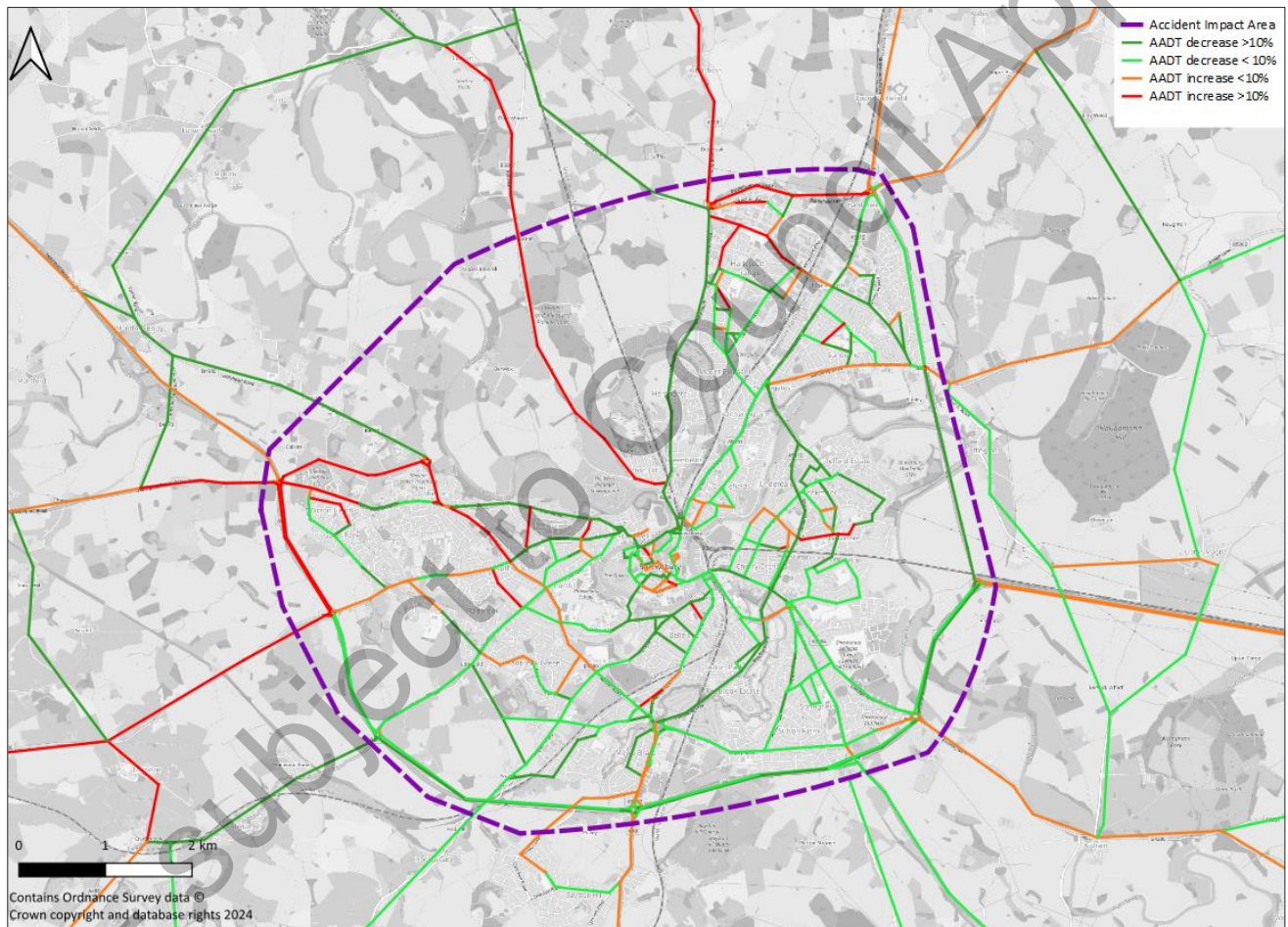
3.5.11. Currently the majority of north-west corridor through traffic either bypasses the town centre using the inner distributor ring road or the existing A5 / A49 outer bypass, or it travels through the town centre using a combination of the northern and western approaches.

3.5.12. These major roads all fall within the accident impact area and so have been selected for more detailed analysis as they are expected to experience the most impact from the scheme.

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3.5.13. Figure 3-9 shows the location of each of these major roads, together with the locations and severity of historic accidents across the study area across the five year accident assessment period.

Figure 3-9 – Accidents on the major roads by severity across the five year assessment period
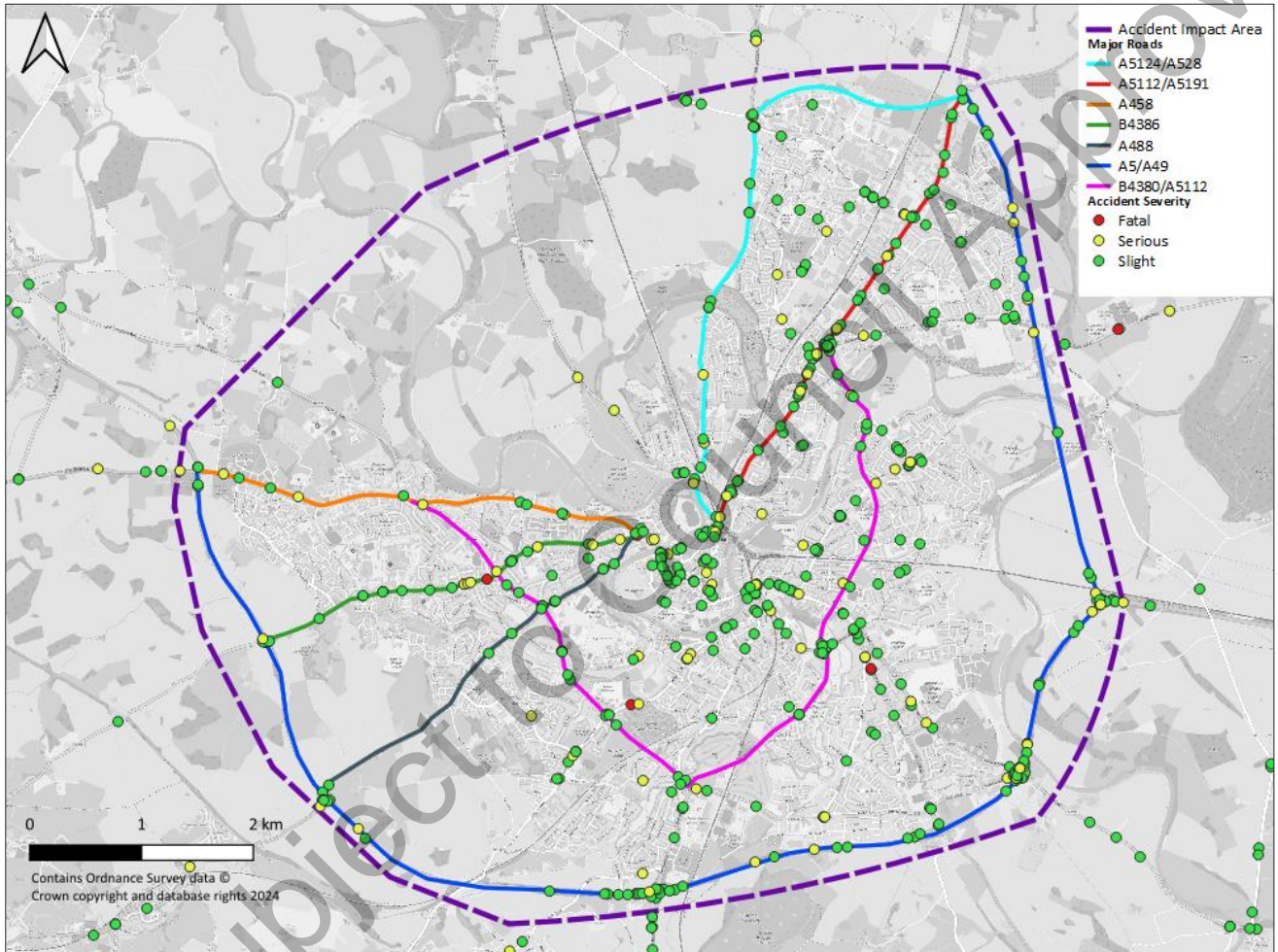
3.5.14. The total number of casualties that occurred across the five assessed years on these major roads are shown in Table 3-17.

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Table 3-17 – Number of casualties on the major roads across the five assessed years

Location	Major Road Section	Number of Casualties
Northern approaches	A5124/ A528 Battlefield Link Road, Ellesmere Road and Coton Hill	27
	A5112 / A5191 Battlefield Road, Whitchurch Road, Ditherington Road, Spring Gardens, St Michael's Street and Castle Foregate	66
Western approaches	A458 Welshpool Road and The Mount	18
	B4386 Mytton Oak Road and Copthorne Road	30
	A488 Radbrook Road, Porthill Road and New Street	12
Outer bypasses	A5 and A49 between Churncote and Battlefield Roundabouts	157
Inner distributor ring road	B4380 / A5112 Shelton Road, Roman Road, Hazledine Way, Bage Way, Robertson Way and Telford Way	47
Total		**357**

Assessment – Identification of Social Groups (Step 2b)

3.5.15. Vulnerable users in the area of impact include those user groups that are more likely to be involved in an accident. These include:

- Pedestrians
- Cyclists
- Motorcyclists
- Male drivers aged 16 to 25

3.5.16. Those social groups that are particularly vulnerable or at increased risk of being involved in an accident include:

- Children aged under 16
- Older people aged over 65

3.5.17. The DI analysis, shown in Table 3-18, compared the casualty rate on all the major roads combined with national rates, using data from STATS19 across the five assessed years.

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Table 3-18 – Share of population in different social groups across the five assessed years

Casualty Type	England		Major Roads	
	Number	% of All Casualty Types	Number	% of All Casualty Types
Pedestrians	110,884	14%	25	7%
Cyclists	86,924	11%	56	16%
Motorcyclists	85,551	11%	29	8%
Male drivers aged 16 to 25	79,474	10%	38	11%
Children aged under 16	85,690	11%	33	9%
Older people aged over 70	51,396	6%	25	7%
All types	**801,612**		**357**	

3.5.18. The table presents the casualty percentages for vulnerable groups on these major roads in comparison to the national average, providing insight into their significance within the accident assessment.

