A51/A500 Route Management Study

Study Report

January 2009

Produced for
4NW, Cheshire East Council and Cheshire West & Chester Council

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4NW in partnership with Cheshire West & Chester and Cheshire East Councils has commissioned Mouchel to undertake a study of the A51 and A500 routes. This study has been a pilot for the Route Management Guidance for the North West, which Mouchel has been commissioned by 4NW to develop.

The process to undertake Route Management Studies has been devised to generate a standard approach to understanding and assessing the performance of regionally important highway corridors and identifying challenges to their current and future operation. The main outputs from the studies are Route Outcomes which the management of the routes will help to deliver over the coming decades.

The process has been aligned to the Government's Delivering a Sustainable Transport System, known as DaSTS. DaSTS focuses on delivering five overall goals for transport:

- Support Economic Growth
- Reduce Carbon Emissions
- Contribute to Better Safety, Security and Health
- Promote Equality of Opportunity
- Improve Quality of Life and a Healthy Natural Environment

The focus of this report is the Route Management Study of the A51/A500, from its junction with the A55 near Chester, to its junction with the M6 Motorway at Junction 16. The route is primarily rural and passes through or around a number of villages along its route, before passing Nantwich to its east and Crewe to the south. The route is part of the Functional Road Hierarchy identified in the Regional Spatial Strategy, a Route of Regional Importance and a non-trunk A-road managed by both Chester West & Chester Council and Cheshire East Council.

During the course of the study, a range of challenges emerged through the process to assess the performance of the route. These challenges reflect both the existing performance and the potential for change, based on known and expected developments and are summarised below.

The route suffers from congestion, significant in some places, which occurs both on the route and on roads that cross it. The Barthomley Link, the most easterly section of the route, is particularly prone to congestion, with significant queues in the eastbound direction both during and between the peak periods. In many places, traffic flows on the route are significantly above the national average for this type of road and HGV numbers are particularly high in comparison to similar routes.

Without careful consideration and the implementation of appropriate measures, planned developments and emerging proposals may have a detrimental impact on the future operation of the route. The Strategic Regional Sites at Basford East and Basford West have the potential to provide very significant economic development for Crewe and the surrounding area but the plans need to be carefully nurtured to ensure that growth in employment and the economy does not have a significant detrimental effect on the already congested local and regional road network.

The success of Cheshire West & Chester Council in securing Growth Point Status for the area may bring economic and social benefits to its major towns and surrounding populations. However, there is potential for resulting developments to have an effect on the supporting transport networks, including the A51 between Chester and Tarporley. The outputs from the West Cheshire Transport Study will be key in clarifying what any effects may be.

The potential impacts of the Basford and Growth Point developments, and other potentially major developments in Chester, Crewe, Nantwich and the surrounding area, will need to be taken into account in the management of the A51/A500 route. There are proposals for other major employment, retail, leisure and transport developments across the A51/A500 corridor which could affect traffic using the route.

Road safety is also a significant concern on the route with a number of sections having a higher than average frequency of collisions for this type of road. The severity of collisions is also a concern with the majority of the route having rates considerably above the average for this type of route. There are a large number of junctions on the route at which there are clusters of collisions and which could provide a focus for improving the safety record of the route.

Of particular concern is the number of HGV related collisions on the route. Although there is a higher than average number of HGVs using the route, the high number of collisions involving these vehicles cannot simply be attributed to this fact. Further investigation is required to understand the reasons behind this trend and to identify potential solutions.

With the growing importance of the carbon agenda, this study has assessed the level of carbon emissions that can be attributed to the use of this route. While this initial assessment has provided some insight into the quantity of carbon emitted, further work needs to be undertaken to provide a greater understanding of the relative impacts of this route alongside others in the region. Furthermore, more work can be done in the area to reduce transport-related carbon emissions. At present, there is a very low uptake of travel plans by major employers in the route corridor and there are emerging interventions, such as personal journey planning and area-wide travel planning, which could encourage people to use alternative modes of transport, reducing both congestion and carbon emissions.

Other environmental issues are apparent within the A51/A500 corridor. The route passes through or close to a number of areas protected for environmental reasons.

There are also significant noise related issues at the western end of the route, which can be attributed to the level of traffic using the road and the relative closeness and density of the surrounding residential area. Of greatest risk to the route itself, is the presence of flood risk areas on a number of sections, which are identified as liable to flooding every 20 years, although the actual risk to the route is unclear.

The identification of these Route Challenges has resulted in the recommendation of six Route Outcomes which will provide a focus for the future management the A51/A500. The six outcomes are set out below:

1. Improved understanding of existing travel on the route and the potential for change in the future

2. Reduced carbon emissions from the use of the route

3. Reduced collision rates and severity of collisions on the route

4. Improved knowledge and management of freight movements on the route

5. Reduced congestion on and across the route

6. Reduced congestion on the Barthomley Link

A number of potential actions have also been identified to provide some guidance on the future work and possible measures to achieve the above outcomes. However, further actions may come to light following subsequent additional and more detailed study work by the local highway authorities.

This report provides a framework upon which the development of measures to resolve Route Challenges can be commenced or continued. It is recommended that Cheshire West & Chester Council and Cheshire East Council use this study to support the work they undertake to formulate such measures. The DaSTS compliant nature of the study process provides a firm foundation upon which to progress management of the route and on which funding decisions can subsequently be based.

A risk assessment has also been undertaken to take account of major risks to the operation of the route. Risks highlighted include those associated with climate change and the interaction of the route and adjacent rail lines.

1 Introduction

1.1 Route Management Studies

4NW, in partnership with Cheshire West & Chester and Cheshire East Councils, has commissioned Mouchel to undertake a study of the A51 and A500 routes. This study has been a pilot for the Route Management Guidance for the North West, which Mouchel has also been commissioned by 4NW to develop.

The process for undertaking Route Management Studies has been devised to provide a standard approach to understanding and assessing the performance of regionally important highway corridors and identifying challenges to their current and future operation. The main outputs from the studies are Route Outcomes which the management of the routes will help to deliver over the coming decades.

The process has been aligned to the Government's Delivering a Sustainable Transport System, known as DaSTS. The strategy focuses on delivering five overall goals for transport:

- Support Economic Growth
- Reduce Carbon Emissions
- Contribute to Better Safety, Security and Health
- Promote Equality of Opportunity
- Improve Quality of Life and a Healthy Natural Environment

Each Route Management Study in the North West will provide the foundations for the development and procurement of options for the better management of the route which will comply with and contribute to the DaSTS goals.

The focus of this report is the Route Management Study of the A51/A500, which links Chester at the north western end of the route, at the junction with the A55, to the M6 Motorway at the south eastern end, at Junction 16. The route is primarily rural and passes through or around a number of villages along its length, before passing Nantwich to its east and Crewe to the south. The route is part of the Functional Road Hierarchy identified in the Regional Spatial Strategy, a Route of Regional Importance and a non-trunk A-road managed by both Chester West & Chester Council and Cheshire East Council.

1.2 Study Background

The pilot study has resulted in the development of a full and complete Route Management Study of the A51/A500 route. This particular corridor was chosen for the pilot for a number of reasons including:

- The location of the route in relation to the national motorway network, and the regionally important urban areas of Chester and Crewe;
- The variety of carriageway types along the route;
- The rural/urban land-use split along the route;
- The route's location in relation to the West Coast mainline railway and the strategic nature of Crewe in relation to this;
- The location of the Strategic Regional Site at Basford East and West in relation to the route.

1.3 Study Scope and Process

The study scope is to produce desired outcomes for the route and to identify possible actions to achieve these.

The study process has used the methodology provided by the Draft Route Management Guidance for the North West document. The study has followed the structured six stage process outlined below:

- **Stage 1 – Start the Study:** The stage involved identifying the Project Team, confirming the programme and milestones, defining study area, commencing the process of collating relevant data.
- **Stage 2 – Identify Route Functions:** The stage involved identifying the existing and future functions of the route at the national, regional and sub-regional level.
- **Stage 3 – Assess Route Performance:** The stage involved assessing the existing performance of the route through the analysis of existing policies, information and data. The process also involves assessing how the route performance may change as a result of spatial planning issues.
- **Stage 4 – Identify Route Challenges:** The process involved identifying challenges that either currently affect the route or may do so in the future. All challenges will be identified at the regional and sub-regional level.
- **Stage 5 – Identify Route Outcomes:** The stage involved identifying the outcomes that the route should deliver over the next 20 years and the potential actions to achieve them.
- **Stage 6 – Produce the Study Report**
  The final stage of the Route Management Study process was to produce a final study report documenting the process and presenting the outputs.

The six stages provided a consistent and measured approach and all contained important goals and project milestones. Each stage produced key outputs that helped to develop the study in a methodical manner.

1.4 Purpose of the Report

The report collates and presents all data, analysis and findings of the Route Management Study. The report, importantly, provides an audit trail from the identification of route challenges to the formulation and development of the resulting route outcomes and associated potential actions.

1.5 Format of the Report

Following on from this introduction, the report is presented as follows:

- Route Description
  This section provides an overall description of the A51/A500 route, splitting it into sections and providing a commentary on the key aspects of the route and major issues.

- Route Functions
  The section outlines the current and potential future functions that the route serves at regional and sub-regional levels.

- Route Performance
  This section provides a commentary on the current level of performance provided by the A51/A500 route and includes a Standard Performance Assessment which will be common to all Route Management Studies.

- Route Challenges
  This section highlights the Challenges that currently affect the route or may do so in the future,

- Route Outcomes
  This section presents the Route Outcomes, the results that the Route Management Study will aim to achieve on the A51/A500 over the coming years. This section also identifies potential actions that may be implemented to assist in the achievement of the Outcomes.

- Conclusions
  Finally, the report provides some overall conclusions to the study.

2 Route Description

This section of the report provides a broad description of the A51/A500 corridor using information collated and analysed during the course of the study.

2.1 Wider Route Area

The wider area surrounding the route covers the Chester, Crewe and Nantwich urban areas as well as a narrower corridor containing the rural areas and villages between and surrounding the towns (see Figure 2-1). Chester is a major sub-regional centre for employment, retail, leisure and tourism, generating daily trips from a wide area including Cheshire, Merseyside and North Wales. Crewe is important to the South Cheshire sub-region, which also contains Nantwich, and provides employment and retail opportunities as well as a growing University campus. Nantwich is a small market town, which is primarily a dormitory settlement for the surrounding larger urban centres and conurbations.

The Wider Route Area contains the A51/A55 junction and Junction 16 of the M6, which are located at the west and east end of the study route respectively. Significantly, the West Coast Mainline Railway runs north to south through the wider study area and the major rail hub of Crewe is located approximately two kilometres north of the study route. The Crewe-Chester railway line also runs parallel to the study route.

Figure 2-1 – A500/A51 Study Route and the Wider Study Area

2.2 Immediate Route Area

The route itself is primarily rural in nature and avoids major urban centres. The route passes through a number of small villages, with larger settlements having been

bypassed during the past few decades. For the purposes of this study, the route has been divided into eight separate sections based on the location of junctions, the standard of the carriageway and the level of traffic.

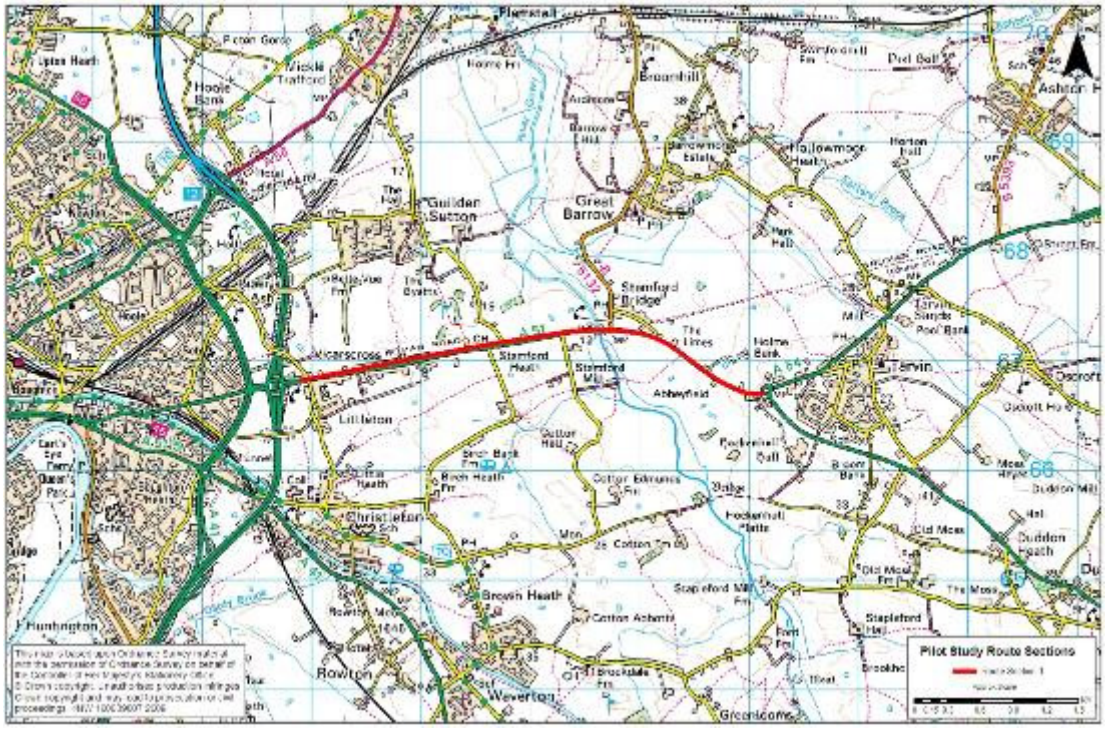
2.2.1 *Section One – Chester to Tarvin (A51: A55 to A54)*

The first section (see Figure 2-2) of the route is approximately 4.6km in length and not only provides the final link from the south-east of Cheshire to Chester and North Wales, but also provides a similar link from Northwich, Winsford and Middlewich via the A54 and A556.

The section starts at the grade-separated roundabout junction with the A55 at Vicar's Cross, with the A55 passing beneath the A51. The A55 is a secondary trunk route from North West England to the North Wales coast providing links to the tourist resorts and the strategically important port at Holyhead on Anglesey. The A55 also links the route to the M53 and M56 which provide links to the Wirral and the Mersey belt respectively.

Travelling eastbound, the study route passes through a residential area, with houses set back some distance from the road, and then heads into the countryside after passing Vicar's Cross Golf Course, changing from 40mph to national speed limit. There is a signalised junction with Barrow Lane before the road becomes wide single standard and links into the roundabout junction with the A54.

Figure 2-2 – Route Section One



At 28,700 vehicles per day (AADT – DfT 2007[1]), the section has the second highest traffic flow on the route, well above the national average for rural A-roads. This can largely be attributed to the merging of the A51 and A54 at the eastern end of the route section; the traffic flows from two major routes combining to generate a very significant flow to and from the A55 and Chester. Related to the high traffic flows, this section has noise related issues, as identified by DEFRA research.

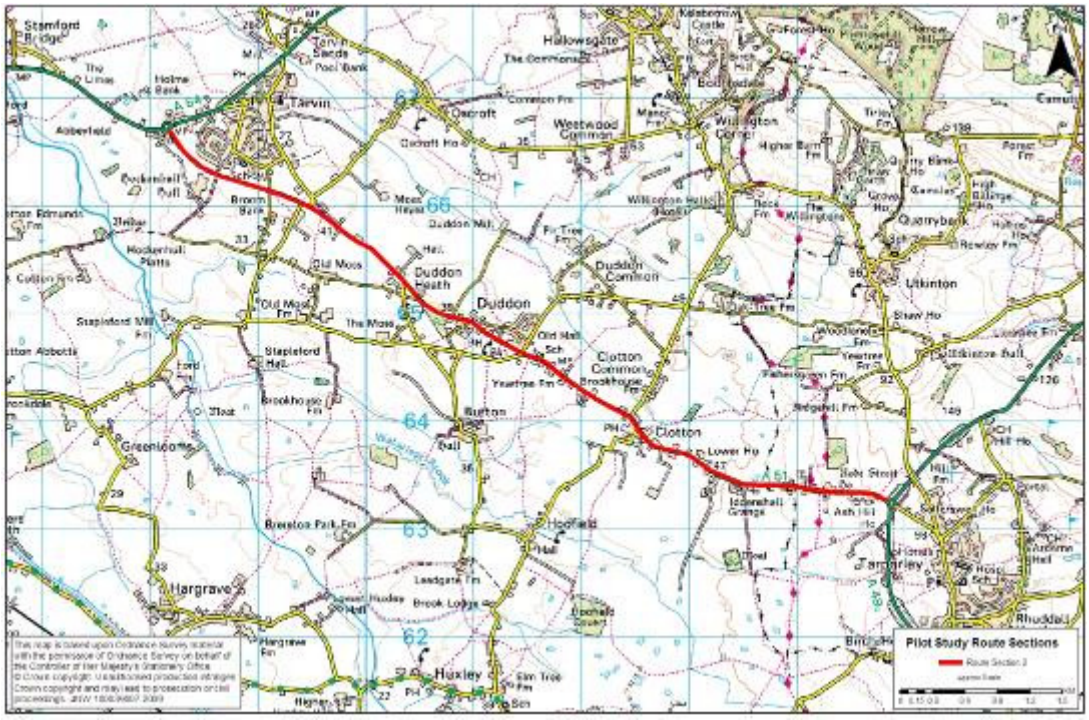
2.2.2 *Section Two – Tarvin to Tarporley (A51: A54 to A49)*

The first 1.5km of the second section (see Figure 2-3) is the Tarvin Bypass, passing to the south of and providing relief to the village of Tarvin. The carriageway then becomes narrower and passes through the villages of Duddon, Clotton and Iddenshall, alternating between 40mph and national speed limits. The route then meets the A49 at a roundabout junction.

The section has the lowest traffic flow of all sections and at 12,700 vehicles per day, is below the national average for this type of route. However, HGV movements are above the national average, which may cause quality of life issues through the villages.

The section has a collision rate close to the national average for this type of road, but it has the second worst record for severity of injuries caused by collisions, significantly above the national average.

Figure 2-3 – Route Section Two



[1] For consistency purposes, all traffic data, including HGV percentages, quoted in this section have been sourced from the DfT AADT website (www.dft.gov.uk/matrix/), providing data for 2007. Traffic data from other sources was not available for one consistent year.

2.2.3 Section Three – Tarporley to Tilstone Fearnall (A51: A49 to A49)

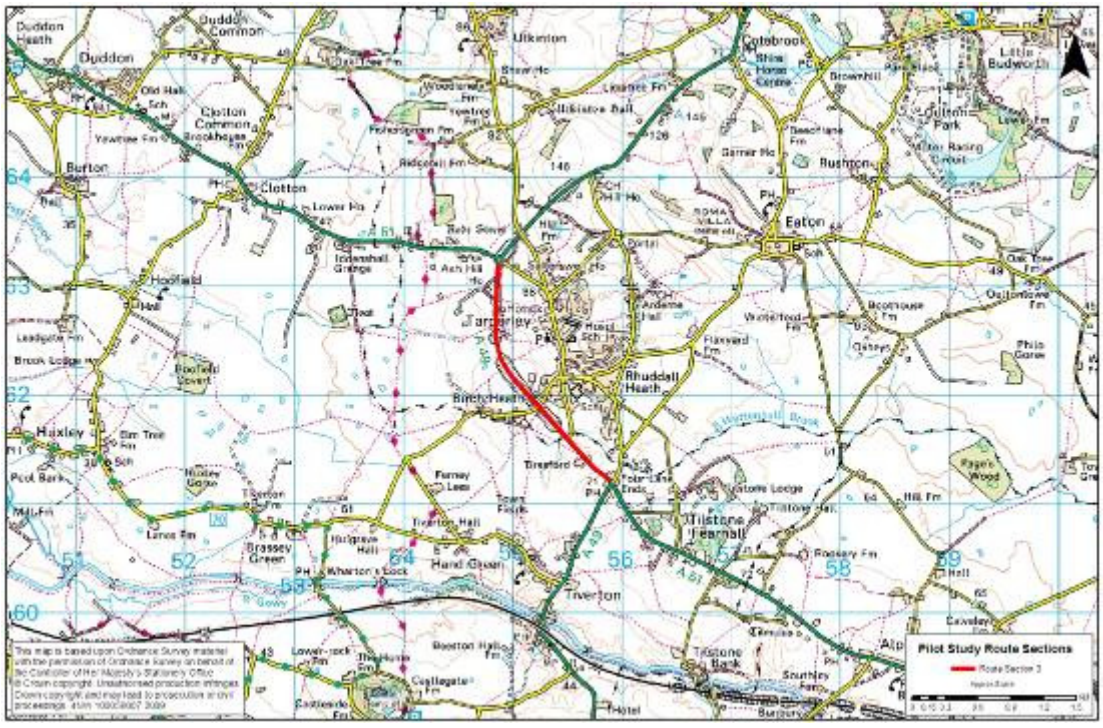
This section of the route is designated the A49 (see Figure 2-4), which links Shrewsbury and Herefordshire with Warrington and Halton and covers a distance 2.6km. The A49 to the north of the route provides a direct link to Warrington, while to the south of the route the A49 initially provides a connection to Whitchurch.

This route section largely comprises the wide single-carriageway standard Tarporley Bypass, which passes to the west of the village. The section then rejoins the A51 at the signalised A49 crossroads. The section has the national speed limit throughout.

This section has significantly higher flows of vehicles, including HGVs, than its adjoining sections. The section caters for distinct movements, those heading along the A51/A500 study corridor and those travelling on the A49 route; this results in higher flows along this individual section.

This section has the lowest collision rate of all route sections but conversely has the highest severity index, revealing that although collisions are less frequent, those that do occur tend to result in more severe injuries.

Figure 2-4 – Route Section Three



2.2.4 Section Four – Tilstone Fearnall to Burford (A51: A49 to A534)

From the A49, the A51 becomes a narrow single carriageway passing through the villages of Tilstone Fearnal, Alpraham and Calveley (see Figure 2-5). After crossing both the Crewe to Chester railway line and the Shropshire Union Canal, immediately south of Calveley, the A51 becomes wider until after the village of Hurleston. The section of carriageway between Wardle, Barbridge and Hurleston is a replacement alignment removing bends. The section ends at Burford Cross-roads to the north of

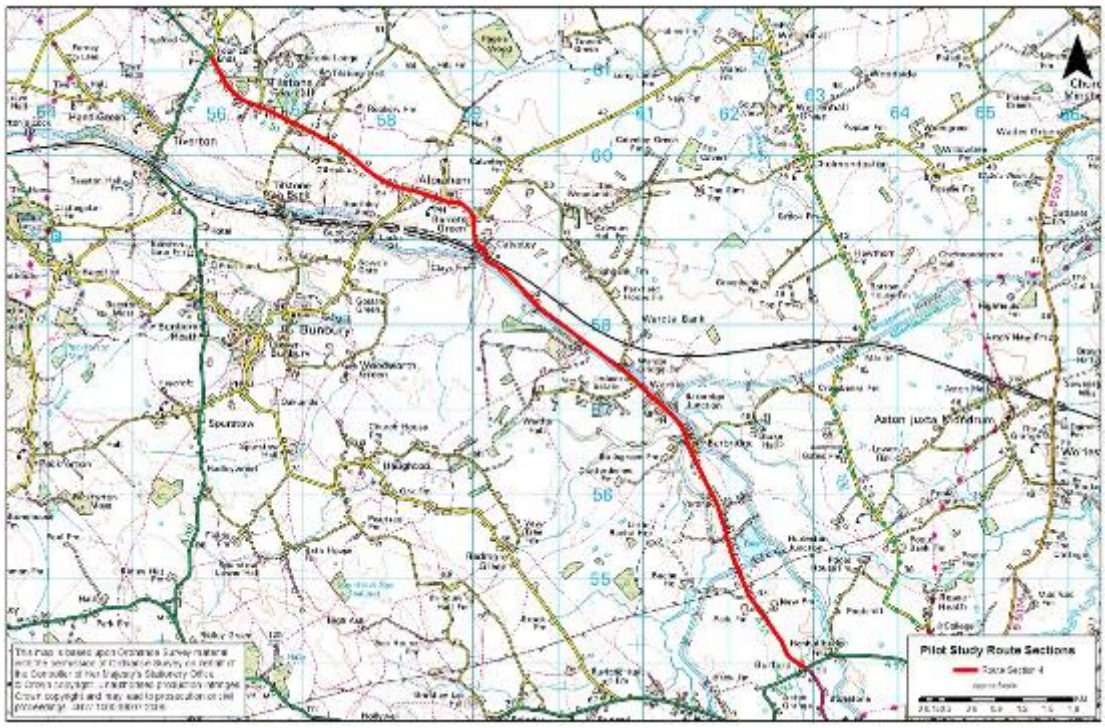
the village of Acton; this is a signalised junction with the A534 which links Nantwich with the Welsh border and Wrexham. This junction suffers from congestion during peak periods.

The council boundary between Cheshire West & Chester and Cheshire East is within this section, immediately south-east of Tilstone Fearnal.

This section provides access to a significant 65,000ft^2 distribution centre at Wardle as well as other industrial units within the surrounding area.

Section Four has a relatively low daily traffic flow for the route, around 13,000 vehicles. This is below the national average, however, the daily HGV flow is nearly 1,500 and this is significantly higher than the national average. The collision rate and severity index are also higher than the national averages for this type of route but not significantly so.

Figure 2-5 – Route Section Four

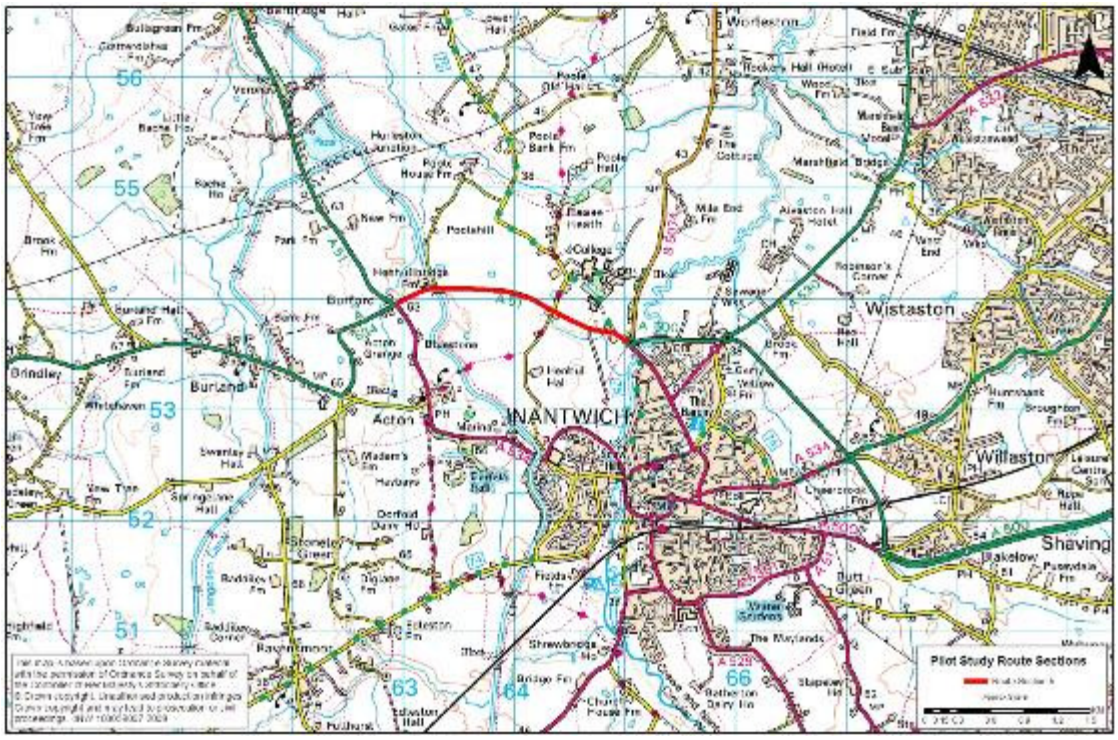


2.2.5 *Section Five – Burford to Reaseheath (A51: A534 to B5074)*

This short section of the route links the Chester and Wrexham roads to the beginning of the A51 Nantwich Bypass at Reaseheath (see Figure 2-6). The road is largely single carriageway although it is narrow in places. The route links into the Nantwich Bypass at a roundabout junction, from where the Barony Road continues into Nantwich town centre, and B5074 provides a rural route to Winsford.

This section has a daily traffic flow of 16,300, well above the national average, and a high collision rate.

Figure 2-6 – Route Section Five

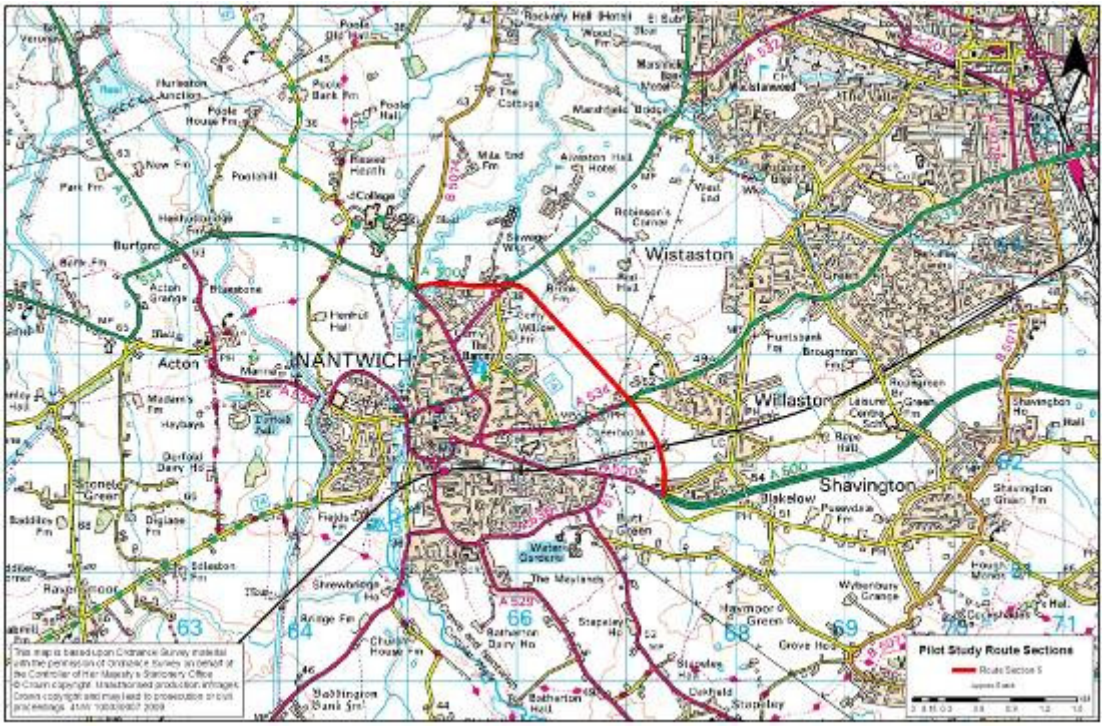


2.2.6 Section Six – Reaseheath to Willaston (A51: B5074 to A00)

Section Six covers the length of the wide single carriageway Nantwich Bypass (see Figure 2-7). The Bypass was completed in 1989 and was designed to take through-traffic out of the town centre. The Bypass has three sections, linking four recently named roundabouts. Starting at the Reaseheath Roundabout, the Bypass heads eastwards and crosses the A530 at the Alvaston Roundabout, which provides a link between Nantwich, Crewe and Middlewich. The bypass then goes on to cross the A534 at the Peacock Roundabout, which is the main road between Crewe and Nantwich. The Bypass terminates at the Cheerbrook Roundabout, to the west of Willaston, which provides a junction with the A500, A51 and Newcastle Road.

Like the previous section, Section Six has a very high collision rate, well above the national average. The section in particular has a high rate for collisions involving pedal cyclists. The Nantwich Bypass suffers from significant congestion during peak periods as do adjoining routes.