3.5.19. Casualty percentages amongst pedestrians, motorcyclists and children are, however, much lower than the national average reflecting the types of roads included (i.e. the high speed rural in nature outer bypasses).

Assessment – Identification of Amenities (Step 2c)

3.5.20. The concentration of vulnerable groups is not only based on the resident population, but also the local amenities (attractors) which are within the impact area that may be used by vulnerable groups.

3.5.21. Amenities include schools, health facilities and local attractions and these are mainly concentrated closer to Shrewsbury town centre. The amenities identified within of the area of impact and are summarised in Table 3-19 and shown in Figure 3-10.

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Table 3-19 – Amenities within the accident impact area

Amenities	Number
Schools / nurseries	31
Healthcare services	55
Care homes	9
Transport – bus stops	604
Parks and open spaces	76
Places of worship	8

Figure 3-10 – Amenities within the area of impact
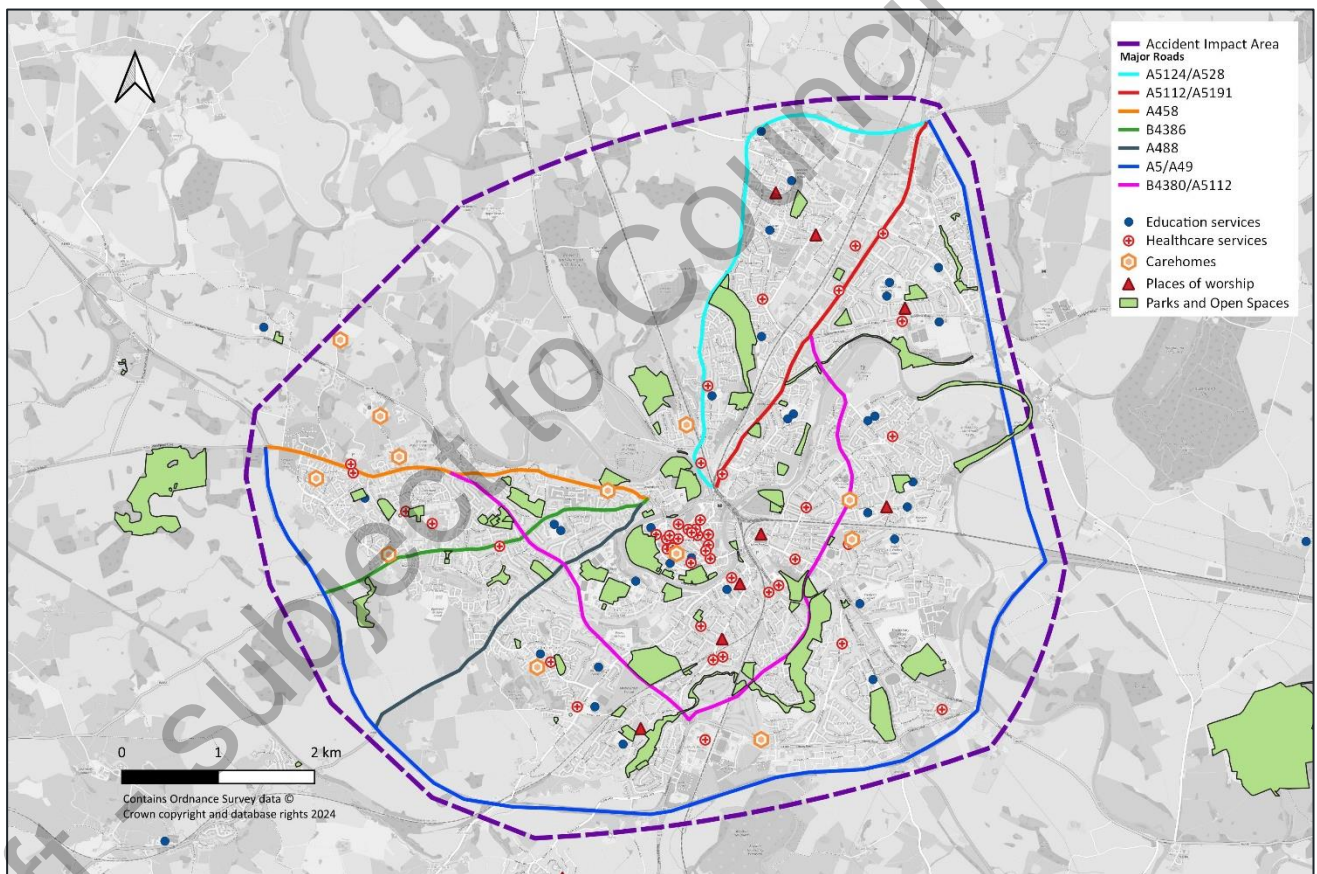
Appraisal of Impact (Step 3)

3.5.22. The percentage change in accidents was calculated for each link, based on the total number of accidents with and without the scheme, forecast by COBALT across the 60-year appraisal period is shown in Figure 3-11.

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Figure 3-11 – Forecast change in number of accidents
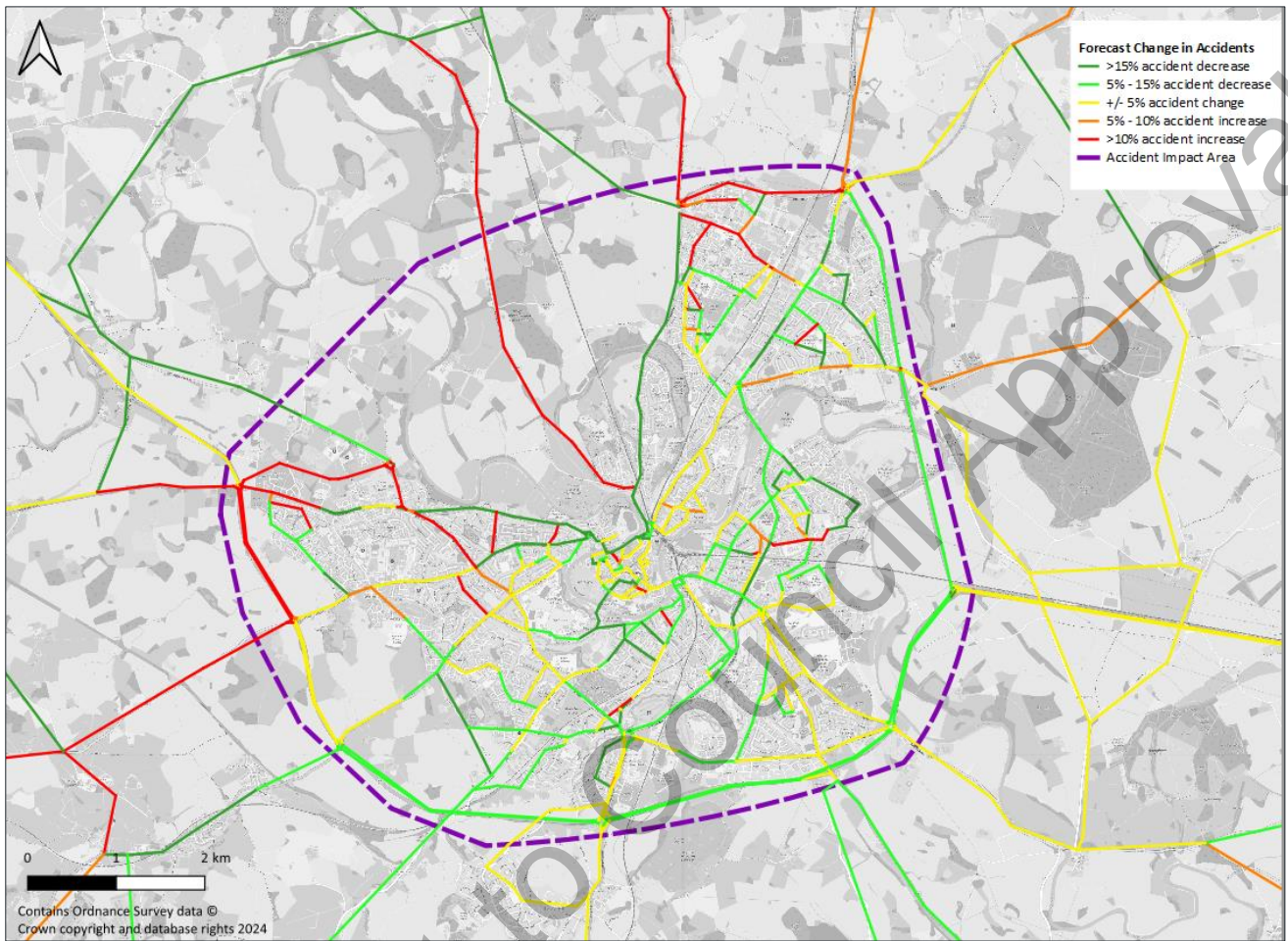
3.5.23. Figure 3-11 shows the following:

- On the A5124/A528 northern approach, the scheme impact is forecast to be mixed with the A5124 showing an increase in accidents of more than 10%, but the A528 showing a decrease in accidents of greater than 15%

- Along the A5112/A5191 northern approach, north of Heathgates Roundabout there are forecast to be decreases in accidents in excess of 5%, whereas to the south of Heathgates Roundabout scheme impacts are reduced with a forecast change in accidents of +/-5%

- Along the A458 western approach, to the west of Holyhead Road, a mix of increases and decreases in accident numbers is forecast. East of Holyhead Road, however, accidents are forecast to decrease by over 15%

- On the B4386 western approach, changes in accidents of +/-5% are predominantly forecast to the west of the B4380, but decreases in accidents of greater than 15% are forecast to the east of the B4380

- On the A488 western approach, changes in accidents are forecast to predominantly be +/-5%

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- Around the inner distributor ring road, decreases in accidents of 5% to 15% are forecast to the east of Longden Road. However, to the west of Longden Road, accident rates are generally forecast to increase, particularly closer to the scheme.
- Around the outer bypasses, decreases in accidents of 5% to 15% are forecast to the east of the A488. However, to the west of the B4386, accident rates are forecast to increase by more than 10%

3.5.24. For each major road, the average percentage change in accidents between the with and without scheme scenarios was considered, alongside a comparison of the share of casualties, by vulnerable group, compared to the national average. The results are shown in Table 3-20.

Table 3-20 – Average percentage change in accidents due to the scheme, including casualty breakdown by vulnerable group

Major Road Section	Average Change in Accidents Due to the Scheme	Casualty Breakdown by Vulnerable Group					
		Pedestrians	Cyclists	Motorcyclists	Male Drivers Aged 16 to 25	Children Aged Under 16	Older People Aged Over 65
A5124/ A528 Battlefield Link Road, Ellesmere Road and Coton Hill	5% to 15% decrease	4%	19%	N/A	19%	4%	15%
A5112 / A5191 Battlefield Road, Whitchurch Road, Ditherington Road, Spring Gardens, St Michael's Street and Castle Foregate	5% to 15% decrease	11%	27%	11%	21%	8%	14%
A458 Welshpool Road and The Mount	5% to 15% decrease	6%	22%	6%	N/A	6%	33%
B4386 Mytton Oak Road and Copthorne Road	5% to 15% decrease	23%	30%	3%	3%	30%	17%
A488 Radbrook Road, Porthill Road and New Street	+/-5%	25%	42%	8%	17%	17%	17%
A5 and A49 between Churncote and Battlefield Roundabouts	5% to 15% decrease	2%	2%	11%	11%	4%	10%
B4380 / A5112 Shelton Road, Roman Road, Hazledine Way, Bage Way, Robertson Way and Telford Way	+/-5%	1%	6%	26%	4%	2%	17%
National average A-road		5%	4%	6%	21%	3%	4%
National average B-road		2%	1%	1%	5%	1%	1%

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3.5.25. Table 3-21 shows the grading system from TAG used to determine the level of impact experienced by each vulnerable group.

Table 3-21 – Grading for assessment of existing casualty rate for vulnerable users

Change in Accidents	Low (More Than 30% Lower Than Average Rate for Class of Road)	Medium (<30% Lower to <30% Higher Than Average for Class of Road)	High (More Than 30% Higher Than Average Rate for Class of Road)
Significant reduction (>15% decrease)	Moderate Beneficial	Moderate Beneficial	Large Beneficial
Slight reduction (>5%, <15% decrease)	Slight Beneficial	Slight Beneficial	Moderate Beneficial
Neutral (<5% increase or decrease)	Neutral Beneficial	Neutral Beneficial	Neutral Beneficial
Slight increase (>5%, <10% increase)	Slight Adverse	Slight Adverse	Moderate Adverse
Significant increase (>10% increase)	Moderate Adverse	Moderate Adverse	Large Adverse

3.5.26. The above grading system is now applied to the results of the assessment in Table 3-20 and the outcome is shown in Table 3-22.

3.5.27. The table shows that the scheme will have a neutral accident impact on each vulnerable group on the A488 western approach and the B4380 / A5112 inner distributor ring road as they both experience changes in accidents below 5%.

3.5.28. Across the other five major road sections, all vulnerable user groups will experience either a slight or moderate beneficial accident impact as a result of the scheme.

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Table 3-22 – Accident assessment of the major roads by vulnerable group

Major Road Section	Vulnerable Group					
	Pedestrians	Cyclists	Motorcyclists	Male Drivers Aged 16 to 25	Children Aged Under 16	Older People Aged Over 65
A5124/ A528 Battlefield Link Road, Ellesmere Road and Coton Hill	Slight Beneficial	Moderate Beneficial	N/A	Slight Beneficial	Slight Beneficial	Moderate Beneficial
A5112 / A5191 Battlefield Road, Whitchurch Road, Ditherington Road, Spring Gardens, St Michael's Street and Castle Foregate	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
A458 Welshpool Road and The Mount	Slight Beneficial	Moderate Beneficial	Slight Beneficial	N/A	Moderate Beneficial	Moderate Beneficial
B4386 Mytton Oak Road and Copthorne Road	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
A488 Radbrook Road, Porthill Road and New Street	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
A5 and A49 between Churncote and Battlefield Roundabouts	Slight Beneficial	Slight Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
B4380 / A5112 Shelton Road, Roman Road, Hazledine Way, Bage Way, Robertson Way and Telford Way	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

3.6 Severance

Introduction

3.6.1. Community severance is defined as the separation of residents from facilities and services they use within their community caused by substantial changes in transport infrastructure or by changes in traffic flows. Severance will only be problematic where either vehicle flows are significant enough to impede pedestrian movement across a road, or where infrastructure presents a physical barrier to movement.

3.6.2. As traffic transfers to the scheme, flows and congestion levels will reduce within the town centre, thereby reducing severance for pedestrians. For example, the University Centre Shrewsbury campus, Severn Theatre and Frankwell Car Park are located in close proximity to each other, and all see high volumes of pedestrian flow and are accessed via narrow footpaths along the narrow roads within Frankwell. The main junctions in this area also have

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poor visibility for pedestrians crossing. Therefore, as traffic transfers to the scheme and flows decrease in this location, levels of severance experienced in this area will fall.

3.6.3. In addition, the scheme adds a new link to the active travel network that will provide for pedestrians with a direct route between the north and west of the town for the first time. New links and enhancements to existing PRoW are also provided for pedestrians.

Screening (Step 1)

3.6.4. Step 1 is a screening process to identify whether a full assessment should be undertaken. As the scheme adds a new shorter link between the west and north of Shrewsbury to the local road network, it is expected to result in changes in vehicle flows, speeds and Heavy Duty Vehicle (HDV) use across various roads within the local road network. In addition, as identified above, some barriers to pedestrian movement will also be removed, therefore, a full distributional assessment of severance impacts across vulnerable groups is considered appropriate.

Assessment – Areas of Impact (Step 2a)

3.6.5. For the purposes of this analysis, the severance impact area has been taken to include the A5 / A49 outer bypasses to the east, south and west and the scheme to the north. The impact area has been defined based on the severance analysis methodology set out within TAG Unit A4-2, which recommends setting up a buffer area around the scheme where significant changes in traffic flow are expected to occur.

3.6.6. Severance impacts have been assessed by considering roads with forecast traffic flow changes of more than 10% within this impact area, based on the AADT flow in the forecast year of 2050 with and without the scheme in place. Changes to road alignments, road closures and infrastructure are also considered within this area.

3.6.7. In addition, four severance locations have been chosen located across the severance impact area for more detailed assessment.

3.6.8. Guidance in the DMRB (Volume 11, Section 3.8) states that the relief of severance due to a scheme is not significant where traffic flows are already relatively low (less than 8,000 vehicles AADT). Therefore, all roads with a 2050 AADT below 8,000 vehicles within the severance impact area have been excluded from the severance analysis.

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3.6.9. Figure 3-12 illustrates the roads with a 2050 AADT of at least 8,000 vehicles that experience changes of greater than 10% in 2050 AADT resulting from scheme implementation. The four selected severance locations, listed below, are also marked.

- **Location 1:** Harlescott Crossroads
- **Location 2:** Shrewsbury Bus Station
- **Location 3:** Meole Brace Retail Park
- **Location 4:** Royal Shrewsbury Hospital

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Figure 3-12 – Roads with 2050 AADT changes due to the scheme of greater than 10%
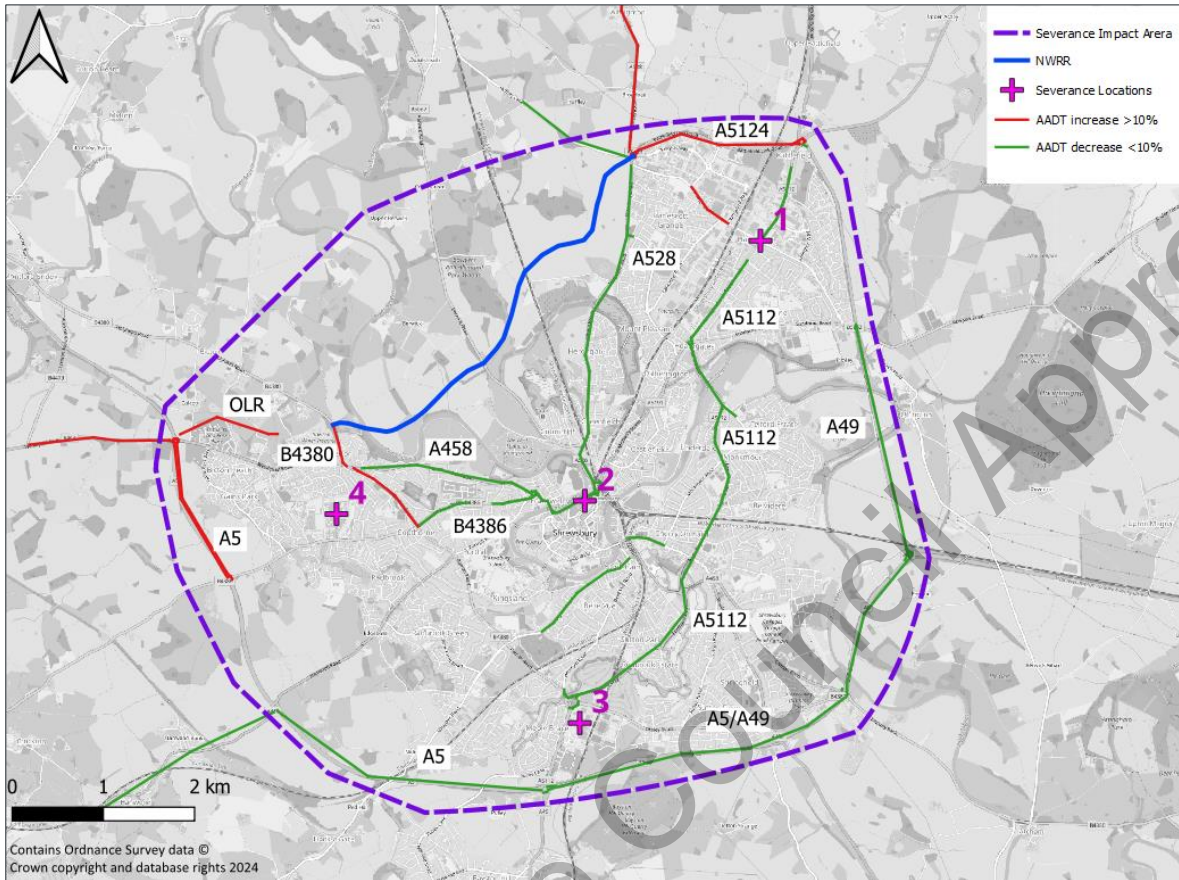
3.6.10. As per TAG, a series of walking catchments have been established to plot community facilities and concentration of potentially vulnerable groups. TAG Unit A4-2 section 6.4.5 mentions that 'These walking catchments should be based on, where possible, established walking routes used by the community and not 'crow-fly' distances. It should include consideration of up to 800m walk journeys to community facilities and bus stops within a 400m walk. It may also be necessary to consider other significant facilities, including secondary and further education sites if they lie within a 1km walking distance from the community'.