Figure 2-7 – Route Section Six

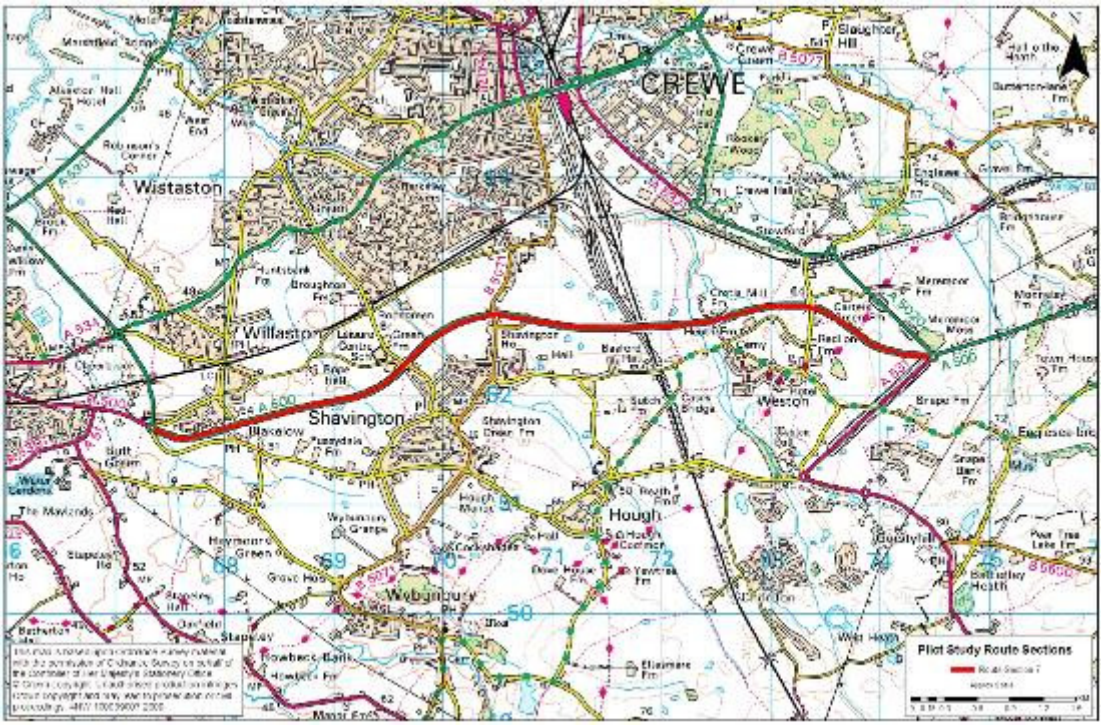


2.2.7 Section Seven – Willaston to Weston (A500: A51 to A531)

At the Cheerbrook Roundabout, the route becomes the A500 as it passes along the Basford – Hough – Shavington Bypass, which opened to traffic in Autumn 2003. The Bypass is of dual two-lane standard and provides access between Nantwich and the Barthomley Link, with two roundabouts between (see Figure 2-8). The first roundabout provides access to the south of Crewe, the village of Shavington and the proposed Basford West Strategic Regional Site, while the second does not presently provide access to any links off the Bypass. The proposed second stage of the Crewe Green Link Road would use this second roundabout to provide access to the Basford East Strategic Regional Site and into the employment areas and distribution facilities at Crewe Gates Farm Industrial Estate and Crewe Business Park. The Bypass terminates at the roundabout junction with the Barthomley Link, A531 and A5020.

Although this is the only dual-carriageway section, the traffic and collision figures are slightly below the average for the route but still largely above the national and regional averages.

Figure 2-8 – Route Section Seven

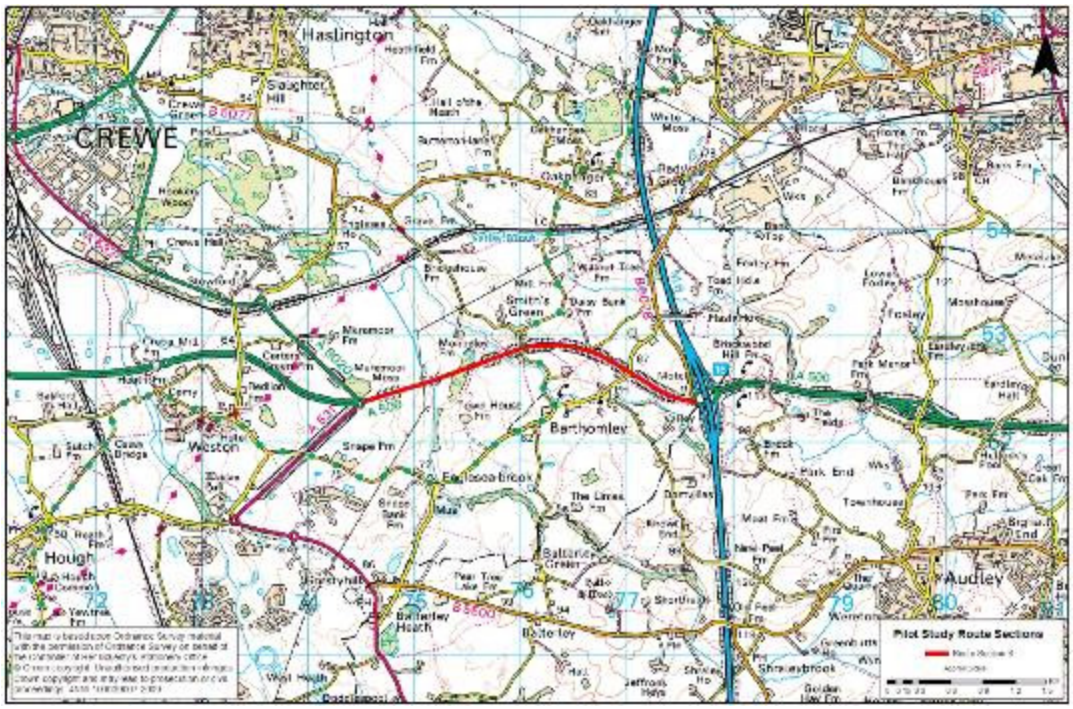


2.2.8 Section Eight – Weston to Barthomley (A500: A531 to M6 Junction 16)

The A500 Barthomley Link was constructed, with other sections of carriageway, including the A531 and A5020, to provide improved access between the M6, The North Staffordshire conurbation and Crewe (see Figure 2-9). This section is of single carriageway standard and provides a link into the grade-separated roundabout junction at M6 Junction 16.

Very significant congestion occurs on this route section both during and between peak periods. The section caters for the highest traffic flows, including HGVs, on the route, amounting to 30,000 vehicles per day. The eastbound direction suffers from the most congestion, possibly resulting in some diversion of traffic onto other less suitable routes; however, the section is close to capacity in both directions. The junction with the M6 is partly signalised (only on the M6 southbound off-slip) and presents some problems for traffic joining from the Barthomley Link, with circulating traffic preventing vehicles from entering the junction.

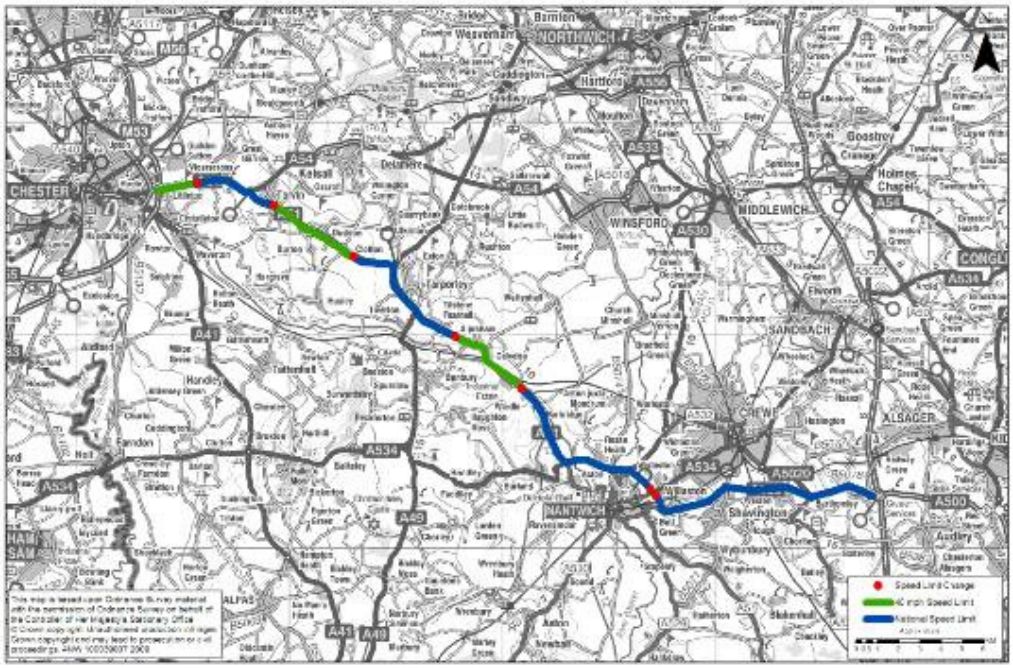
Figure 2-9 – Route Section Eight



2.3 Route Speed Limits

The study route is characterised by national[2] and 40mph speed limits. Figure 2-10 demonstrates that the 40mph speed limits are confined to areas where the route passes through villages and the approach to the suburban areas of Chester.

Figure 2-10 – Route Speed Limits



[2] National speed limit is 70mph on dual-carriageways and 60mph on single carriageways

3 Route Functions

Route Functions highlight the current and future role of the route within the wider transport network and the surrounding geographical area. The Route Functions are identified at the regional and sub-regional levels providing a hierarchy of importance.

3.1 Existing Route Functions

The existing route functions have been identified through an analysis of a range of spatial matters including the following:

- Regionally and sub-regionally important cities, towns, important residential and employment areas within the Immediate and Wider Route Areas
- International, national, regional and sub-regional gateways within the Immediate and Wider Route Areas
- Junctions with other regional routes or those of strategic national or national/regional importance
- Important cities, towns, residential and employment areas and gateways outside the route's Wider Route Area but which the route indirectly serves

The information set out above is has been tabulated and is presented in Appendix A.

From an analysis of the major movements generated by the spatial influences, the current Route Functions have been identified as presented below.

Regional Functions

- Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays

Sub-regional Functions

- Providing connectivity between the Cheshire area and the North Staffordshire conurbation
- Providing connectivity between the Cheshire area and Merseyside
- Providing connectivity between the Cheshire area to Manchester city-region
- Providing connectivity between Chester and the Cheshire area
- Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe
- Providing a link to large employers within Chester and Crewe from the Cheshire area

- Providing a link to the key sub-regional higher education and health services located within Chester and Crewe

- Providing a strategic diversion route for the M6 (between Junctions 16 and 17)

The following table provides a summary of the current Route Functions and the sections of the route they apply to.

Table 3-1 – Route Function Matrix

Functional Tier	Function	Route Section							
		1	2	3	4	5	6	7	8
Regional	Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays	■	■	■	■	■	■	■	■
Sub-regional	Providing connectivity between the Cheshire area and the North Staffordshire conurbation						■	■	■
	Providing connectivity between the Cheshire area and Merseyside	■	■	■	■	■	■	■	
	Providing connectivity between the Cheshire area to Manchester city-region	■					■	■	■
	Providing connectivity between Chester and the Cheshire area	■	■	■	■	■	■	■	
	Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe	■	■	■	■	■	■	■	
	Providing a link to large employers within Chester and Crewe from the Cheshire area	■	■	■	■	■	■	■	■
	Providing a link to the key sub-regional higher education and health services located within Chester and Crewe	■	■	■	■	■	■	■	■
	Providing a strategic diversion route for the M6 (between Junctions 16 and 17)								■

3.2 Future Route Functions

The Future Route Functions have been identified through the same process set out above for the Current Functions, but in the context of an analysis of proposed or potential spatial developments.

While there is a significant number of changes that will occur within the Wider Route Area over the coming few years, these may not have such an influence on the route that its predominant functions will change significantly. The Future Route Functions, with one exception, therefore remain unchanged from the Existing Functions. The only change is the addition of the following final function relating to the housing growth points.

- Providing access to the housing growth points and employment sites within Cheshire West & Chester

The following table identifies the route sections that will perform the Future Route Functions.

Table 3-2 – Future Route Function Matrix

Functional Tier	Function	Route Section							
		1	2	3	4	5	6	7	8
Regional	Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays	■	■	■	■	■	■	■	■
Sub-regional	Providing connectivity between the Cheshire area and the North Staffordshire conurbation						■	■	■
	Providing connectivity between the Cheshire area and Merseyside	■	■	■	■	■	■	■	
	Providing connectivity between the Cheshire area to Manchester city-region	■					■	■	■
	Providing connectivity between Chester and the Cheshire area	■	■	■	■	■	■	■	
	Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe	■	■	■	■	■	■	■	
	Providing a link to large employers within Chester and Crewe from the Cheshire area	■	■	■	■	■	■	■	
	Providing a link to the key sub-regional higher education and health services located within Chester and Crewe	■	■	■	■	■	■	■	■
	Providing a strategic diversion route for the M6 (between Junctions 16 and 17)								■
	Providing access to the housing growth points and employment sites within West Cheshire West & Chester	■	■	■					

4 Route Performance

A major, early task in the Route Management Study process was the collation and analysis of information and data to enable the performance of the route to be assessed. This assessment takes two forms; firstly the Standard Performance Assessment through which all regionally important routes will be assessed on the same basis and secondly through the review and understanding of a broader range of information available on the individual route. The assessment also takes account of results from the stakeholder consultation process undertaken as part of the study.

4.1 Standard Performance Assessment

The Standard Performance Assessment uses specific sets of data to identify broad route performance. These data sets will be used in future on all routes for which a study will be undertaken, enabling comparisons to be made between individual routes. The data is used to provide an analysis of the route's performance against issues affecting the five DaSTS goals.

4.1.1 Support Economic Growth

To assess the level of current use the route and, therefore, level of economic activity it supports, a range of traffic flow data has been reviewed. Table 4-1 outlines the total daily vehicle flow across the A51/A500 study route. The figures account for all vehicles (motorcycle, car, bus/coach and HGV) and outline the average daily flow over a single point within each study route section. The data highlights that Sections One and Eight experience significantly higher flows than the other route sections. The data also highlights that the average flow across the study route is approximately 26% higher than the national average and 42% higher than the regional average for this type of route (rural A-road). As can be seen in the table, the flows vary significantly across the route, with only two sections having flows below the national average.

Table 4-1 – Daily (AADT) Flows on the Study Route

Section	Description	AADT	Comparison to National Average
1	A51: A55 to A54	28,727	Higher
2	A51: A54 to A49	12,734	Lower
3	A51: A49 to A49	15,737	Higher
4	A51: A49 to A534	12,942	Lower
5	A51: A534 to B5074	16,316	Higher
6	A51: B5074 to A500	17,024	Higher
7	A500: A51 to A531	16,235	Higher
8	A500: A531 to M6 J16	30,012	Higher
Average		18,716	Higher
Regional Av		10,800	-
National Av		13,900	-
Source: DfT 2007 AADT Website – www.dft.gov.uk/matrix			

Table 4-2 shows the annual average daily HGV flow across the study route, and as with the total vehicle flow, Sections One and Eight experience significantly higher HGV flows than all other route sections. Section Two experiences the lowest flow overall compared to all other route sections and Section Five has the highest

proportion of HGVs in relation to all vehicles within the section. HGV flow is on average, approximately 57% higher than the national average and 66% higher than the regional average for a rural A-road. This highlights that the route is of significant regional importance.

Table 4-2 – Daily HGV Flows on the Study Route

Section	Description	Annual Average Daily HGV Flow	Comparison to National Average
1	A51: A55 to A54	2,067	Higher
2	A51: A54 to A49	913	Higher
3	A51: A49 to A49	1,691	Higher
4	A51: A49 to A534	1,474	Higher
5	A51: A534 to B5074	1,471	Higher
6	A51: B5074 to A500	1,484	Higher
7	A500: A51 to A531	1,077	Higher
8	A500: A531 to M6 J16	3,026	Higher
Average		1,733	Higher
Regional Av		577	-
National Av		743	-
Source: DfT 2007 AADT Website – www.dft.gov.uk/matrix			

Table 4-3 shows that Section Eight in the eastbound direction experiences the lowest average AM/PM peak hour speed (30.8mph/30.4mph) on the route and the data shows that this is significantly lower than the designated speed limit for that section (60mph). This indicates that congestion is an issue during peak periods on the eastbound arm; in comparison the westbound arm has a significantly higher average AM/PM peak hour speed (47.9mph/48.6mph) but again indicates increased flow and associated congestion during this period. Section Five also shows peak hour speeds significantly below the speed limit; this is a relatively short and narrow section and congestion occurs at the junctions at either end.

No national or regional average data for comparison is available at this time.

Table 4-3 – Peak Hour Average Speeds

Section	Description	Flow Direction	Speed Limit	Average AM Peak Hour Speed (mph)	Average PM Peak Hour Speed (mph)
1	A51: A55 to A54	-	40/60	-	-
		-		-	-
2	A51: A54 to A49	East	60/40	39	38.3
		West		38.4	38.1
3	A51: A49 to A49	North	60	53.6	53
		South		50.9	52.1
4	A51: A49 to A534	North	60/40	41.6	42.3
		South		41.1	41
5	A51: A534 to B5074	East	60	41.3	38.5
		West		42.2	44
6	A51: B5074 to A500	East	60	50.6	47.9
		West		49.2	49.2
7	A500: A51 to A531	East	70	65	64
		West		64.15	66.9
8	A500: A531 to M6 J16	East	60	30.8	30.4
		West		47.9	48.6
Source: Cheshire West & Chester Council and Cheshire East Council Note: The flow/speed counter locations on Sections Two and Four were located within the 40mph zones of each section.					

4.1.2 *Reduce Carbon Emissions*

The CO_2 emissions of transport using the route have been calculated for each section and are shown in Table 4-4. The outputs include total emissions per day and total daily emissions per km.

The data shows that traffic on Sections One and Eight produce the highest emissions, both in total per day and per km, indicating both the highest traffic flows and levels of congestion. Comparison has not been made with other similar routes but it is expected that this could be undertaken in the future.

Table 4-4 – CO_2 Emissions (Tonnes/Day)

Section	Description	CO_2 Emissions (Tonnes/Day)	CO_2 Emissions (Tonnes/Day/km)
1	A51: A55 to A54	25	5.55
2	A51: A54 to A49	19	2.48
3	A51: A49 to A49	9	3.63
4	A51: A49 to A534	30	2.86
5	A51: A534 to B5074	8	3.34
6	A51: B5074 to A500	12	3.43
7	A500: A51 to A531	31	4.13
8	A500: A531 to M6 J16	21	6.63

4.1.3 *Contribute to Better Safety, Security and Health*

To assess the current levels of safety on the route, collision data (see Table 4-5), for the period 2004 – 2008 has been analysed. The data shows that seven sections all have collision rates (collisions per 100m vehicles km) that are higher than the national average for rural A-roads. Section Six has the highest collision rate in comparison to the other route sections. Within the five year study period there have been a total of 52 collisions along the section, five of which have been classified as fatal or serious and 47 as slight. The analysis also reveals that 70% of all collisions involving pedal cycles occurred within Section Six, with a significant cluster of collisions involving pedal cycles occurring at the junction of the A51/A530. Some 59 collisions involving HGVs (16.95% of all collisions) have occurred during the study period, the highest number of which occurred within Section Four. This is significantly higher than the average for this type of route and the data shows that this is more than just a consequence of higher than average proportions of HGVs; further analysis has been undertaken to identify the causes of these collisions but further work is required.

Table 4-5 – Collision Rates for A51/A500 Study Route

Section	Description	Collisions per 100m Veh km	Comparison to National Average
1	A51: A55 to A54	29.67	Higher
2	A51: A54 to A49	25.36	Higher
3	A51: A49 to A49	12.7	Lower
4	A51: A49 to A534	28.97	Higher
5	A51: A534 to B5074	41.8	Higher
6	A51: B5074 to A500	45.11	Higher
7	A500: A51 to A531	16.89	Lower
8	A500: A531 to M6 J16	25.18	Higher
Average		28.21	Higher
Regional Av		-	-

Section	Description	Collisions per 100m Veh km	Comparison to National Average
National Av		23.21	-
Source: Cheshire West & Chester Council, Cheshire East Council and DfT National Accident Statistics 2008			

Table 4-6 illustrates that six of the route sections have a severity index (the percentage of injury collisions involving serious or fatal injuries) that is greater than the regional average for rural A-roads; five of those also have an index that is greater than the national average. There is no common trend in the type of route section with high severity indices with both single and dual-carriageways featuring higher than average figures for this type of route. More work is required to identify the causes of these trends.

Table 4-6 – Collision Severity Statistics for A51/A500 Study Route

Section	Description	Ratio of KSI	Comparison to National Average
1	A51: A55 to A54	8.6%	Lower
2	A51: A54 to A49	32.6%	Higher
3	A51: A49 to A49	33.3%	Higher
4	A51: A49 to A534	23.9%	Higher
5	A51: A534 to B5074	26.7%	Higher
6	A51: B5074 to A500	9.6%	Lower
7	A500: A51 to A531	27.0%	Higher
8	A500: A531 to M6 J16	20%	Lower
Average		22.7%	Higher
Regional Av		15.5%	-
National Av		21.7%	-
Source: Cheshire West & Chester Council, Cheshire East Council and DfT National Accident Statistics 2008			

More details and analysis of the collision statistics is provided in Appendix D.

4.1.4 *Promote Equality of Opportunity*

To assess the extent to which the route provides alternative forms of transport to those without access to a private car, the level of public transport provision on the route has been assessed. Table 4-7 highlights that Section One has the highest peak hour public transport capacity on the study route. The data also shows that capacity along Sections Two to Six is consistent during the peak hour as only the Arriva 84 bus service operates along these sections.

Table 4-7 – Peak Hour Inter-Urban Public Transport Capacity on the Route

Section	Description	Number of Buses per hour	Peak Hour Inter-Urban Public Transport Seat Capacity on the Route
1	A51: A55 to A54	6	264
2	A51: A54 to A49	4	176
3	A51: A49 to A49	4	176
4	A51: A49 to A534	4	176
5	A51: A534 to B5074	4	176
6	A51: B5074 to A500	4	176
7	A500: A51 to A531	0	0
8	A500: A531 to M6 J16	0	0
Average			143

4.1.5 Improve Quality of Life and a Healthy Natural Environment

Table 4-8 – Residential Units within 100m of the Route per 100m

Section	Description	Number of Residential Properties within Route Section	Residential Units within 100m of the Route per 100m
1	A51: A55 to A54	85	1.89
2	A51: A54 to A49	143	1.83
3	A51: A49 to A49	10	0.38
4	A51: A49 to A534	271	2.58
5	A51: A534 to B5074	14	0.61
6	A51: B5074 to A500	39	1.15
7	A500: A51 to A531	49	0.66
8	A500: A531 to M6 J16	10	0.31
Average	-	77.63	1.18

To assess the potential impact of road noise and air pollution on quality of life, the number and density of residential units, homes, within 100m of the route has been assessed. Table 4-8 shows that the density of residential units is relatively low and highlights the predominantly rural nature of the study area. Section Four contains the highest density of residential properties due to the number of villages through which the route passes.

4.2 Stakeholder Consultation

As part of the process to collate information and data, a consultation exercise was undertaken with a range of stakeholders. Included in the consultation were the following organisations:

- Project Advisory Group members
- Parish Councils
- Major employers

Stakeholders were asked to provide their views on current policy, practise, problems and opportunities along the route which affect them. The range of responses was limited with comments coming primarily from Parish Councils. In summary, the contributions received were as follows:

- Consultations have revealed that the A49 acts as a diversion route for HGVs between the West Midlands and north Cheshire.
- The issue of rat-running through villages due to congestion on Barthomley Link was raised by stakeholders as were concerns relating to the ability of the link to cope with additional traffic generated by developments in the Crewe area including Basford.
- There were also concerns over the general suitability of the route for the level of traffic that uses it, particularly Section Five.

- Collision issues at the A51/A534 Burford Crossroads caused by confusion at the give-way for vehicles heading south-east on the route was highlighted

- The appropriateness of the speed limit at Reaseheath, particularly in relation to the presence of the pedestrian crossing was a concern

- The number/proportion of Heavy Goods Vehicles through the villages of Barbridge, Wardle and Calveley is an issue and cause for complaint from residents

- The issues of strategic traffic including HGVs passing through Acton between Nantwich and A51 was raised.

4.3 Background Policy and Information Analysis

Using the DaSTS headings, this section of the report highlights other key outputs from the policy and information analysis process and highlights outputs in addition to those identified through the standard performance assessment. Full details of the analysis are provided in the Appendices B to F.

4.3.1 Support Economic Growth

- Several sections along the route experience peak period congestion with Section Eight (Barthomley Link) experiencing the most significant level of congestion when compared to other route sections.

- The traffic flow data highlights the tidal nature of movements along the A500/A51 with flow in one direction being generally higher during either the AM peak or PM peak for most sections.

- The data for Section Eight (Barthomley Link) shows that movement along the westbound direction of the carriageway is significantly higher for most periods during the 24 hours analysed. This indicates that there may be some diversion of eastbound traffic off the route due to congestion.

- The data shows that traffic flow remains relatively constant throughout the year. December and January experience the lowest flow during the year and June and July the highest, however the differences in flow are not great enough to suggest any true seasonality across the route.

- The flow data also highlights that, over the four year period analysed, there has been a reduction in flow across much of the route. Five of the route sections have experienced a fall in flow between 2004 and 2008, the largest reduction has been on Section One where traffic flow has fallen by approximately 9.3%.

- However, flow on Sections Five and Six, including the Nantwich Bypass, has increased significantly over the same period; the data shows that flow has increased by approximately 9.3% across the bypass.

- The data for HGV flow shows that half of the sections experienced an increase in flow over the 2004 to 2008 period. The data shows that Section One has experienced a 19.1% rise in HGV flow over the four year period and similarly Sections Four and Six (Nantwich Bypass) have also experienced a large rise in HGV flow.

- The largest reduction in HGV flow has occurred along Section Five where the HGV flow reduced by 13.4% between 2004 and 2008. Section Eight, which provides the link to Junction 16 of the M6, has experienced the consistent flow over the same period as there has only been a change of -0.1% in HGV flow.

- Obstruction to traffic flow is often caused by vehicles parked on carriageways or making deliveries through villages located within Sections Two and Four.

4.3.2 Tackle Climate Change

- 28 major trip generators are located within the wider study area, with only eight of which are known to have specific or area-wide travel plans.

4.3.3 Contribute to Better Safety, Security and Health

- A total of 60 collisions were recorded as involving HGVs along the whole route in the five year period the highest frequency occurred in the daytime, in the months of January and August and in 2006/2008. This shows that 30% of the collisions had casualties that were either killed or seriously injured (KSI). The remaining 70% of the collisions had casualties with slight injuries. The most common cause of collisions was rear shunts with 18 such occurrences.

- A total of 33 (55%) of the 60 collisions involving HGVs occurred at major junctions, with two junctions having five or six collisions each. Eight of the 11 junctions are roundabouts and two are signalised crossroads.

- The data also highlights that there have been 10 collisions involving pedal cycles the majority of which occurred in Section Six with a significant cluster at the A51/A530 Alvaston Roundabout.

- The percentage of collisions involving pedestrians is lower than the national average, however, the proportion of pedal cycle collisions is very high within Section Six (Nantwich Bypass).

- There are 15 collision cluster locations (concentrations of collisions within a limited area) along the study route with Sections Four, Six and Seven all having three significant collision clusters located along each section. All but two collision cluster locations are at junctions.

- A speed limit review has been conducted for A and B-roads in Cheshire and a number of changes have been recommended including reducing the speed limit within Duddon/Clotton to 30mph. The proposals may have an impact on

user views of the A51/A500 as a regional route due to changes in perception of journey times, potentially resulting in reassignment to other routes.

4.3.4 Promote Equality of Opportunity

- The LTP2 and Cheshire Bus Strategy 2006-2011 remain key documents for promoting smarter choices within Cheshire in relation to providing access to education, employment, key services and minimise exclusion.

- The Cheshire Bus Strategy identifies bus use as a key tool in providing access to education, employment, key services as well as reducing congestion and air pollution. It is also states that local bus services are key in providing a long term sustainable transport solution.

- There are approximately 78 bus stops located within Sections One to Five and no bus stops located on Sections Six to Eight. The 84 bus route was upgraded to quality bus partnership status in 2004 and operates along Sections One to Six. However, patronage data is not available and therefore it is difficult to assess the success/usage of 84 bus route.

- The Cheshire Bus Strategy highlights the desire to promote the use of Park & Ride schemes surrounding Chester.

- The Crewe to Chester railway line runs parallel to the route and provides an alternative to road travel through the corridor. The following train services operate between Crewe and Chester:

    - Crewe to Chester (Hourly)

    - London Euston – Chester/Holyhead (Hourly)

- The North West Route Utilisation Strategy (2007) identifies the Crewe to Chester rail route as a fast regional link. The document also identifies passenger growth and meeting passenger demand without compromising freight as key challenges. The route offers a number of opportunities including the fact that the route operates under capacity and the provision of longer distance trains can have a positive effect on the wider network. The fast regional link also offers the opportunity for more services (in off-peak travel conditions, Chester Station to Crewe Station journey times are 23mins by rail and 36mins by road).

- The Wales Route Utilisation Strategy highlights that the Crewe to Chester rail route forms part of the longer Crewe to Holyhead route which is identified as a major branch of the West Coast Mainline. The document highlights that there could be an increase of 5-10% in journeys along this route per year.

- The Freight Utilisation Strategy identifies that the West Coast Mainline via Crewe will be a key route with an additional 15 trains per day by 2014/15.

The Crewe to Chester line has low freight utilisation with less than 12 trains per day and is projected to continue to have a relatively low total gross tonnage compared to the rest of the network by 2014/15.

4.3.5 Improve Quality of Life and a Healthy Natural Environment

- DEFRA has identified a First Priority Location for action on noise issues (an area where road traffic noise is at least 76 dB) within Section One between Littleton and Stamford Bridge.

- There is one Air Quality Management Area located close to the study route (within the wider study area) on the A51 Tarvin Road/Christleton Road. However, there are no Air Quality Management Areas located along the study route itself.

- There are five route sections that pass through flood risk areas (Sections One, Four, Six, Seven and Eight). The areas (not the route itself) are stated as having an annual probability of flooding of 1 in 20 (5%).

- Route Sections One and Eight pass through designated Green Belt areas and 27 sites of Grade-A Biological Importance (county level importance). Two of these sites are located within the immediate study area (Clotton Common – Route Section Two and Town House Wood – Route Section Eight).

4.4 Spatial Planning

As part of the study process, an analysis of spatial planning issues within the study corridor and wider surrounding area has been undertaken. Regional and local spatial planning documents have been reviewed to provide the land use development context for the route and highlight any issues that may impact on the future operation of the A51 and A500.

4.4.1 Strategic Regional Sites

- The Northwest Development Agency's Strategic Regional Sites Review Technical Report 2009 reviewed the 11 sites highlighted within The Regional Strategy document: A Strategy Towards 2020. The report retains the Basford site to the south of Crewe and inserts Central Chester into the list of sites.

- Being located adjacent to the route and with the main accesses using the route itself, the potential impact of the Basford sites could be substantial. Basford West (55 ha) and Basford East (92 ha) constitute the area designated as a Regional Investment Site. Traffic modelling reveals that the A500 Barthomley Link is operating at its design capacity in the eastbound direction at peak periods. Assessments show that the scale and mix of the development put forward in the development briefs will require significant investment in local infrastructure funded through a mixture of private and public finance.

- The Deeside Hub (a series of developments which span a large geographical area covering north-west Cheshire and north-east Wales) could have a significant impact on the study route. The developments include Deeside Enterprise Ring (locations around Chester), Chester Urban Renaissance Area, developing the tourism and visitor experience (including developing Chester Zoo), Chester Core Development Zone and Chester Education Cluster.