3.6.11. Therefore, the following assessment has considered 1km buffer from all four selected locations to understand the concentration of amenities or community facilities, based on the 1km maximum walking distance mentioned above.

3.6.12. Furthermore, the severance assessment of vulnerable groups considers pedestrian journeys of up to 800 meters to be justified although, for those groups with mobility issues, the walking catchment is be reduced to 400m. Therefore, while the assessment considers amenities within 1 km of the scheme, for all the chosen locations of severance assessment, changes in AADT flows are considered up to a distance of 800 meters from every location to understand the change in severance level for children and no-car households, along with their income quintiles, and up to a distance of 400 meters from every location to assess

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those groups with mobility issues, such as the elderly population and people with disabilities.

Assessment – Identification of Social Groups (Step 2b)

3.6.13. Table 3-23 shows that the distribution of vulnerable groups across the severance impact area is broadly in line with national averages.

Table 3-23 – Share of vulnerable groups in the severance impact area

Vulnerable Group	% Across England	% Within the Severance Impact Area
Children (aged under 16)	17%	16%
Older people (aged 70+)	19%	17%
No-car households	20%	18%
Persons with disabilities	18%	18%

Assessment – Amenities in the Impact Area (Step 2c)

3.6.14. The severance impact area contains a significant number of local amenities, as detailed in Table 3-24 and shown in Figure 3-13.

Table 3-24 – Amenities in the severance impact area

Amenities in the Impact Area	Number
Education amenities	31
Health amenities	55
Parks and playgrounds	76
Care homes	12
Bus stops	543
Place of worship	8
Local shops	255

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Figure 3-13 – Change in AADT flow and amenities within the severance impact area
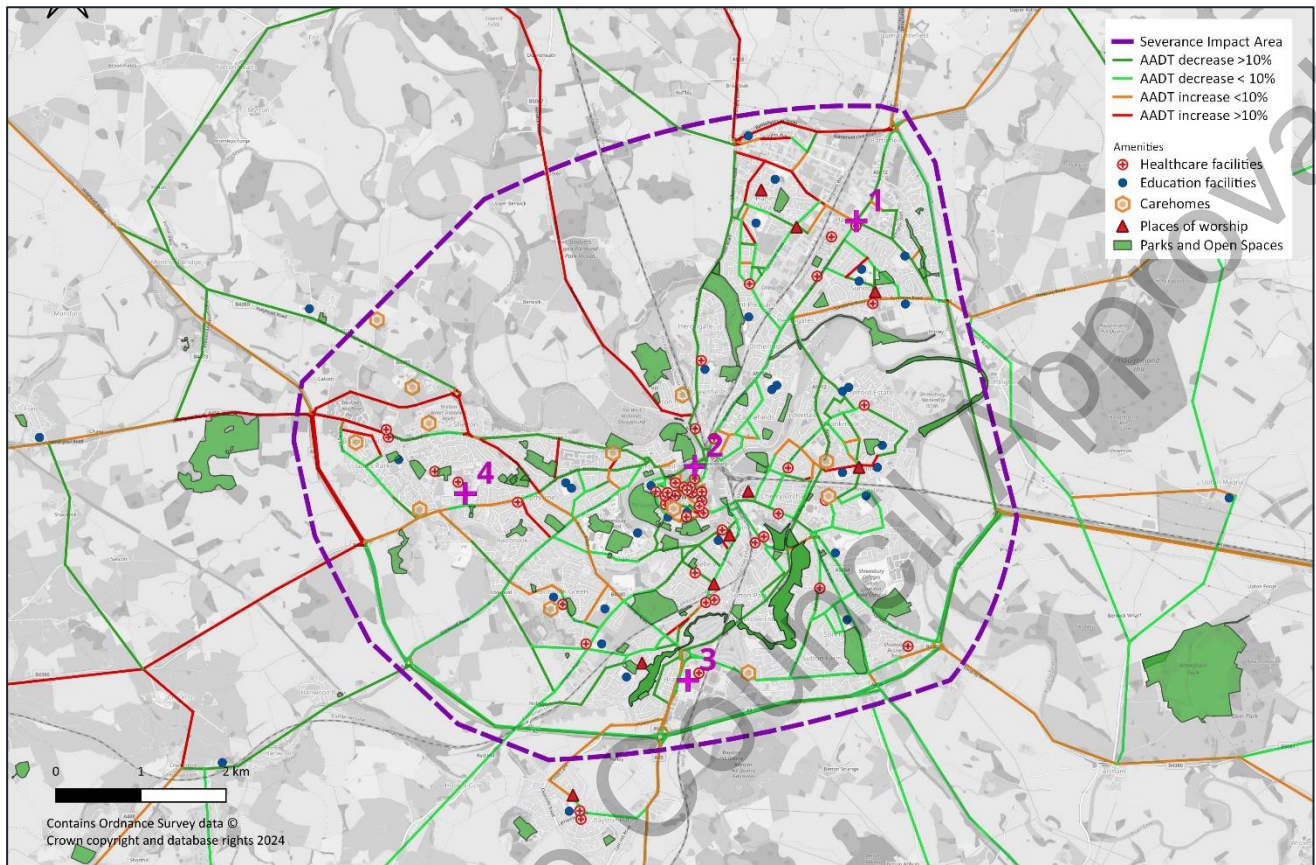
Appraisal of Impact (Step 3a)

3.6.15. As detailed earlier, the four locations selected for the assessment of severance are.

- **Location 1:** Harlescott Crossroads
- **Location 2:** Shrewsbury Bus Station
- **Location 3:** Meole Brace Retail Park
- **Location 4:** Royal Shrewsbury Hospital

3.6.16. These four locations were selected as they each have different features that result in them attracting higher numbers of pedestrians. Changes experienced in AADT flows at, or in the vicinity of, each of these locations, will therefore change the level of severance experienced by pedestrians accessing them.

3.6.17. Figure 3-14 to Figure 3-17 provide representations of the LSOAs within the severance impact area and highlight for each LSOA whether its population each of the four vulnerable groups, detailed in Table 3-23 above, is above or below the national average.

3.6.18. If the share of vulnerable population in the severance impact area is greater than that of the national average, then a greater than 10% increase in 2050 AADT would be disadvantageous for the population in terms of severance and vice versa.

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Figure 3-14 – LSOAs showing share of children under 16 in comparison with the national average
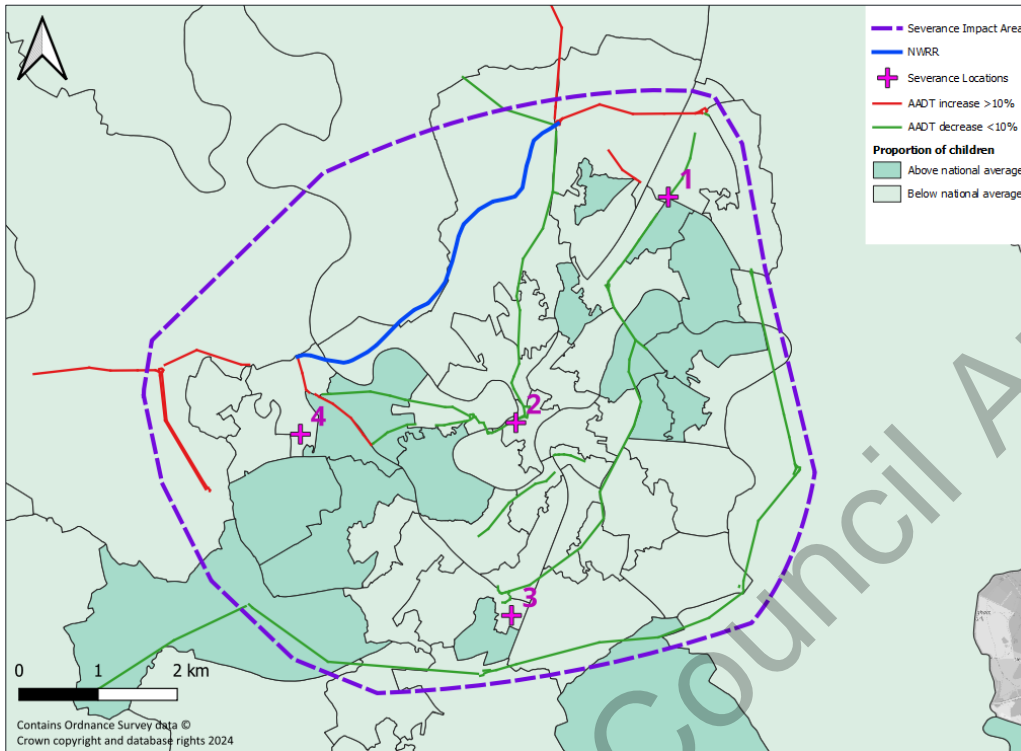
Figure 3-15 – LSOAs showing share of older people 70+ in comparison with the national average

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Figure 3-16 – LSOAs showing proportion of no-car households in comparison with the national average
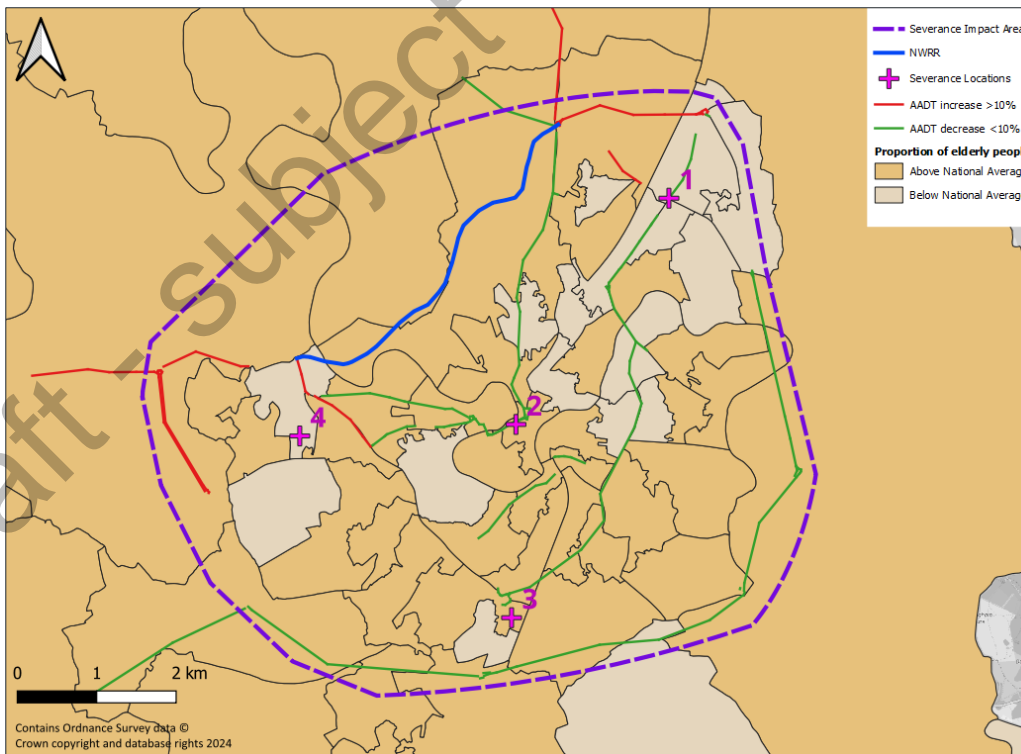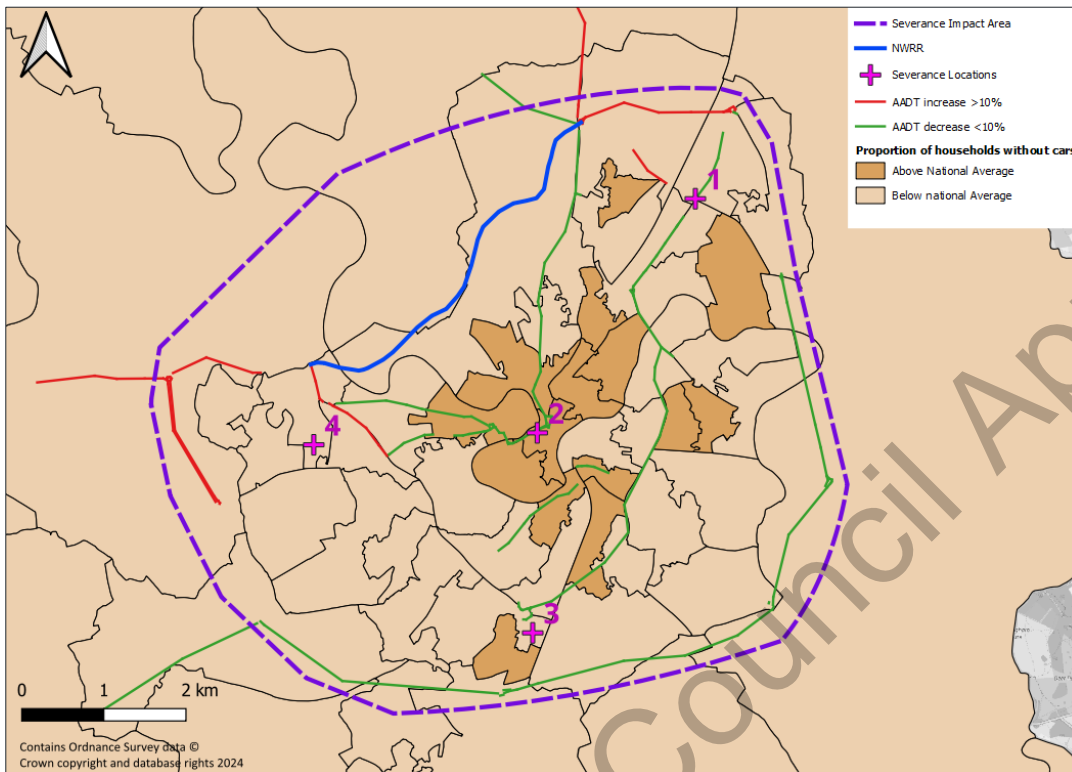

Figure 3-17 – LSOAs showing share of people with disability in comparison with the national average

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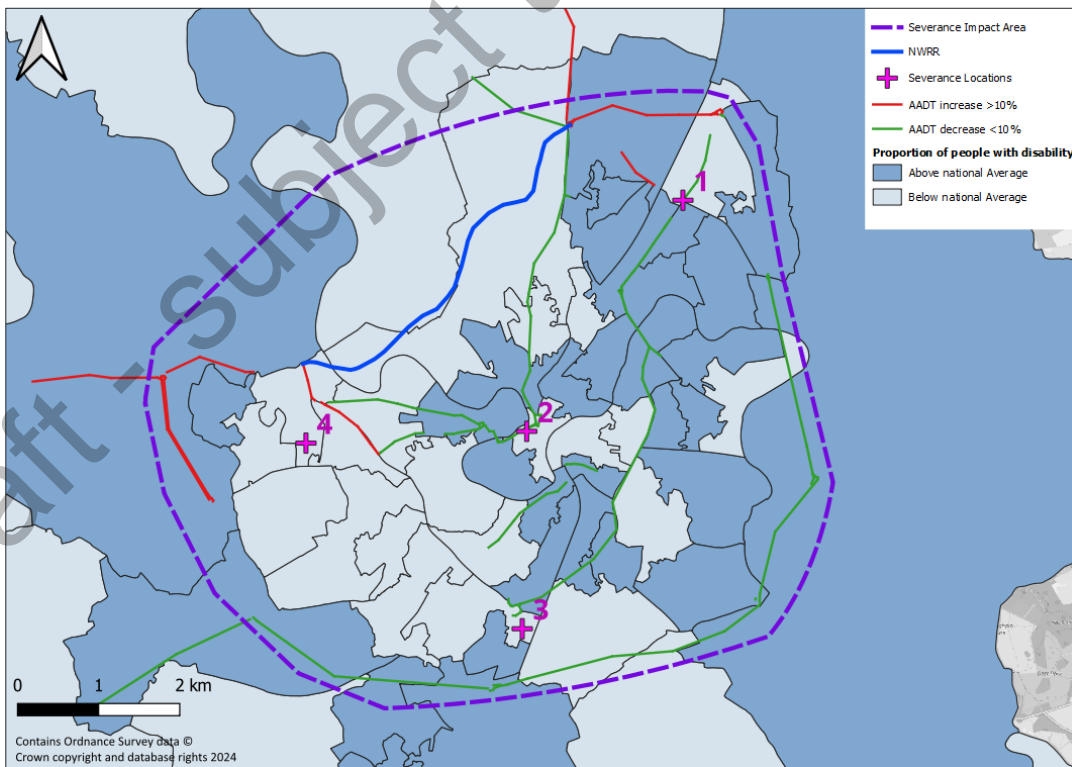
3.6.19. Table 3-25 summarises the results of the assessment. The proportion of children and no-car households was considered within 800 meters of each severance location and for people who are older or disabled, the proportion was considered within 400 meters to account for potential have mobility issues. 2050 AADT flow changes were also considered within 800 meters, with flow changes being considered significant if there was an increase or decrease of more than 10%, in line with TAG.

Table 3-25 – 2050 AADT flow change and concentration of vulnerable groups compared with national averages

Severance Location	2050 AADT Flow Change	Children Aged Under 16	Older People Aged 70+	No-Car Households	People with Disability
1	Some decreases >10%	Greater than national average	Less than national average	Less than national average	Greater than national average
2	Decreases >10%	Less than national average	Greater than national average	Greater than national average	Less than national average
3	Increase <10%	Less than national average	Greater than national average	Less than national average	Less than national average
4	Some increases >10% close to catchment area	Less than national average	Less than national average	Less than national average	Less than national average

Location 1 (Harlescott Crossroads)

3.6.20. Lies at the junction of the A5112, Harlescott Lane and Featherbed Lane and caters for pedestrian movements in all directions. This location is mostly surrounded by large retail park housing shops and restaurants, although there are also leisure facilities, places of worship, schools, open spaces and community facilities within the wider 800m catchment area.

3.6.21. Along the A5112 north and south of the crossroads, AADT flows are forecast to decrease by more than 10%, benefitting pedestrians crossing this busy road to access the various local amenities from both the surrounding residential areas and the nearby sites of other local amenities.

3.6.22. To the west of the crossroads, there is a small section of Harlescott Lane that is forecast to experience an increase in AADT flows by more than 10%, however pedestrian flows are expected to be lower in this area, with fewer pedestrians needing to cross.

3.6.23. Just outside the catchment area, to the north and west, the A5124 is forecast to experience a greater than 10% increase in AADT, whilst the A528 is forecast to experience a greater than 10% decrease. Both these links are more rural in nature and see low levels of pedestrian usage and even lower numbers crossing. Therefore, neither of these significant flow changes are expected to lead to any change in severance.

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3.6.24. Considering the presence of vulnerable groups, the proportion of children and people with disability is above national average, while the proportion of older people and no-car households is below the national average.

3.6.25. Overall, the assessment concluded that the scheme would be **Moderate Beneficial** at this location for children and people with disability and **Neutral** for older people and no-car households, in terms of severance.

Location 2 (Shrewsbury Bus Station)

3.6.26. Situated on Smithfield Road, close to Shrewsbury Railway Station and the town centre. This location lies next to the river with nearby access to the several schools, University Centre Shrewsbury, Theatre Severn, other recreational and leisure facilities, community facilities, places of worship and shops within the town centre.

3.6.27. Smithfield Road along with Welsh Bridge, the A458 and A528 to the east and west are all forecast to experience AADT flow decreases of more than 10% as traffic switches from this area to use the scheme. This will benefit the large numbers of pedestrians accessing the many amenities in the area, including many that currently cross these roads.

3.6.28. Within the catchment area, the proportion of older people and no-car households is above the national average, while the proportion of children and people with disability is below national average.

3.6.29. Overall, the assessment concluded that the scheme would be **Large Beneficial** at this location for older people and no-car households and **Neutral** for children and people with disability, in terms of severance.