4.4.2 Growth Point Status

- The focus for the increased development through the designation of Growth Point Status will be the four urban areas of Chester, Ellesmere Port, Northwich and Winsford but smaller areas, including Tarporley, will also have additional growth.

- This designation provides the Cheshire West & Chester Council with an opportunity to increase the level of housing and employment development over the coming decades and this could have an impact on the route.

- In transport terms, the work on the Growth Point designation particularly focuses on the M56 and M53/A55 highway corridors and it is possible that the impact from such developments may be greatest on these routes.

- However, sections of the A51/A500 route provides a vital link between the four main urban areas designated for Growth Point developments and they are likely to be affected by any related significant increases in journeys made in the area.

- The West Cheshire Growth Point Programme of Development identifies the need for a Strategic Transportation Study (the West Cheshire Transport Study) which will assess whether the current transport network will be adequate for the proposed growth in housing and employment. Without the outputs from this study it is difficult to assess the potential impact of the Growth Point developments on the A51/A500 route but these outputs will need to be taken account of in any future planning for the route.

- Key projects connected to the Growth Point Status include the Chester Transport Strategy and Sustainable Transport Planning Support, which have the aim to provide people with greater options for smarter choices.

4.4.3 Housing Employment Projected Growth

- RSS identifies Ellesmere Port, Chester and Northwich as requiring 1,317 extra dwellings per annum. The stated Growth Point objective is to increase this figure to 1,600 dwellings per year.

4.4.4 North Wales – Spatial Planning

- The study route has a junction with the A55, which provides a secondary link from Cheshire, Merseyside and the North West into North Wales. This route

also forms an important link to Irish Sea port at Holyhead. Any plans and developments along the A55 could have an impact on the study route.

- The Unitary Development Plans of Flintshire, Denbighshire, Conway, Gwynedd and Isle of Anglesey highlight the importance of the A55 to North Wales.

- The Wrexham Unitary Development Plan highlights the A534, which links into the study corridor to the west of Nantwich, as being part of its Primary Highway Network.

5 Route Challenges

The main outputs from the assessment of the route's performance, and associated data and policy review, are a range of Route Challenges. These challenges identify the significant regional and sub-regional problems that affect the route and its ability to perform its current and future Route Functions.

The route challenges have been identified from a number of sources; primarily these have been:

- Route performance outputs
- Existing plans, proposals and programmes
- Spatial Planning outputs e.g. Growth Point Documents
- Project Advisory Group
- Project Team working knowledge

The Challenges have been defined as any problem that affects or has an impact on the study route; these have been analysed and evaluated in relation to the broad DaSTS goals. All challenges have been evaluated according to their current and potential future impact on the study route and are summarised below.

5.1 Challenges

5.1.1 Support Economic Growth

These challenges have been identified as those that may affect the current economic performance of the areas served by the route as well as the ability to support future economic growth in those areas.

Existing

1. **Higher than average daily traffic flows, including HGVs, lead to congestion and delays at key junctions and on major links.**
2. **Eastbound peak hour congestion occurs on Barthomley Link**
3. **Congestion on Barthomley Link may lead to diversion of strategic traffic onto other routes**
4. **There is a low uptake of travel plans by major employers in the study area**
5. **Obstruction caused by vehicles parked on carriageways through villages cause delays**

Future

6. **The Basford Strategic Regional Site could generate additional traffic using the route leading to environmental, safety and congestion issues.**

7. **Major developments in Chester, Crewe, Nantwich and the wider route area could have a significant impact on the route**

8. **Growth Point status in the Cheshire West & Chester area may generate impacts on the route**

9. **Tourism developments may have a significant impact on the route**

10. **Proposed speed limit changes may have an impact on the perception of the A51/A500 as a regional route**

5.1.2 *Reduce Carbon Emissions*

The following challenge is the main output from the analysis of carbon emissions generated by the traffic using the route.

11. **Greater understanding of the carbon emissions of the route is required**

5.1.3 *Contribute to Better Safety, Security and Health*

These challenges have been identified as the primary problems related to personal safety, security and health occurring on the route.

12. **The route has high collision rates and collision severity indices above the national average**

13. **HGV collision rates on the route are significantly above the national average**

14. **There are 14 collision cluster locations on the route**

5.1.4 *Promote Equality of Opportunity*

No specific challenges related to equality of opportunity have been identified within the study area.

5.1.5 *Improve Quality of Life and a Healthy Natural Environment*

The following Challenges have been identified in relation to problems on the route that may affect quality of life and the natural environment.

15. **There are noise related issues within Section One of the route**

16. **The route passes through designated flood risk areas**

17. The route passes through and past areas with environmental designations

5.2 Challenge Tables

Appendix G provides a number of tables that present the links between the Route Challenges identified within this section and the key issues highlighted as part of the Route Performance assessment process.

6 Route Outcomes

6.1 Outcomes

Route Outcomes are the key output from the Route Management Study process and set out what could be achieved on the route over the coming 20 years. The Outcomes have been developed from an analysis of the challenges, and their causes, identified in the previous sections.

The Outcomes identified are summarised as follows:

1. **Improved understanding of existing travel on the route and the potential for change in the future**

   At present, data on the traffic movements on the route is limited to traffic count sites (seven covering the eight sections) and some localised modelling information and there is no recent data concerning origins and destinations for traffic on the route. More extensive data collection and analysis is necessary to provide a greater understanding of the travel patterns on the route and provide more evidence to support appropriate and targeted interventions. Further information would also enable improved monitoring of traffic patterns on the route.

   While an assessment of the carbon emissions generated by the use of the route has been undertaken, a greater understanding of these outputs is required. Primarily, this is related to aiding understanding of the carbon emissions from this route on a comparative basis with other routes in the region.

   The implementation of transport improvements to complement the developments associated with Cheshire West & Chester Council's Growth Point Status will be informed by the West Cheshire Transport Study[3]. Outputs from this study will need to be assessed for relevance to and impact on the A51/A500 route. Furthermore, a greater understanding is required of other proposed or potential developments, including those proposed by Local Development Frameworks, within the wider route area and the extent to which they may have an impact on the route.

2. **Reduced carbon emissions from the use of the route**

   While no comparison has been made with similar routes, the carbon emissions on Sections One and Eight appear to be high. The cause of these high figures may be related to general levels of traffic, the number of HGVs, vehicle speeds and the levels of congestion. In line with the DaSTS goals, a primary aim of the authorities with responsibility for the A51/A500 route will

[3] The West Cheshire Transport Study is to be undertaken to support the Growth Point Status developments and is separate to the existing Chester Transport Strategy.

be to reduce the carbon emissions associated with its use over the coming 20 years.

3. Reduced collision rates and severity of collisions on the route

In managing the highway network, a key role for local authorities is to not only reduce collisions but also their severity. The study has shown that the collision rate on the Nantwich Bypass and the section between the Bypass and Burford cross-roads are particularly high and the severity of collisions on a number of sections is significantly higher than the national average for a rural A-road. The route also has a significant number of collision cluster sites, largely at junctions, where there have been concentrations of collisions over the past five years.

The study has highlighted that the proportion of HGV collisions that have occurred along the route is significantly higher than the national average. Collisions involving HGVs have the potential to impact on a wide area, due to the road closures and diversion routes etc.

4. Improved management of freight movements on the route

The route caters for very large numbers of freight movements for the standard and location of carriageway. A key use of the route for HGVs is for access from the M6 Junction 16 to Crewe; on sections to the west of Crewe HGV flows decease significantly but are still high. The flow on Section One of the route is also particularly high as the link provides access from both the A51 and A54 to the A55. The high level of freight movements also contributes to significantly higher than average collisions involving HGVs.

This Route Outcome promotes the improved management of freight movements on the route including trying to increase engagement with the haulage industry and promoting the use of appropriate routes. The outcome is in line with Policy RT7 of the Regional Spatial Strategy.

5. Reduced congestion on and across the route

As a major regional route, significant traffic flows use the route on a daily basis. The quantity of traffic travelling along and across the route has led to significant congestion at a number of junctions and along sections of the route and adjoining carriageways. Delays are also caused on some sections of the route by vehicles parking on the route or making deliveries or servicing properties along the route.

This Route Outcome highlights the importance of reducing congestion at key junctions and links along and across the route.

6. Reduced congestion on the Barthomley Link

Section Eight of the route, the Barthomley Link, suffers from significant congestion during peak periods on the eastbound approach to Junction 16 of

the M6. The link is close to capacity in both the eastbound and westbound directions and there are delays for eastbound traffic on entry to M6 Junction 16. Significant development is proposed both within Crewe and the Strategic Regional Sites at Basford East and West which is likely to exacerbate existing problems with the operation of the link.

This outcome highlights the need to address the congestion issues on Barthomley Link taking into account the future proposed development in the surrounding area.

6.2 Potential Actions

To accompany the Route Outcomes, a range of potential actions have been identified which could assist with the achievement of those Outcomes over the next 20 years. The actions span across a range of approaches to implementing improvements and cover the following:

- Further data collection, analysis and monitoring
- Stakeholder engagement
- 'Soft' measures and smarter choices
- Engineering-based solutions

The lists of potential actions are not exhaustive and further actions may be identified following subsequent additional and more detailed study work by the local authorities. It is not proposed that all of the potential actions need to be carried out, nor is any priority implied.

1. Improved understanding of existing travel on the route and the potential for change in the future

- Full roadside interview survey for the route and analysis
- Full registration plate matching survey for the route and analysis
- Annual monitoring and reporting of traffic and collision trends
- Incorporate outputs from the Growth Point related West Cheshire Transport study into the future planning of the route
- Consultation with stakeholders (e.g. users' forum, parishes, bus operators, etc)
- Further modelling of carbon emissions and comparison with other routes
- Further investigation of HGV use of the route

2. **Reduced carbon emissions from the use of the route**
   - Diversion of "through" HGV movements onto M6/M56/A55 including changes to strategic signing – an assessment will need to be made of any potential carbon saving
   - Increase the number of travel plans utilised by major employers and trip generators
   - Personalised Travel Planning and area or corridor-wide travel planning (e.g. Crewe and Nantwich)
3. **Reduced collision rates and severity of collisions on the route**
   - Route-wide safety study including analysis of frequency and severity, or
   - Route-wide HGV collision study
   - Collision studies at collision cluster sites
4. **Improved management of freight movements on the route**
   - Develop a Freight Quality Partnership for the route and/or wider area
   - Consultation with freight operators
   - Designated routing
   - Improved signing
   - Identification of diversion routes
   - Local HGV bans on side roads
5. **Reduced congestion on and across the route**
   - Crewe Green Link Stage II may relieve A5020
   - Improvements to junctions A51/B5132, A51/A54, A51/A49 (Rhuddal Heath), A51/A534 (Burford), A51/A530, A51/A534 (Peacock Roundabout) and A500/A5020 junctions.
   - Incorporate outputs from the Growth Point related West Cheshire Transport study into the future planning of the route
   - Improvements to bus network
   - Improved bus services between Crewe and the North Staffordshire Conurbation
   - Promotion and marketing of rail use between Chester, Crewe and the North Staffordshire Conurbation

- Lay-bays and 'off-street' parking improvements in the villages
- Parking and waiting restrictions within the villages while limiting impacts on residents
- Improvements to cycling facilities for local movements across routes
- Ensure all major traffic-generating events have Event Management Plans in place and reviewed regularly

6. Reduced congestion on the Barthomley Link

- Implementation of improvements secured as part of Basford East Development
- Capacity improvements on Barthomley Link
- Management of the potential impacts of Basford East and West
- Implementation of comprehensive travel planning approach at Basford East and West
- Implementation of public transport improvements between Crewe and the North Staffordshire Conurbation
- Study of traffic flows in wider highway network to assess the extent of vehicle trips diverting onto other routes

6.3 Outcome Tables

Detail Tables have been developed for each outcome, highlighting the information that has been used to develop them and provide an audit trail through the Route Management Study process. These tables are presented in Appendix H.

6.4 Risk Assessment

In addition to the Route Outcomes, a risk assessment has been undertaken of major risks to the operation of the route. These risks include those posed by flooding caused by climate change and the interaction of the carriageway with railway lines. The risk assessment is presented in Appendix I.

7 Conclusions

7.1 Summary

The A51/A500 Route Management Study has been undertaken as a pilot to test the emerging Route Management Guidance for the North West. The overall aim of the study was to identify outcomes, at a regional level, for the highway authorities responsible for the route, Cheshire West & Chester Council and Chester East Council, to seek to achieve over the next 20 years.

The study has used a process and methodology that are compliant with the Government's Delivering a Sustainable Transport System (DaSTS). The study has been undertaken using a structured process involving the collation and analysis of the available information and data, consultation with stakeholders, the identification of major problems and challenges and the formulation of outcomes and potential actions to resolve them.

During the course of the study, a range of challenges emerged through the process to assess the performance of the route. These challenges reflect both the existing performance and the potential for change, based on known and expected developments and are summarised below.

The route suffers from congestion, significant in some places, which occurs both on the route and on roads that cross it. The Barthomley Link, the most easterly section of the route, is particularly prone to congestion, with significant queues in the eastbound direction both during and between the peak periods. In many places, traffic flows on the route are significantly above the national average for this type of road and HGV numbers are particularly high in comparison to similar routes.

Without careful consideration and the implementation of appropriate measures, planned developments and emerging proposals may have a detrimental impact on the future operation of the route. The Strategic Regional Sites at Basford East and Basford West have the potential to provide very significant economic development for Crewe and the surrounding area but the plans need to be carefully nurtured to ensure that growth in employment and the economy does not have a significant detrimental effect on the already congested local and regional road network.

The success of Cheshire West & Chester Council in securing Growth Point Status for the area may bring economic and social benefits to its major towns and surrounding populations. However, there is potential for resulting developments to have an effect on the supporting transport networks, including the A51 between Chester and Tarporley. The outputs from the West Cheshire Transport Study will be key in clarifying what any effects may be.

The potential impacts of the Basford and Growth Point developments, and other potentially major developments in Chester, Crewe, Nantwich and the surrounding area, will need to be taken into account in the management of the A51/A500 route.

There are proposals for other major employment, retail, leisure and transport developments across the A51/A500 corridor which could affect traffic using the route.

Road safety is also a significant concern on the route with a number of sections having a higher than average frequency of collisions for this type of road. The severity of collisions is also a concern with the majority of the route having rates considerably above the average for this type of route. There are a large number of junctions on the route at which there are clusters of collisions and which could provide a focus for improving the safety record of the route.

Of particular concern is the number of HGV related collisions on the route. Although there is a higher than average number of HGVs using the route, the high number of collisions involving these vehicles cannot simply be attributed to this fact. Further investigation is required to understand the reasons behind this trend and to identify potential solutions.

With the growing importance of the carbon agenda, this study has assessed the level of carbon emissions that can be attributed to the use of this route. While this initial assessment has provided some insight into the quantity of carbon emitted, further work needs to be undertaken to provide a greater understanding of the relative impacts of this route alongside others in the region. Furthermore, more work can be done in the area to reduce transport-related carbon emissions. At present, there is a very low uptake of travel plans by major employers in the route corridor and there are emerging interventions, such as personal journey planning and area-wide travel planning, which could encourage people to use alternative modes of transport, reducing both congestion and carbon emissions.

Other environmental issues are apparent within the A51/A500 corridor. The route passes through or close to a number of areas protected for environmental reasons. There are also significant noise related issues at the western end of the route, which can be attributed to the level of traffic using the road and the relative closeness and density of the surrounding residential area. Of greatest risk to the route itself, is the presence of flood risk areas on a number of sections, which are identified as liable to flooding every 20years, although the actual risk to the route is unclear.

The identification of these Route Challenges has resulted in the recommendation of six Route Outcomes which will provide a focus for the future management the A51/A500. The six outcomes are set out below:

7. Improved understanding of existing travel on the route and the potential for change in the future

8. Reduced carbon emissions from the use of the route

9. Reduced collision rates and severity of collisions on the route

10. Improved knowledge and management of freight movements on the route

11. Reduced congestion on and across the route

12. Reduced congestion on the Barthomley Link

A number of potential actions have also been identified to provide some guidance on the future work and possible measures to achieve the above outcomes. However, further actions come to light following subsequent additional and more detailed study work by the local highway authorities.

7.2 Next Steps

This report provides a framework upon which the development of measures to resolve Route Challenges can be commenced or continued. It is recommended that Cheshire West & Chester Council and Cheshire East Council use this study to support the work they undertake to formulate such measures. The DaSTS compliant nature of the study process provides a firm foundation upon which to progress management of the route and on which funding decisions can subsequently be based.

Appendix A – Route Functions – Supporting Evidence

Current Route Functions

The following table identifies the current major spatial influences on the route.

Table A-1 – Current Spatial Influences on the Route

Element of Route Function	Route Area	Occurrence of Element
Regionally and sub-regionally important cities, important residential and employment areas within the Immediate and Wider Route Areas	Immediate Route Area	Cities/ Towns: - Important Residential and Employment Areas: - Major Employers: -
	Wider Route Area	Cities/Towns: • Chester (Employment/ Retail/ Tourism/ Education), Crewe (Employment/ Retail/ Education), Nantwich Major Employment Areas: • Capenhurst Technology Park, Chester West Employment Park, Chester Business Park, Sealand Industrial Estate, Basford East & West Strategic site, Crewe Gates Farm Industrial Estate, Crewe Business Park, Marshfield Bank Employment Park Major Employers: • Bentley, Bombardier Transportation, MBNA, HBOS, Marks & Spencer Financial Services, BAE Systems, Manchester Metropolitan University (Cheshire), University of Chester
International, national, regional and sub-regional gateways within the Immediate and Wider Route Areas	Immediate Route Area	-
	Wider Route Area	• Chester Railway Station, Crewe Railway Station
Junctions with other regional routes or those of strategic	-	• M6 Junction 16, • Junction of A51/A55

Element of Route Function	Route Area	Occurrence of Element
national or national/regional importance		
Important cities, towns, residential and employment areas and gateways outside the route's Wider Route Area but which the route indirectly serves	-	Important Cities/ Towns: • Ellesmere Port, Stoke-on-Trent, Important Residential and Employment Areas: • The Wirral and Merseyside, Deeside, North Staffordshire Conurbation, North Wales. Employment Areas: • Vauxhall, Cheshire Oaks Gateways: • Liverpool Airport • Port of Holyhead • 12 Quays (Birkenhead) • Port of Liverpool

Future Route Functions

The following table identifies the potential future major spatial influences on the route.

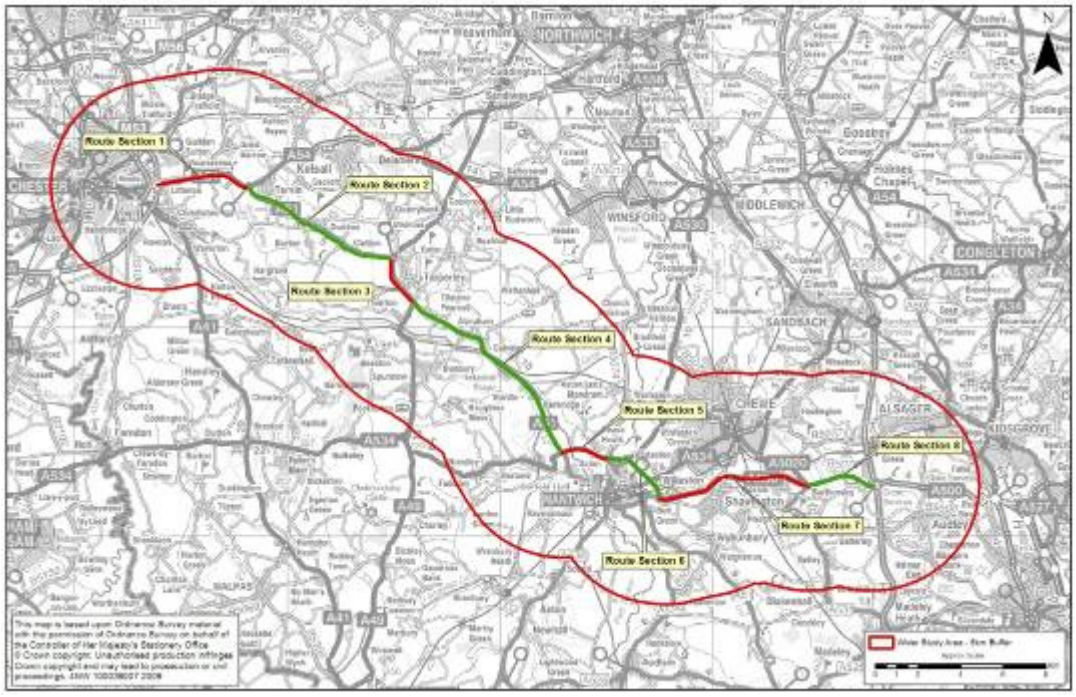
Table A-2 – Future Spatial Influences on the Route

Elements of Route Function	Committed or Potential Changes to Elements
Regionally and sub-regionally important cities, towns and employment areas within the Immediate and Wider Route Areas	• Development of Strategic Regional Sites at Basford East and West. • Crewe continuing as sub-regional focus for development in East Cheshire
International, national, regional and sub-regional gateways within the Immediate and Wider Route Areas	• Crewe Rail Gateway Project • Development of Crewe Rail Freight Facility
Junctions and interchanges with other regional routes or those with strategic national or national importance.	• Potential for Crewe Railway Station to be moved to a site at Basford. • Potential for High Speed Rail Network to pass through Crewe
Important cities, towns, employment areas and gateways outside the route's Wider Route Area but which the route indirectly serves.	• Proposed Mersey Gateway Bridge
Alternative routes. This could include changes to the status or function of other regional routes, sub regional routes or rail routes and the potential impact that these changes may have on the study	• Use of Managed Motorways on the M6 will reduce congestion and may increase the attractiveness of the M6 for movements between the West Midlands and North Wales,

route.	potentially transferring some traffic from the A51/A500 route. • Implementation of Crewe Green Link Part II
Identify the potential for the development of housing growth points or significant enhancements to existing settlements, employment areas, and gateways on the route or within the Wider Route Area.	• Housing Growth Point development at Chester, Ellesmere Port, Winsford and Northwich.

Appendix B – Performance – Support Economic Growth (DaSTS Goal 1)

Figure B-1 – A500/A51 Route Sections



DaSTS Goal 1 refers to the ability of the route to support regional economic effectiveness and growth. In this section socio-economic data is analysed including current demographics and population density, and projected population increases. The area surrounding the route has been analysed in terms of indices of multiple deprivation and car ownership and compared to the wider region.

The levels of traffic including HGV flows are assessed currently and in terms of recent growth. Average vehicle speeds and major trip generators affecting the route are identified. Proposed developments are detailed within the spatial planning section. Future housing and employment rates are also assessed in light of the Growth Point status designation in the Chester West & Chester area.

Population

Cheshire as a whole has an approximate total population of 688,000 with approximately 52% (360,000) of the population located within Cheshire East and 48% (328,000) within Cheshire West & Chester. The data also shows that the population is forecast to rise to 346,000 in Cheshire West & Chester in 2026 and to approximately 380,000 in Cheshire East, a total population of 726,000[4].

[4] Cheshire West & Chester New Population Forecasts 2008

In both Cheshire West & Chester and Cheshire East there may be approximately 5% fewer children within the areas by 2026. In Cheshire West & Chester there will be an estimated 40% increase in those aged 65 to 84 years by 2026 and it is estimated that the number of people aged over 85 living within the area will double. In Cheshire East it is estimated that there will be an approximate 50% increase in those aged 65 to 84 years and it is estimated the number of people aged over 85 living within the area will double in the same period.

The population data shows (see Figure A-2) that the A500/A51 is bordered by three significantly populated areas, Chester to the west, Northwich and Winsford to the north and Crewe to the east. The route links Chester to both Crewe and Nantwich and significantly both the A49 and A54 provide direct links between the A500/A51 and the Northwich area to the north. The data also shows that the most densely populated areas within the study area are concentrated within Chester and Crewe and that the majority of wards located within the wider study area are sparsely populated.

Figure B-2 – Total Population within Cheshire West & Chester and Cheshire East

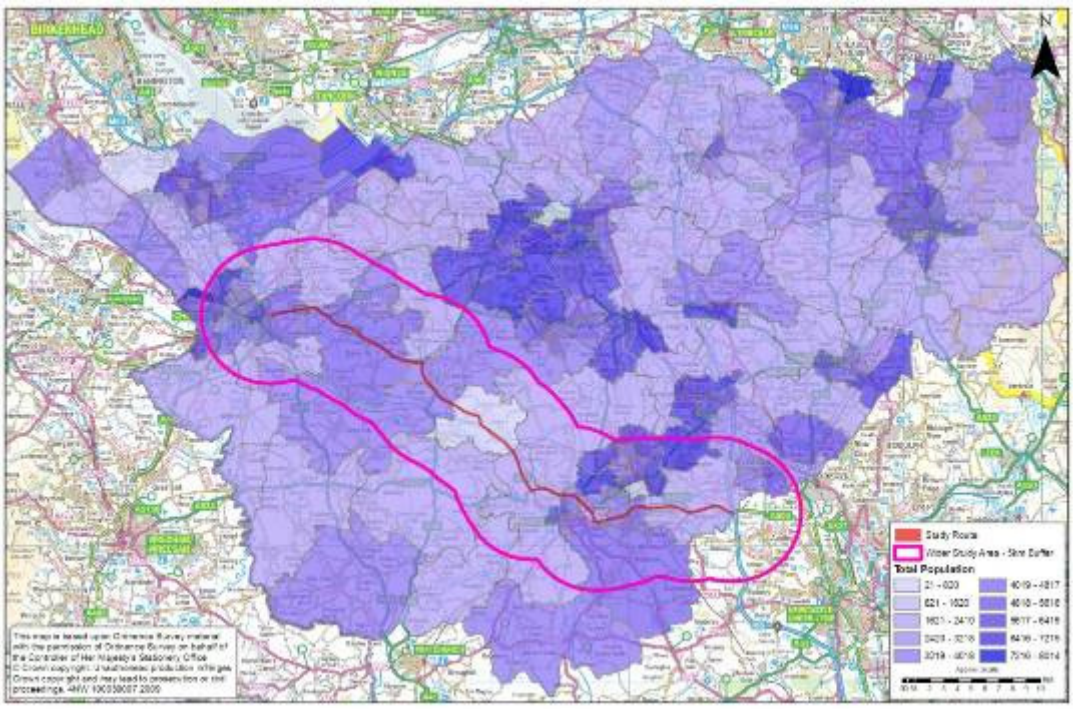
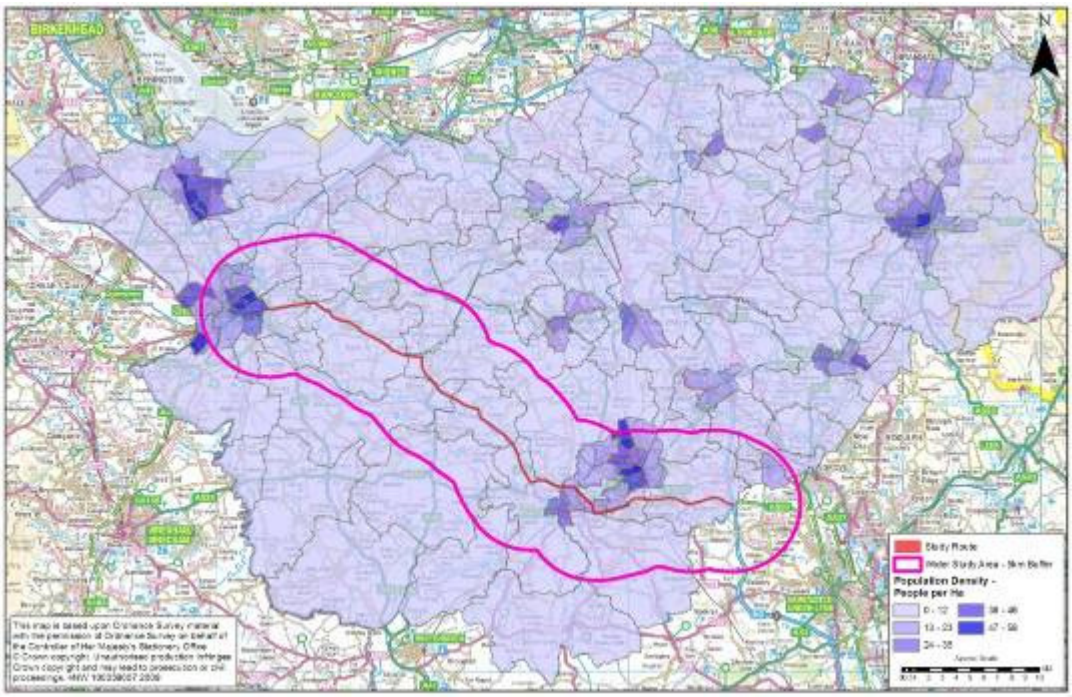


Figure B-3 – Population Density – Number of People per Hectare



Socio Economic Background

Indices of Deprivation data for 2007 (see following table) show that within Cheshire West & Chester and Cheshire East there is some variation. The Indices of Deprivation are shown by ranking each of the 354 districts in the county according to a range of indicators with one being the lowest ranked and 354 the highest; the six former districts of Cheshire have been used for the basis of this analysis.

In terms of broad deprivation, the Index of Multiple Deprivation, it can be seen that Ellesmere Port & Neston is the most deprived area in Cheshire and Macclesfield and Congleton in Cheshire East are the least deprived.

The data also shows that Congleton is the least deprived in terms of income and employment but Chester and Vale Royal are the most deprived.

Table B-1 – Multiple Deprivation – Average Ranke for Districts

Unitary Authority	Former District	Index of Multiple Deprivation	Rank of Income Scale	Rank of Employment Scale
Cheshire West & Chester	Ellesmere Port & Neston	147	226	197
Cheshire East	Crewe and Nantwich	174	172	165
Cheshire West & Chester	Chester	184	160	146
Cheshire West & Chester	Vale Royal	196	161	138
Cheshire East	Macclesfield	290	191	172
Cheshire East	Congleton	303	290	251
Source: Office of National Statistics 2007				

Data for car ownership shown in the table below illustrate that the North West has a lower number of cars/vans per household than the national average. Both Cheshire West & Chester and Cheshire East, however, have an above average number of vehicles per household with an average of 1.26 and 1.34 respectively. The highest number of cars/vans per household can be seen in Congleton (1.43) compared to the lowest number (1.18) in Ellesmere Port & Neston. This is a fairly significant range, however, all areas within Cheshire have above average vehicles per household compared to both the regional and national average.

Table B-2 – Car Ownership Statistics for Cheshire

Unitary Authority/ Former District	Count House-holds	No. of Household with No Car/ Van	No. of Household with 1 Cars/ Vans	No. of Household with 2 Cars/ Vans	Total Cars/ Vans	Cars/ Vans Per House-hold
Congleton	37,282	5,419	15,113	13,245	53,301	1.43
Crewe and Nantwich	45,699	10,057	20,225	12,274	55,308	1.21
Macclesfield	64,162	10,513	26,394	21,531	88,574	1.38
Cheshire East	**147,143**	**25,989**	**61,732**	**47,050**	**197,183**	**1.34**
Chester	50,130	11,096	21,622	14,063	60,848	1.21
Ellesmere Port & Neston	33,170	7,349	14,967	8,853	39,225	1.18
Vale Royal	49,592	8,524	20,753	16,157	66,848	1.35
Cheshire West & Chester	**132,892**	**26,969**	**57,342**	**39,073**	**166,921**	**1.26**
North West	2,812,789	849,769	1,224,554	605,586	2,874,991	**1.02**
England	20,451,427	5,488,386	8,935,718	4,818,581	22,607,629	**1.10**
Source: Office of National Statistics – 2001 Census Data						

Economy and Employment

A study of Cheshire's economy suggests that Cheshire West & Chester's economic output (GVA) will decline by average of 0.3% a year during 2008-12 and grow at an annual rate of 2.2% thereafter (Cheshire West & Chester Council). Forecasts also show that Cheshire West & Chester's economy is expected to grow slower than that of North West England or the UK. Employment is expected to fall during 2008-12 and post-2012 employment growth is predicted to be weaker in Cheshire West & Chester than in the North West or the UK. The economic output (GVA) of Cheshire East is expected to grow by 0.8% from 2008 – 2012, a reduction of 0.8 percentage points from the period 2006 – 2008 (Cheshire East Council Economic Forecasts 2006-2020). Employment is also expected to decrease by 0.9% from 2008 – 2012 which is similar to the regional and national forecast. The economy is forecast to grow by 2.8% post 2012, a faster rate than both the region and the UK as a whole.