Location 3 (Meole Brace Retail Park)

3.6.30. Located to the south of the town centre, close to the A5 / A49 Bayston Hill Roundabout and Shrewsbury Town football stadium. Along with its retail offering, this location is also within the catchment area of a school, a golf course and a health club and several places of worship and community facilities lie close to the edge of its catchment area.

3.6.31. Many roads within the catchment area of this location are local residential roads with AADT flows below 8,000 and so were excluded from the severance assessment. However, along the A5 to the south of this location and around most of Meole Brace Roundabout and along the A5112 to the north of this location, AADT flows are forecast to fall by greater than 10%. These flow decreases will enable pedestrians to better access to retail park and surrounding amenities, given at this location all crossings are at street level with no bridges, despite the high flows.

3.6.32. Comparing the national average of the vulnerable groups, except the proportion of older people, all other groups are below the national average.

3.6.33. Overall, the assessment concluded that the scheme would be **Moderate Beneficial** at this location for older people and **Neutral** for all other groups, in terms of severance.

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Location 4 (Royal Shrewsbury Hospital)

3.6.34. Situated in a predominantly residential area to the west of the town centre and accessed by road only from the B4386 and by foot via multiple entrances. This location provides a variety of medical services, and several schools also fall in the very edges of its catchment area.

3.6.35. Many roads within the catchment area of this location are local residential roads with AADT flows below 8,000 and so were excluded from the severance assessment. Just outside the catchment area, the B4380, OLR and A5 all show forecast increases in AADT flows of greater than 10%. These three roads, however, have limited frontages and are more rural in nature and have low pedestrian usage, with the numbers of pedestrian crossing these roads being very low. Therefore, these significant flow changes are not expected to lead to any change in severance.

3.6.36. Within the catchment areas, the proportion of all four vulnerable groups is below the national average and so the overall assessment concluded that the scheme would be **Neutral** at this location for all groups, in terms of severance.

Appraisal Outcome (Step 3b)

3.6.37. The overall assessment shows the grading of distributional impacts for each social group under investigation according to a seven-point scale (Large, Moderate and Slight Beneficial or Adverse, or Neutral). The outcome of severance assessment for the scheme is shown in Table 3-26.

Table 3-26 – Severance impact assessment for proposed pedestrian crossings

Severance Location	Children Aged Under 16	Older People Aged 70+	No-Car Households	People with Disability
Location 1	Moderate Beneficial	Neutral	Neutral	Moderate Beneficial
Location 2	Neutral	Large Beneficial	Large Beneficial	Neutral
Location 3	Moderate Beneficial	Neutral	Neutral	Neutral
Location 4	Neutral	Neutral	Neutral	Neutral

3.7 Personal Affordability

Introduction

3.7.1. Changes in transport costs have the potential to disproportionately affect areas where there are few or no travel alternatives, particularly in areas where income levels preclude car ownership. As a result, impact on travel to work, education and access to affordable food etc. can be expected. These impacts are likely to be exacerbated in areas with low income, low car ownership and a large elderly population, as well as areas where there is a higher proportion of people with disabilities. Personal affordability benefits arise when the cost

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related to fuel and non-fuel (maintenance, wear and tear) is reduced. This is influenced by changes in journey speed and distance brought about by scheme implementation.

Screening (Step 1)

3.7.2. Step 1 was a screening of personal affordability impacts as shown in Table 3-27. As a result of the screening a personal affordability impact appraisal was carried out for fuel and non-fuel operating costs (TUBA benefit). A full appraisal of fuel and non-fuel costs was required due to the scheme's impact on journey speeds, congestion, and re-routeing. Other impacts were either not considered relevant or not expected to be impacted by the scheme.

Table 3-27 - Screening of personal affordability impact appraisal

Mode	Cost Change	Expected	Captured in TUBA	Impact
Car	Car fuel and non-fuel cost	Yes	Yes	Changes due to congestion relief and rerouting
	Road user charges	No	No	
	Public parking charges	No	No	
	Other car charge/costs	No	No	
Public Transport	Bus fares	No	No	
	Rail fares	No	No	
	Rapid transit fares	No	No	
	Mode shift between public transport modes due to change in supply	No	No	
	Concessionary fares	No	No	
	Other public transport charges/costs	No	No	
Non-motorised modes	Walking costs	No	No	
	Cycling costs	No	No	

3.7.3. As a TUBA appraisal was undertaken for the scheme, the results of this assessment have been used as the basis for the personal affordability analysis.

Assessment – Area of Impact (Step 2a)

3.7.4. As with the user benefit DI appraisal, the impact area for the personal affordability DI appraisal has been selected based on the detailed model area which is considered large enough to capture the largest impacts expected from the scheme. Areas further away from the scheme where impacts are likely, but are expected to be relatively small, were excluded from the DI impact area. This area is shown earlier in Figure 3-1.

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Assessment – Identification of Social Groups (Step 2b)

3.7.5. In line with the TAG methodology, the primary group of interest is people at the lower end of the income distribution. The income domain from the IMD 2019 has been mapped at the LSOA level across the impact area, as shown in Figure 3-2.

3.7.6. VOCs (fuel and non-fuel) for commuting and other purposes only (non-business) were output from the TUBA assessment as a model zone level. Following the same methodology adopted for the user benefit DI appraisal, these zonal benefits from TUBA have all been disaggregated, as necessary, to LSOAs in proportion to the population of the LSOAs within each model zone. The distribution of population in different income groups in the impact area is shown in Table 3-5.

Assessment – Identification of amenities (Step 2c)

3.7.7. Based on TAG, the identification of amenities for personal affordability is not required for the DI appraisal.

Appraisal of Impact (Step 3)

3.7.8. Table 3-28 presents the distribution of total personal affordability benefits across the population within the scheme impact area by income quintile, identifying where there are differences between the distribution of personal affordability benefits and population, and including the outcome of the assessment based on the seven-point scale and the criteria or thresholds outlined earlier in Table 3-4.

Table 3-28 – Distribution of personal affordability benefits by income quintile

User Benefits	IMD Income Quintile					Total
	1 (0%-20%)	2 (20%-40%)	3 (40%-60%)	4 (60%-80%)	5 (80%-100%)	
Total decrease in user costs (£)	-21,524	240,912	164,176	120,166	481,065	984,795
Share of benefits in the impact area	-2%	24%	17%	12%	49%	100%
Population	23,336	9,306	20,494	24,117	22,830	100,083
Share of population in the impact area	23%	9%	20%	24%	23%	100%
Difference (share of benefit – share of population)	-25%	15%	-3%	-12%	26%	
Assessment	Slight Adverse ✗	Large Beneficial ✓✓✓	Moderate Beneficial ✓✓	Slight Beneficial ✓	Large Beneficial ✓✓✓	

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3.7.9. Table 3-28 shows all income quintiles, except Quintile 1 (the most deprived) receive personal affordability benefits from the scheme.

3.7.10. The total personal affordability benefit experienced across the scheme impact area is **£984,795** (2010 PV).

3.7.11. The largest share of personal affordability benefits are received by Quintile 5 (the least deprived) at 49%, with Quintiles 2, 3 and 4 also receiving a share of personal affordability benefits, albeit to a lesser degree with shares of 24%, 17% and 12% respectively. Quintile 1, however, receives a small disbenefit.

3.7.12. Overall, personal affordability benefits are not distributed proportionally as, despite having the lowest share of population, Quintile 2 has the second highest share of personal affordability benefits. Also, Quintile 4 has the highest share of population but the second lowest share of personal affordability benefits, and Quintile 5 has the highest share of personal affordability benefits by far, but only the third highest population. Lastly, Quintile 1 receives disbenefits, despite having the second largest population.

3.7.13. Figure 3-18 shows the overall distribution of personal affordability benefits by LSOA, across the scheme impact area.

Figure 3-18 – Spatial distribution of overall personal affordability benefits amongst LSOAs

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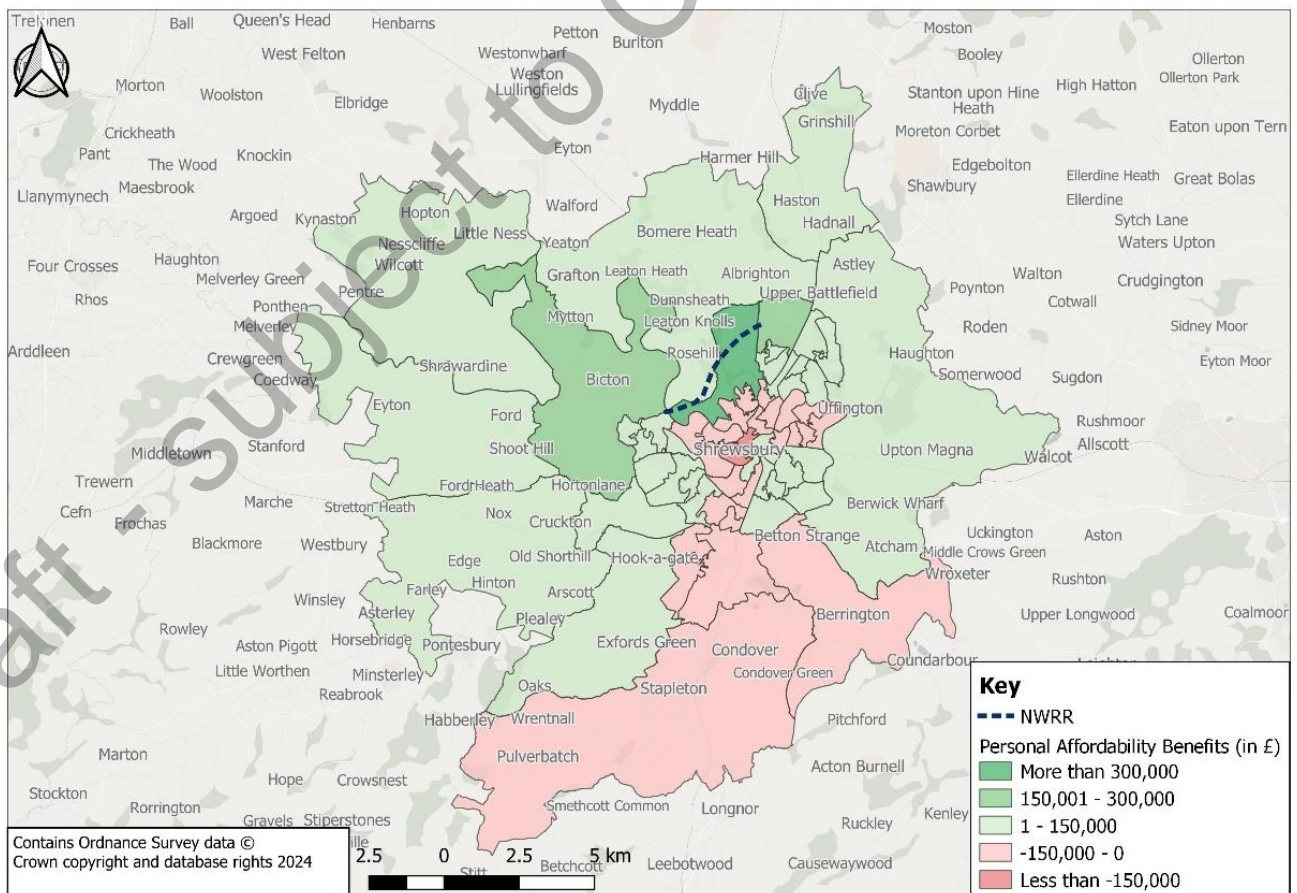
Appendix A