The unemployment rate in Cheshire is below that of the North West region (4.6%) and the county as a whole (4.1%) rates, although it is still more than double the rate of June 2008 (1.7%).

Table B-3 – Unemployment Claimant Count – May 2009

Local Authority	Female		Male		Total	
	No.	Rate	No.	Rate	No.	Rate
Cheshire East	1,763	**1.7%**	4,889	**4.3%**	6,652	**3.1%**
Cheshire West & Chester	1,822	**1.9%**	5,221	**5.0%**	7,043	**3.5%**
North West	46,818	**2.3%**	149,294	**6.7%**	196,112	**4.6%**

The North West economy has performed well in recent years. Overall GVA per head in the North West is 12% lower than the England average, but there are considerable variations across the region, with Cheshire having the highest GVA per head.

Census Data Analysis

The 2001 Census for England and Wales provided a vast array of information, amongst which was data on travel to work patterns. This data can be used to identify key commuter movements within wide areas or very specific locations. For the study, the raw Census data has been used to derive matrices of travel movements within the study area, including by a range of modes of transport. This analysis has been based on all the wards within Cheshire (2003 Administrative Boundaries) and districts, counties and regions outside of Cheshire. To aid analysis, urban wards within the county have been amalgamated to represent the larger town areas, while the rural wards have remained separate (in the following tables, amalgamations of wards, within Cheshire only, are highlighted with an asterisk*).

The table below identifies the movements between the three main urban areas and rural wards within the study corridor. The urban areas and wards are displayed in the order they occur within the corridor heading from west to east. Only journeys those that are most likely to use the corridor itself are highlighted within the table.

The table shows all travel to work movements between urban areas and rural wards within the study corridor. The table shows that, as would be expected, the majority of movements are to and from the larger urban areas (Chester, Crewe and Nantwich), however, several of the more rural wards also attract significant inbound commuting trips. Bunbury, for example, attracts nearly 430 trips along the corridor, the second highest. Of the trips into Chester from the study corridor itself, two thirds are from areas at the western end of the corridor up to and including Tarporley.

Of the 3,850 commuter movements identified as both commencing and finishing within the corridor, half take place purely within the western half of the corridor and 13% are purely within the eastern half. Only 18.5% of the movements within the corridor travel between the two extreme ends (i.e. between the Chester and Crewe/Nantwich areas).

Table B-4 – Travel to Work Movements within the Corridor

All	Chester*	Christleton	Tarvin	Tarporley & Oulton	Bunbury	Acton	Nantwich*	Crewe*	Englesea
Chester*		348	201	45	21	3	147	192	9
Christleton	560		27	9	0	0	9	12	0
Tarvin	340	24		33	6	0	21	18	0
Tarporley & Oulton	184	3	33		33	0	12	55	0
Bunbury	72	9	24	37		9	51	88	0
Acton	15	0	3	6	26			155	16
Nantwich*	99	3	9	24	119				34
Crewe*	273	0	21	27	237	108			
Englesea	3	0	0	0	6	3	30		

Of the 3,850 journeys starting and finishing within the corridor which should use the A51/A500, 79% are made by car, 6% by bus and 1% by train.

The table below shows the total movements between Chester and the Northwich conurbation, Winsford and the former district of Congleton. The table also includes the wider rural area of the former Vale Royal district, but only includes those wards which the A51/A500 corridor would provide the most direct link to Chester. These movements are likely to use the A51/A500 corridor, and at minimum the Section One between the A55 and A54.

The Census showed that almost 2,000 commuters travel between Chester and the former districts of Vale Royal and Congleton using the A51/A500 corridor. Of these journeys, 86% were by car drivers, and only 2% and 3% respectively by train and bus.

Table B-5 – Travel to Work Movements To/From Chester

All	To Chester	From Chester
Northwich Conurbation	264	201
Winsford	198	123
Rest of Vale Royal	667	138
Congleton	277	81

The following table shows car driver commuter movements between Crewe, Nantwich and districts, sub-regions and regions outside of the study area between which the study corridor would likely be used. The table shows that approximately 830 people would travel between Crewe and Nantwich and areas to the north and west of the corridor via the A51/A500 while 225 travel between the towns and Wrexham. Over 4,700 travel between Crewe and Nantwich and areas to the south and east of the study corridor.

Table B-6 – Travel to Work Movements To/From Crewe and Nantwich

Location	To		From	
	Nantwich	Crewe	Nantwich	Crewe
Ellesmere Port & Neston	15	75	9	45
Wirral	9	78	9	36
Flintshire	24	60	18	93
Wrexham	9	93	18	105
North Wales	9	54	0	3
Rest of Wales	3	24	0	21
Rest of Merseyside	39	231	93	423
Newcastle-under-Lyme	114	957	108	618
Stoke-on-Trent	69	629	129	643
Staffordshire	45	472	66	180
Shropshire	99	249	75	229
Derbyshire	6	72	0	24
West Midlands	9	285	30	150
East Midlands	0	48	9	39
Yorkshire & Humber	15	90	6	54
North East	21	15	0	18
North West	54	465	132	648
Rest of England	3	138	36	195

Traffic – Flow

General traffic data for the route has been collated from both the two Cheshire authorities and the Department for Transport. Unfortunately there are no fixed monitoring sites in Section One of the route but on the other sections the flows appear reasonably consistent between the two sources.

Table B-7 – AADT Flows Covering the Study Route

Section	Length (km)	Existing Speed Limit (mph)	Direction	AADT Flows (24hr) – Source: Cheshire West & Chester/ Cheshire East – 2008/09	AADT Flows (24hr) – Source: DfT AADT Website – 2007
001	4.5	40/60	Eastbound	-	-
			Westbound	-	-
			AADT	-	**28,727**
002	7.8	60/40	Eastbound	5,999	-
			Westbound	5,913	-
			AADT	**11,913**	**12,734**
003	2.6	60	Northbound	7,616	-
			Southbound	7,320	-
			AADT	**14,937**	**15,727**
004	10.5	60/40	Northbound	6,020	-
			Southbound	6,050	-
			AADT	**12,071**	**12,942**

Section	Length (km)	Existing Speed Limit (mph)	Direction	AADT Flows (24hr) – Source: Cheshire West & Chester/ Cheshire East – 2008/09	AADT Flows (24hr) – Source: DfT AADT Website – 2007
005	2.3	60	Eastbound	8,518	-
			Westbound	8,578	-
			AADT	**17,096**	**16,316**
006	3.4	60	Eastbound	9,047	-
			Westbound	9,531	-
			AADT	**18,578**	**17,024**
007	7.4	60	Eastbound	8,579	-
			Westbound	7,637	-
			AADT	**16,217**	**16,235**
008	3.2	60	Eastbound	12,869	-
			Westbound	14,331	-
			AADT	**27,201**	**30,012**
				Route Average	**18,715**
				Regional Average for a Rural A-road	**10,800**
				National Average for a Rural A-road	**13,900**

! Traffic flows are higher than national and regional averages for rural A-roads

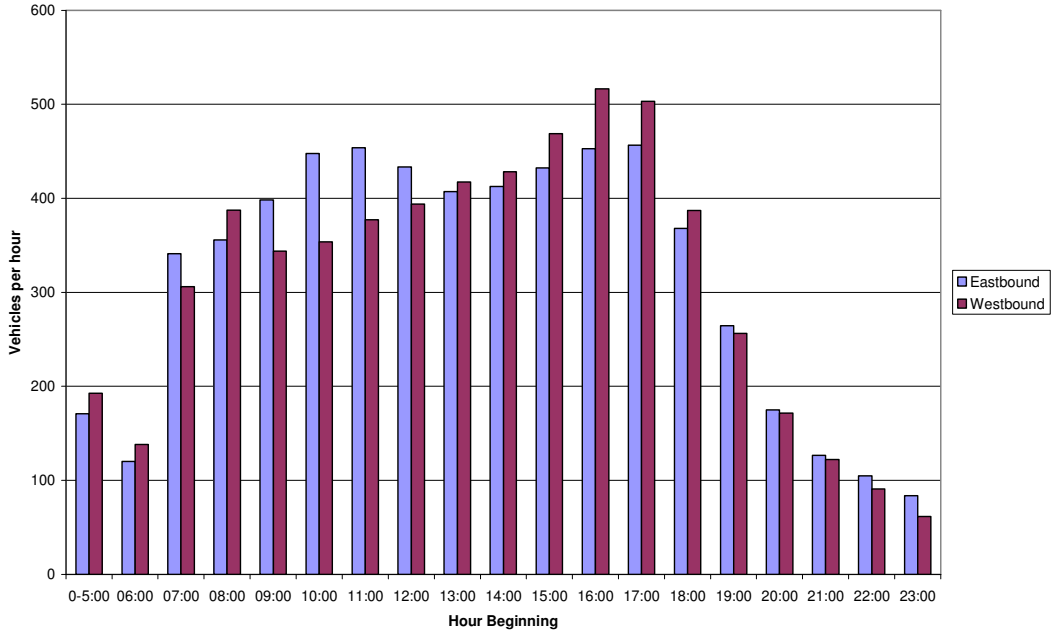
! Sections One and Two have traffic flows more than double the national average for rural A-roads

Traffic – Hourly Flow

The following figures show the distribution of directional traffic flows for each route section over an average 24 hour period. Data was sourced from Cheshire West & Chester Council and Cheshire East Council and no data was available for Section One.

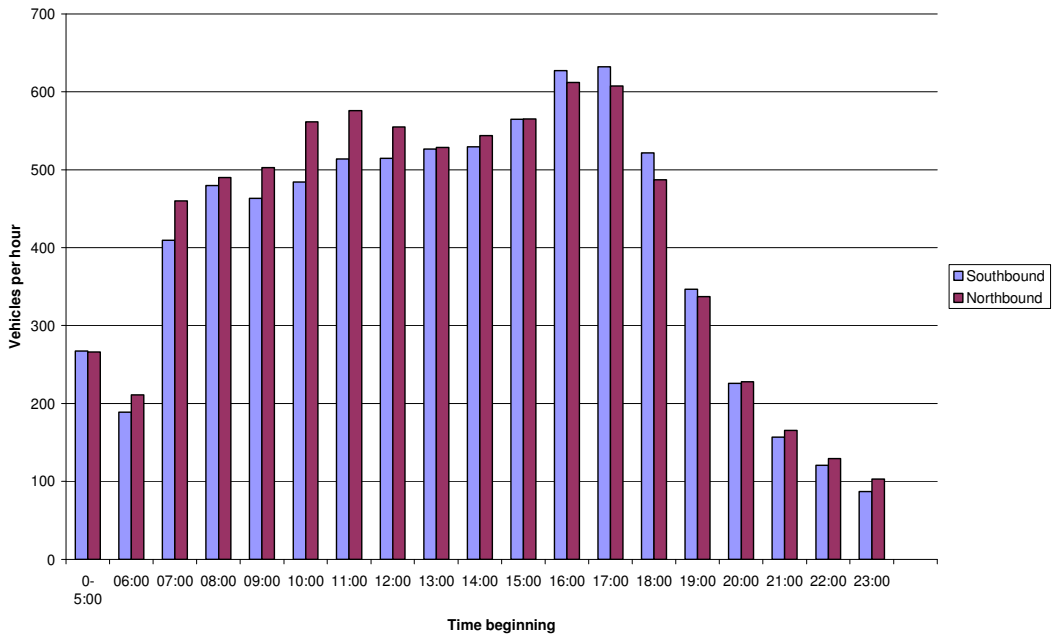
The following figure shows the directional hourly flows for Section Two of the route. During the AM peak the traffic moves predominantly in an easterly direction whereas during the PM peak the predominant traffic flow is in a westbound direction. Overall the traffic flows are noticeably tidal, in opposite directions during the morning and afternoon.

Figure B-4 – Directional hourly flows for Section Two



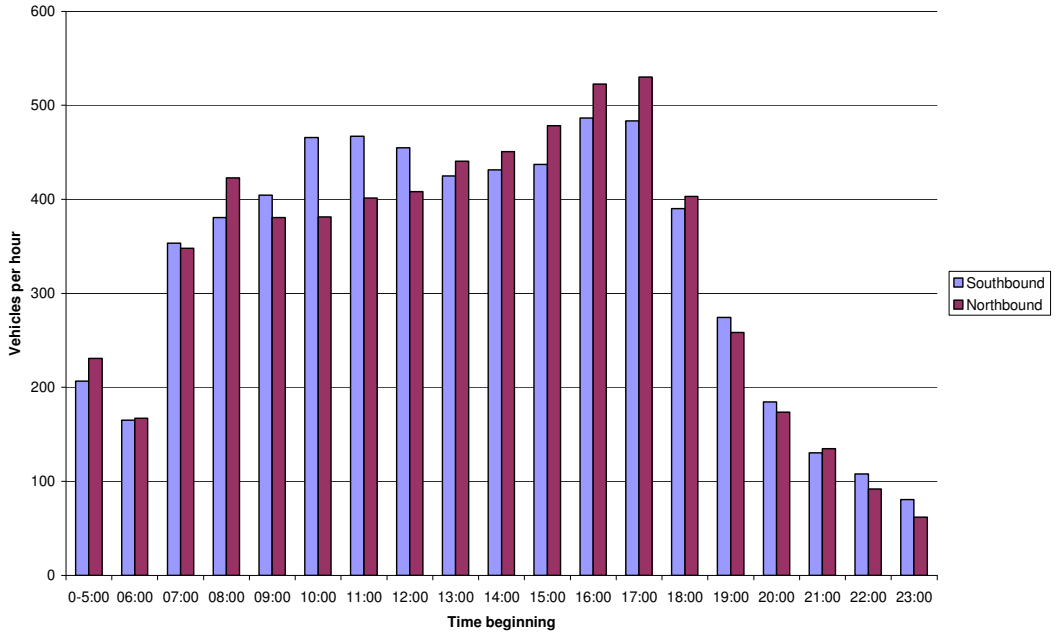
The following figure shows that in Section Three the higher proportion of traffic travels northbound during the AM peak period and southbound during the PM peak period. The northbound flow in the morning following the peak period is particularly noticeable.

Figure B-5 – Directional hourly flows for Section Three



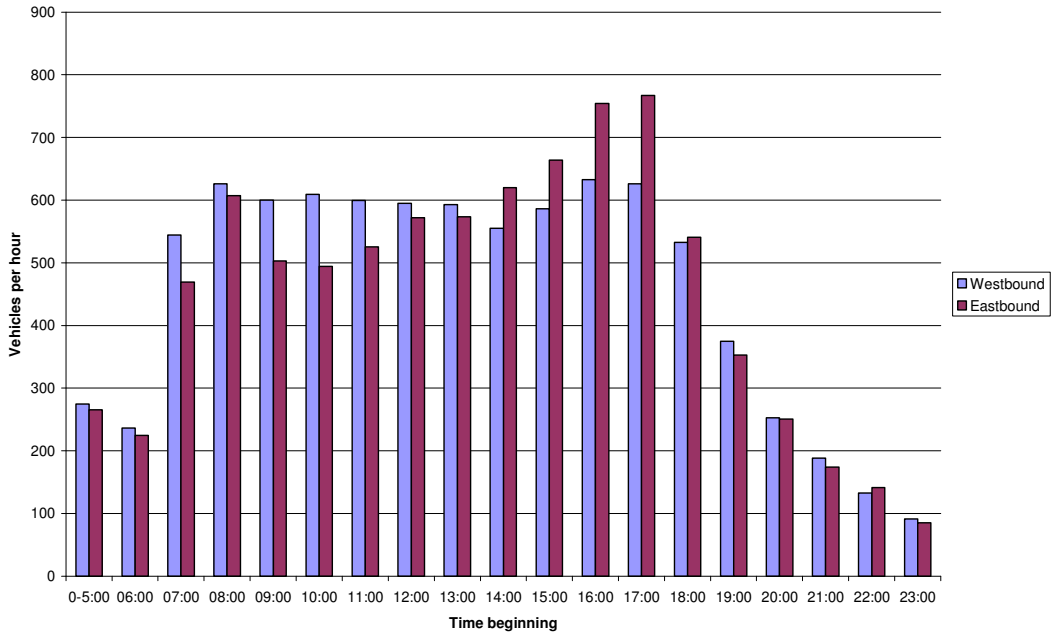
The following figure shows the hourly directional flows for Section Four. With the exception of the AM peak hour itself, the predominant direction of traffic flow in the morning is southbound and this switches in the afternoon.