DI Screening Proforma

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Distributional Impact Appraisal Screening Proforma

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	The NWRR scheme has proposed a link that connects between. Currently, the northern and western parts of Shrewsbury are poorly connected with north-west corridor through traffic having four main route options involving passing through the town centre, using the inner distributor ring road, using the full length of the existing A5 / A49 outer bypass, or using unsuitable and narrow local roads to the north-west of the town. This increases congestion, and thus the journey time and cost. It will be reduced by the implementation of the scheme which together with the A5 and A49 bypasses, the Battlefield Link Road and the planned OLR, will provide the 'missing link', completing the full ring of the outer bypass of Shrewsbury consequently decreasing journey time and cost.	Yes
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	Yes	It is anticipated that the impact of NWRR scheme on noise will be significant for the area. The scheme would deliver a new link across the River Severn providing a quicker transport link around the town between the western and northern sides of Shrewsbury. This would alleviate current congestion around the town centre and on the inner distributor ring road, reducing noise level.	Yes

Air quality	Any change in alignment of transport corridor or any links with significant changes in vehicle flow, speed or %HDV content: • 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	Yes	The scheme would have an impact on the air quality around the town centre of Shrewsbury. The link to connect the northern and western parts of Shrewsbury will significantly reduce the existing congestion created at the town centre. It has been assumed that the scheme will promote better air quality in the hotspot pollution area in Shrewsbury town centre, while creating some increases in areas with headroom below the national objective levels.	Yes
Accidents	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	Yes	The scheme will provide a shorter and more direct link, built to modern standards, between the north and west of the town which will reduce traffic volumes using the existing north-west corridor links, in particular the town centre roads are not designed to modern standards. This will help in reducing the number and severity of accidents within Shrewsbury. Moreover, the lower flows on roads within the town centre will reduce the potential for conflicts with those choosing to travel by active mode.	Yes
Security	Any change in public transport waiting/interchange facilities including pedestrian access expected to affect user perceptions of personal security	Qualitative	The delivery of transport schemes and interventions may not affect the level of security for transport users. In line with TAG Unit A4.1, a qualitative assessment will be undertaken to consider the changes in security.	No
Severance	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	Yes	The scheme is anticipated to result in reduced traffic volume at the existing busy road and vehicle transfer to the new shorter, more direct NWRR. The scheme also provides a 3m wide footway/cycleway along	Yes

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	significant changes (>10%) in vehicle flow, speed, %HGV content		the length of its southern side as well as bridges and at-grade crossings for pedestrians and cyclists to maintain connectivity and ensure safety. This road space reallocation to public transport and active modes of travel is essential to impact the level of severance.	
Accessibility	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)	Yes	The scheme does not propose a change in routing or timing of the current public transport. Consequently, no major changes will be experienced on the accessibility of public transport.	No
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])	Yes	With the increased growth in Shrewsbury and increased traffic demand, the lack of network resilience will create more traffic using the north-west corridor passing through the town centre, with increased congestion, queuing and delay and associated adverse impacts transport costs to the regional and local economy. The NWRR scheme is a way to resolve the problem by proposing the direct link to connect the north and west part of the town and thus reducing the journey cost. Thus, it has been anticipated that the scheme would be beneficial for the affordability of the users.	Yes

Appendix B

TAG Worksheets
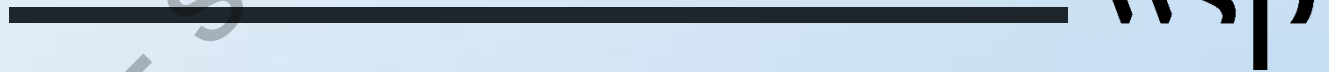
Distributional Impacts: User Benefits

	IMD Income Domain £m					Total
	Most Deprived Areas ←		→ Least Deprived Areas			
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
LSOA 1				£16,199		£16,199
LSOA 2	£22,569					£22,569
LSOA 3				£750,572		£750,572
LSOA 4					£790,242	£790,242
…….						
LSOA *N*					£2,224	£2,224
Total benefits (∑LSOAs)	£26,477,149	£11,427,749	£15,292,791	£13,857,212	£32,937,814	£99,992,715
Total disbenefits (∑LSOAs)						
Share of user benefits	26%	11%	15%	14%	33%	100%
Share of user disbenefits						
Share of population in the impact area	23%	9%	20%	24%	23%	100%
Assessment	✓✓	✓✓	✓	✓	✓✓✓	

Distributional Impacts: Noise

| | IMD Income Quintile | | | | | Total |
| | Most Deprived <------------------> Least Deprived | | | | | |
	1 0-20%	2 20-40%	3 40-60%	4 60-80%	5 80-100%	
Households with increased noise [A]	472	624	1127	697	1769	4689
Households with decreased noise [B]	0	0	417	164	81	662
Households with no change in noise level [C]	360	139	1204	738	789	3230
Net number of winners - losers in each group [D] = [B] – [A]	-472	-624	-710	-533	-1688	
Total number of winners - losers across all groups [E] = ∑[D]						-4027
Net winners - losers as % of total [F] = [D] / [E]	12%	15%	18%	13%	42%	
Share of total households within the noise impact area	10%	9%	32%	19%	31%	
Assessment	Moderate Adverse ××	Large Adverse ×××	Slight Adverse ×	Slight Adverse ×	Large Adverse ×××	

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Distributional Impacts: Air Quality

2027 due to changes in annual mean NO_2

	IMD Income Quintile					Total
	Most Deprived	<------------------>		**Least Deprived**		
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**	
Number of households with improved air quality [A]	58	301	1488	915	222	2984
Number of households with no change in air quality [B]	736	2411	2416	4087	3112	12762
Number of households with worse air quality [C]	0	189	198	428	200	1015
Number of net winners - losers [D] = [A] – [C]	58	112	1290	487	22	
Total number of winners - losers across all groups [E] = ∑[D]						1969
Net winners - losers in each area as percentage of total [F] = [D] / [E]	3%	6%	66%	25%	1%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Moderate Beneficial ✓✓	Slight Beneficial ✓	Large Beneficial ✓✓✓	Slight Beneficial ✓	Slight Beneficial ✓	

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Distributional Impacts: Air Quality

2042 due to changes in annual mean NO$_2$

	IMD Income Quintile					Total
	Most Deprived		<------------------>		**Least Deprived**	
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**	
Number of households with improved air quality [A]	0	0	221	121	1	343
Number of households with no change in air quality [B]	794	2864	3870	5243	3528	16299
Number of households with worse air quality [C]	0	37	11	66	5	119
Number of net winners - losers [D] = [A] – [C]	0	-37	210	55	-4	
Total number of winners - losers across all groups [E] = ∑[D]						224
Net winners - losers in each area as percentage of total [F] = [D] / [E]	0%	-17%	94%	25%	-2%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Neutral	Moderate Adverse ✗✗	Large Beneficial ✓✓✓	Slight Beneficial ✓	Slight Adverse ✗	

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Distributional Impacts: Air Quality

2027 due to changes in annual mean PM$_{2.5}$

	IMD Income Quintile					Total
	Most Deprived		**<------------------>**		**Least Deprived**	
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**	
Number of households with improved air quality [A]	0	0	21	1	0	22
Number of households with no change in air quality [B]	794	2901	4081	5427	3534	16737
Number of households with worse air quality [C]	0	0	0	2	0	2
Number of net winners - losers [D] = [A] – [C]	0	0	21	-1	0	
Total number of winners - losers across all groups [E] = ∑[D]						20
Net winners - losers in each area as percentage of total [F] = [D] / [E]	0%	0%	105%	-5%	0%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Neutral	Neutral	Large Beneficial ✓✓✓	Slight Adverse ✗	Neutral	

Distributional Impacts: Air Quality

2042 due to changes in annual mean PM$_{2.5}$

	IMD Income Quintile					Total
	Most Deprived		**<------------------>**		**Least Deprived**	
	1 **0-20%**	**2** **20-40%**	**3** **40-60%**	**4** **60-80%**	**5** **80-100%**	
Number of households with improved air quality [A]	0	0	19	1	0	20
Number of households with no change in air quality [B]	794	2901	4083	5420	3534	16732
Number of households with worse air quality [C]	0	0	0	9	0	9
Number of net winners - losers [D] = [A] – [C]	0	0	19	-8	0	
Total number of winners - losers across all groups [E] = ∑[D]						11
Net winners - losers in each area as percentage of total [F] = [D] / [E]	0%	0%	173%	-73%	0%	
Share of total households within the air quality impact area	5%	17%	24%	32%	21%	
Assessment	Neutral	Neutral	Large Beneficial ✓✓✓	Large Adverse ×�××	Neutral	

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Distributional Impacts: Accidents

Change in Accidents that Could Impact on Defined Vulnerable Groups						
Roads	**Children Aged Under 16**	**Older People Aged 70+**	**Pedestrians**	**Cyclists**	**Motorcyclists**	**Young Male Drivers**
A5124/ A528 Battlefield Link Road, Ellesmere Road and Coton Hill	Slight Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	N/A	Slight Beneficial
A5112 / A5191 Battlefield Road, Whitchurch Road, Ditherington Road, Spring Gardens, St Michael's Street and Castle Foregate	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Slight Beneficial
A458 Welshpool Road and The Mount	Moderate Beneficial	Moderate Beneficial	Slight Beneficial	Moderate Beneficial	Slight Beneficial	N/A
B4386 Mytton Oak Road and Copthorne Road	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Slight Beneficial
A488 Radbrook Road, Porthill Road and New Street	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
A5 and A49 between Churncote and Battlefield Roundabouts	Moderate Beneficial	Moderate Beneficial	Slight Beneficial	Slight Beneficial	Moderate Beneficial	Slight Beneficial
B4380 / A5112 Shelton Road, Roman Road, Hazledine Way, Bage Way, Robertson Way and Telford Way	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
3. Change in numbers of pedestrians, cyclists and motorcyclists						
110 pedestrians, cyclists and motorcyclists are assessed.						
Overall assessment for link						
Moderate beneficial						
Qualitative Commentary						
The table indicates a neutral accident impact for vulnerable groups on the A488 western approach and the B4380/A5112 inner distributor ring road. On the other five major road sections, all vulnerable groups will experience slight to moderate accident reduction benefits due to the scheme.						

Distributional Impacts: Severance

Location	All Social Groups			No-Car Households			Young People			Older People			People with Disabilities		
	Change in Severance [A]	No. of People Affected [B]	Overall Effect [A]*[B]	Change in Severance [A]	No. of Households Affected	Overall Effect [A]*[B]	Change in Severance [A]	No. of People Affected [B]	Overall Effect [A]*[B]	Change in Severance [A]	No. of People Affected [B]	Overall Effect [A]*[B]	Change in Severance [A]	No. of People Affected [B]	Overall Effect [A]*[B]
1	2	9396	18792	0	9396	0	2	9396	18792	0	9396	0	2	9396	18792
2	3	9817	29450	3	9817	29450	0	9817	0	3	9817	29450	0	9817	0
3	2	7180	14360	0	7180	0	2	7180	14360	0	7180	0	0	7180	0
4	0	7303	0	0	7303	0	0	7303	0	0	7303	0	0	7303	0

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Distributional Impacts: Security

Security Indicator and element of entire journey	Performance for each security indicator			Relative importance of each indicator [B] (High /Medium /Low) (=3/2/1)				Weighted score for each indicator [C] = [A] * [B]			
	Without scheme	With scheme	Change (0/+1/+2) [A]	All users	Older people	Women	Young People	All users	Older people	Women	Young People
Access on foot from origin to the public transport stop	Low	Low	0								
Site perimeters, entrances and exits	Low	Low	0	N/A	N/A	N/A	N/A				
Formal surveillance	Low	Low	0	N/A	N/A	N/A	N/A				
Informal surveillance	Low	Low	0	N/A	N/A	N/A	N/A				
Landscaping	Low	Medium	1	N/A	N/A	N/A	N/A				
Lighting and visibility	Low	Medium	1	N/A	N/A	N/A	N/A				
Emergency call	Low	Low	0	N/A	N/A	N/A	N/A				
Staffing of facility	Low	Low	0								
Public transport journey between the boarding and alighting stops	Low	Low	0								
Access on foot from the alighting stop to destination	Low	Low	0								
Total security improvement score [D] = $\sum[C]_n$											
No of users affected (<500 users / day is low, >10,000 is high) [E]											
Overall assessment of security impacts (all users and vulnerable groups)											

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Distributional Impacts: Journey Quality - Vehicles

Factor	Sub-factor	Better	Neutral	Worse
Traveller Care	Cleanliness		✓	
	Facilities		✓	
	Information		✓	
	Environment		✓	
Travellers' Views	-	✓		
Traveller Stress	Frustration	✓		
	Fear of potential accidents	✓		
	Route uncertainty	✓		

Reference Source

DfT (2022) TAG Unit A4-1 Social Impact Appraisal, Part 6 Journey Quality Impacts.

Summary Assessment Score

Large Beneficial

Qualitative Comments

The overall journey quality impact on vehicles has been assessed as Large Beneficial as, whilst traveller care is considered neutral, both travellers views and travellers stress are considered beneficial and they are both expected to impact well over 10,000 users daily, which equates to a large impact.

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Distributional Impacts: Journey Quality – Active Modes

Factor	Sub-factor	Better	Neutral	Worse
Traveller Care	Cleanliness	✓		
	Facilities	✓		
	Information		✓	
	Environment	✓		
Travellers' Views	-	✓		
Traveller Stress	Frustration	✓		
	Fear of potential accidents	✓		
	Route uncertainty		✓	

Reference Source

DfT (2022) TAG Unit A4-1 Social Impact Appraisal, Part 6 Journey Quality Impacts.

Summary Assessment Score

Slight Beneficial

Qualitative Comments

The overall journey quality impact on active modes is assessed as Slight Beneficial. While moderate benefits arise from traveller frustration and fear of accidents, which affect active mode users both on the scheme and in the town centre, the remaining benefits primarily impact the smaller group directly using the scheme.

Distributional Impacts: Affordability

	IMD Income Domain £m					Total
	Most Deprived Areas ← → Least Deprived Areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
LSOA 1				£399		£399.13
LSOA 2	£726					£726.06
LSOA 3				-£8,737		-£8737.15
LSOA 4					£3581	£3581.04
…….						
LSOA *N*				£169		£169
Total Increase in user charges (∑LSOAs)	£21,524					£21,524
Total decrease in user charges (∑LSOAs)		£240,912	£164,176	£ 120,166	£481,065	£1,006,319
Share of increase in user charges	2%					
Share of decrease in user charges		24%	17%	12%	49%	
Share of population in the impact area	23%	9%	20%	24%	23%	
Assessment	×	✓✓✓	✓✓	✓	✓✓✓	

Appendix C

TAG Output Summary

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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%	26%	12%					N/A	-2%	5%	20%
		20-40%	11%	15%					N/A	24%	22%	20%
		40-60%	15%	18%					N/A	17%	33%	20%
		60-80%	14%	13%					N/A	12%	26%	20%
		80-100%	33%	42%					N/A	49%	14%	20%
	Children aged under 16			18%	17%	9%	N/A	16%	N/A		15%	17%
	Young adults aged 16 to 25					11%			N/A		10%	12%
	Older people aged 70+			16%		7%	N/A	17%	N/A		19%	14%
	People with a disability						N/A	18%	N/A		19%	18%
	Black and Minority Ethnic						N/A		N/A			
	No-car households								N/A		14%	23%
	Households with dependent children								N/A			
	Indicator population in the impact area		100,083	35,115	98,975	90191	N/A	33,696	N/A	100,083	323,570	59,597,611
Amenities present within the impact area	Schools / nurseries			✓	✓	✓	N/A	✓	N/A	N/A		
	Playgrounds			✓	✓	✓	N/A	✓	N/A	N/A		
	Parks and open spaces			✓	✓	✓	N/A	✓	N/A	N/A		
	Hospitals			✓	✓	✓	N/A	✓	N/A	N/A		
	Care homes / day centres			✓	✓	✓	N/A	✓	N/A	N/A		
	Community centre											

Appendix D

Distributional Impact Appraisal Matrix

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Impact	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	✓✓	✓✓	✓	✓	✓✓✓	No	User benefits are distributed unevenly across quintiles. Quintile 5 (least deprived) and Quintile 1 (most deprived) receive the highest shares, at 33% and 26%, respectively, while the other three quintiles receive 11-15% each. Quintile 2, with the smallest population, gets the lowest benefits. Benefits are not proportional to population size—Quintile 4, despite having the largest population, receives the second-lowest benefits, whereas Quintile 5 has the highest benefits but ranks third in population size.
Noise	✗✗	✗✗✗	✗	✗	✗✗✗	No	Quintile 1, representing 10% of households, has a Moderate Adverse impact as net losses align with its population share (12%). Quintiles 2 (9%) and 5 (31%) face Large Adverse impacts due to disproportionately higher net losses (15% and 42%). Quintiles 3 (18%) and 4 (13%) experience Slight Adverse impacts, with net losses lower than their household shares (32% and 19%).
Air quality	✓✓	✓	✓✓✓	Neutral	✓	No	For PM2.5, Quintile 3 receives the highest benefits in both 2027 and 2042. The 4th quintile transitions from a slight adverse impact to a large adverse impact, while the 1st, 2nd, and 5th quintiles remain neutral. For NO2, Quintile 3 again shows significant benefits in both years. However, the 1st quintile shifts from moderate benefit in 2027 to neutral in 2042. The 2nd and 5th quintiles transition from slight benefits to moderate adverse and slight adverse impacts, respectively.
Affordability	✗	✓✓✓	✓✓	✓	✓✓✓	No	Personal affordability benefits are unevenly distributed. Quintile 5 (least deprived) receives the highest share of benefits (49%), followed by Quintiles 2 (24%), 3 (17%), and 4 (12%). Quintile 1 incurs a slight disbenefit. The distribution is not proportional to population size, with Quintile 2 receiving high benefits despite a small population, and Quintile 4 receiving low benefits despite the largest. Quintile 5, with the third-largest population, receives the most benefits, while Quintile 1, with the second-largest population, experiences disbenefits.
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	✗✗										Quintile 4 has the highest proportion of children, followed by Quintiles 3 and 5, while Quintile 2 has the lowest. Given the range of impacts from slight to significantly adverse, it can be concluded that the scheme will moderately disadvantage the overall child population.
Air Quality	✓✓										The majority of children are in the 1st and 2nd quintiles, which experience significant benefits from the scheme. The remaining quintiles have a relatively similar share of the child population. Considering that the average impact across quintiles ranges from slight to significant benefits, it can be concluded that children overall will experience moderate benefits from the scheme.
Accidents	✓✓	✓✓					✓	✓✓	✓✓	✓✓	The forecast change in accidents from DM to DS shows a mixed impact on the vulnerable groups. Overall, the new scheme will reduce the number of accidents impacting, consequently reducing the impact of accidents on all the vulnerable groups. The impact on various vulnerable groups ranges from neutral to slight and moderate beneficial impact for all the selected links.
Security	N/A	N/A		N/A	N/A	N/A					N/A
Severance	✓✓	✓✓✓	NA		✓✓						The level of severance experienced by the vulnerable groups in the 4 chosen locations ranges from neutral to moderate and large beneficial. Majorly the change in AADT shows a beneficial impact on the overall impact area which helps in reducing the severance for these groups.
Accessibility	N/A	N/A	N/A	N/A	N/A	N/A					N/A

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