Figure B-6 – Directional hourly flows for Section Four



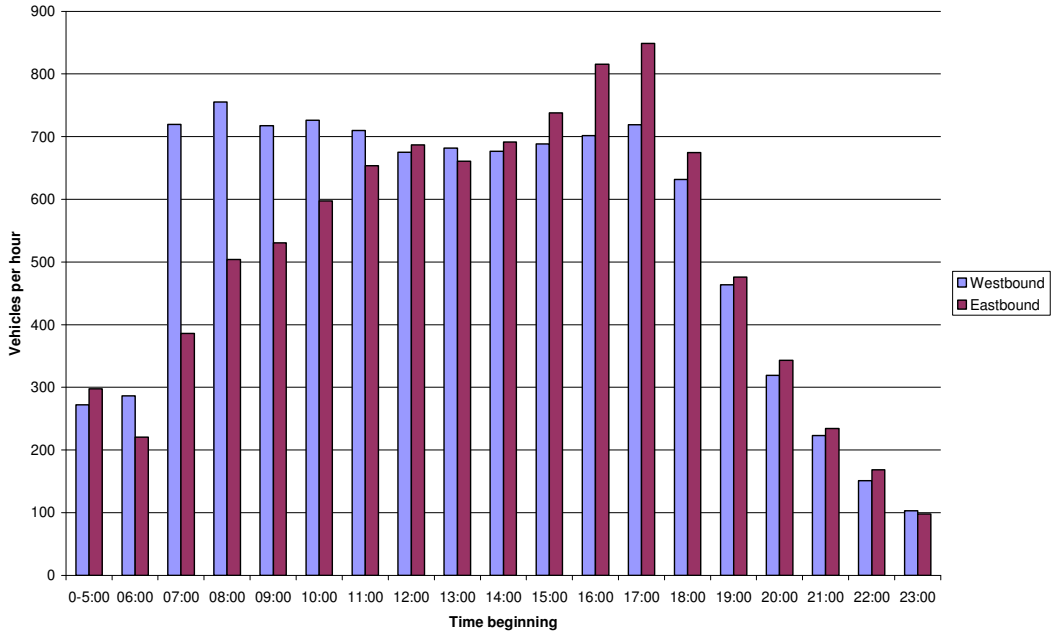
The hourly directional traffic flow data for Section Five is shown in the following figure. This section also shows significant tidality of flows with more traffic travelling westbound in the morning and eastbound in the afternoon.

Figure B-7 – Directional hourly flows for Section Five



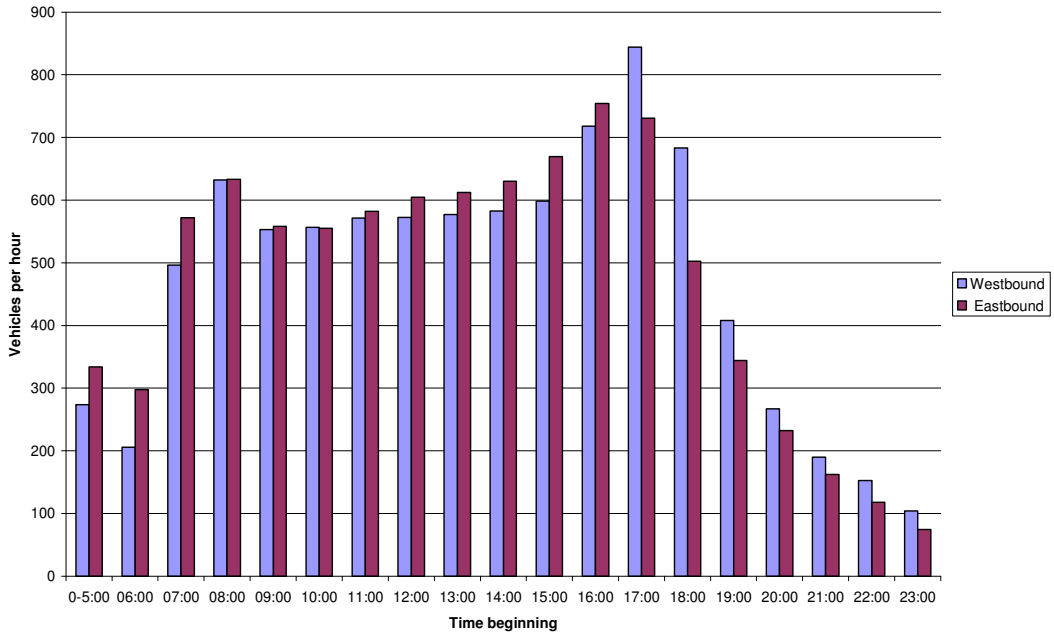
The following figure shows the directional hourly flows for the westbound and eastbound traffic along Section Six. During the morning the direction of travel is primarily westerly and the flow reverses in the afternoon.

Figure B-8 – Directional hourly flows for Section Six



The following figure of the directional hourly flows for Section Seven shows a relatively even distribution of traffic travelling in each direction in the morning but predominantly westbound in the afternoon.

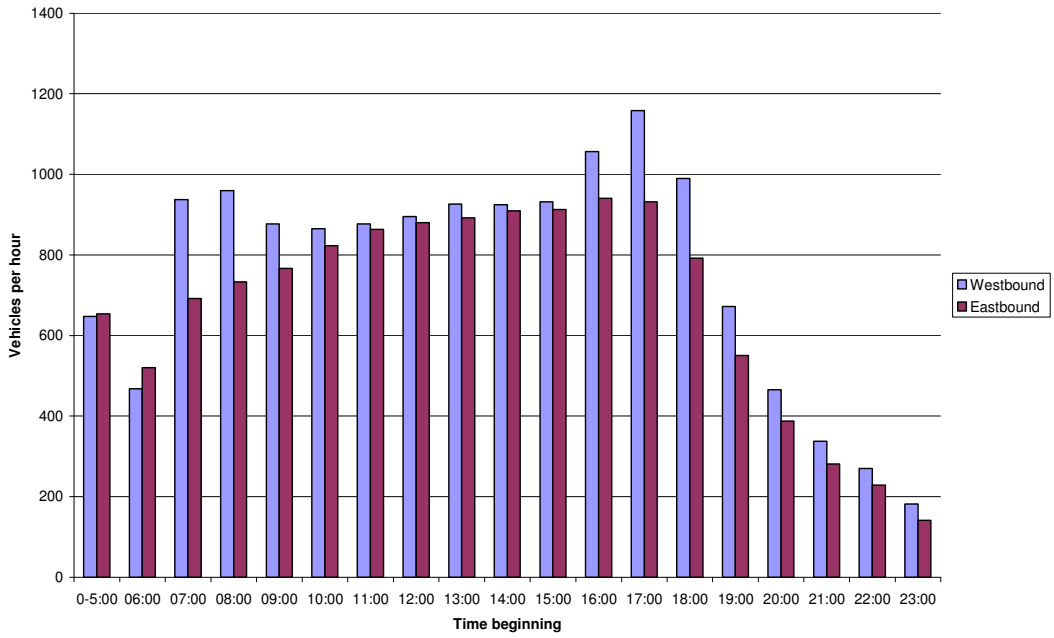
Figure B-9 – Directional hourly flows for Section Seven



The following figure shows the directional flow of vehicles per hour along Section Eight of the study route. The distribution of traffic travelling in each direction is relatively even during the middle part of the day but during both peak periods the predominant flow is westbound as is the total flow for the 24 hour period. The lack of opposing tidal movements on the section during the peak periods and the

significantly higher total daily flow in the westbound direction indicates that the congestion known to occur on this section may be causing the diversion of traffic onto other routes.

Figure B-10 – Directional hourly flows for Section Eight

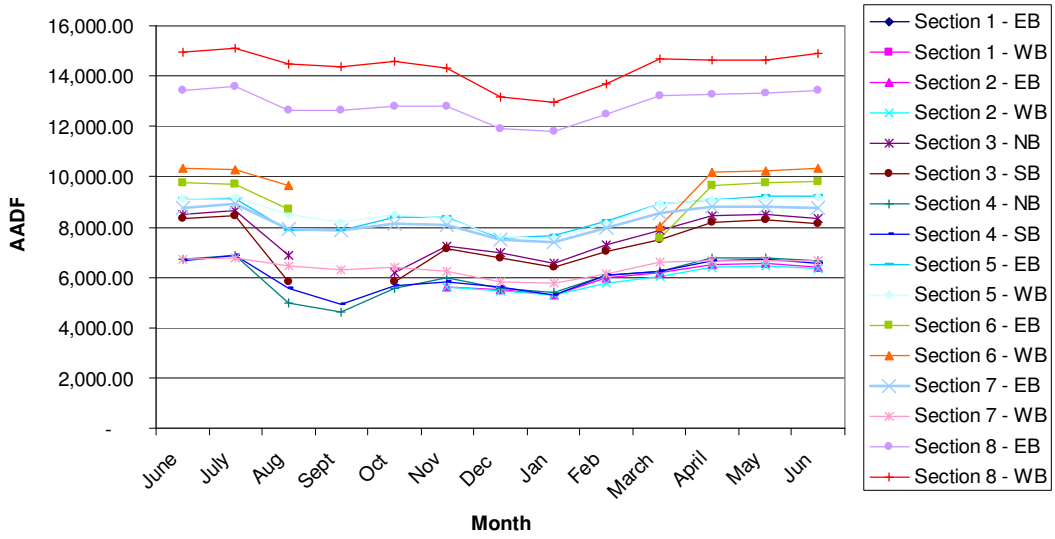


!	Congestion on the Barthomley link may be causing the diversion of strategic traffic onto alternative routes

Traffic – Seasonal Flows

The data reveals that traffic flows remain relatively constant throughout the twelve month period analysed. However, all sections do experience a slightly lower flow during December and January and several sections experience a lower flow during August and September. The data shows that peak flows occur within May, June and July.

Figure B-11 – Seasonal Traffic Flows



Traffic – Classification

The classification data highlights that HGV movements are significantly higher within Section One and Section Eight, and remain relatively consistent through sections Three to Seven. Only Section Two has a significantly lower HGV flow in comparison to all other route sections. The flow of LGVs follows a similar pattern with the highest flows being associated with Sections One and Eight. However, Sections Two, Three and Four have consistently lower flows than all other sections within the study route. Pedal cycle flows remain low throughout all route sections and the highest bus flow is confined to the first six sections, with Section One experiencing the highest overall bus flow.

Table B-8 – Classification Data (Source: DfT)

Section	Year	PC	2WMV	CAR	Coach /Bus	LGV	HGV	AADF – All Motor Vehicles	Annual Daily HGV Flow	HGV %	Coach %
1	2007	9	193	23480	217	2745	2092	28727	2092	7.30%	0.46%
2	2007	7	99	10090	102	1469	974	12734	974	7.60%	0.31%
3	2007	2	204	12310	71	1455	1687	15727	1687	10.70%	0.06%
4	2007	5	72	9758	116	1453	1543	12942	1543	11.90%	0.42%
5	2007	12	125	12722	84	1913	1472	16316	1472	9.00%	0.13%
6	2007	17	198	13432	80	1825	1489	17024	1492	8.80%	0.11%
7	2007	0	111	12443	30	2016	1635	16235	1635	10.10%	0.18%
8	2007	0	86	23273	54	3630	2969	30012	2969	9.90%	0.18%
							Average	18715	1733	9.30%	0.24%
							Regional Av*	10800	577	5.30%	-
							National Av*	13900	743	5.30%	-
Source: DfT AADT website 2007 and National Road Traffic Survey 2008, DfT											
* Coach figures are assumed and includes National Express and Home to School travel											

!	HGV flows on the route are significantly higher than the national average

!	HGV flows on Sections One and Eight are nearly three and four times the national average respectively

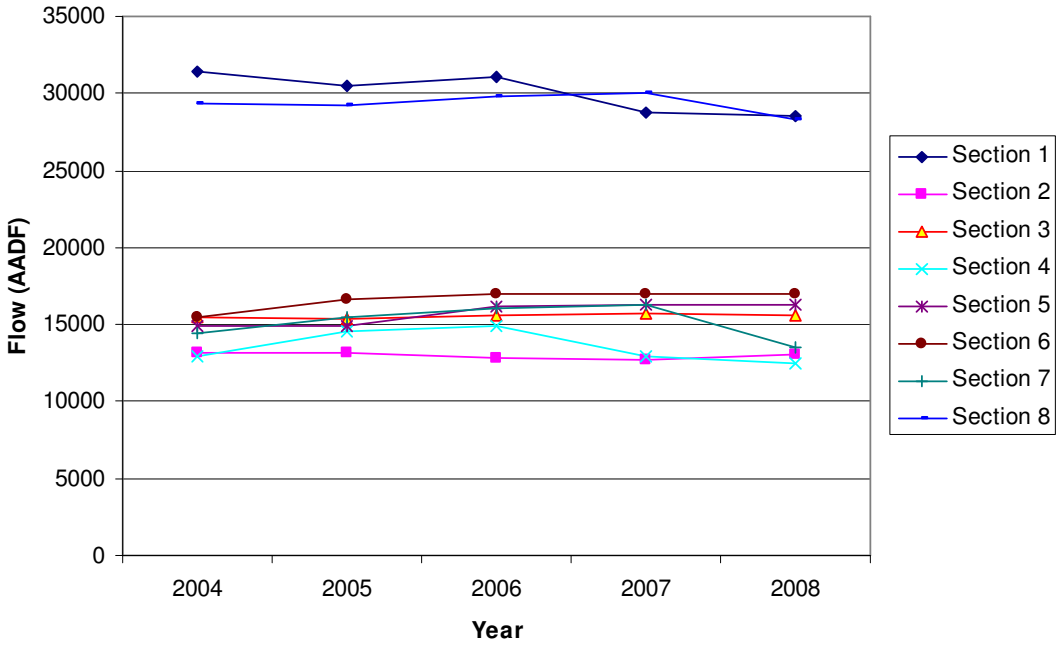
Traffic – Daily Traffic Growth

The traffic growth analysis reveals that over the period 2004 – 2008 five sections have experienced a drop in the total flow (see table and figure below). Over the four year period Section One has experienced a 9.26% reduction in flow; significantly there has been a year on year reduction over all years with the exception of 2006. Similar patterns have also been experienced on Section Eight where there has been a reduction of 3.55% over the four year period. The data also shows that there has been a relatively consistent growth in flow on Section Five and Six. Data was sourced from Cheshire West & Chester Council and Cheshire East Council.

Table B-9 – A51/ A500 Traffic Growth: 2004 – 2005 (Source: DfT)

Route Section	Total Flow (AADF)					Change (2004-2008)	% Change
	2004	2005	2006	2007	2008		
001	31,449	30,520	31,077	28,727	28,538	-2,911	-9.26%
002	13,134	13,139	12,796	12,734	13,061	-73	-0.56%
003	15,443	15,342	15,637	15,727	15,641	198	1.28%
004	12,905	14,570	14,953	12,942	12,522	-383	-2.97%
005	14,885	14,850	16,210	16,316	16,230	1,345	9.04%
006	15,462	16,613	16,986	17,024	16,925	1,463	9.46%
007	14,462	15,516	16,107	16,235	13,498	-964	-6.67%
008	29,368	29,267	29,806	30,012	28,326	-1,042	-3.55%

Figure B-12 – A51/ A500 Traffic Growth: 2004 – 2008



Traffic – Daily HGV Traffic Growth

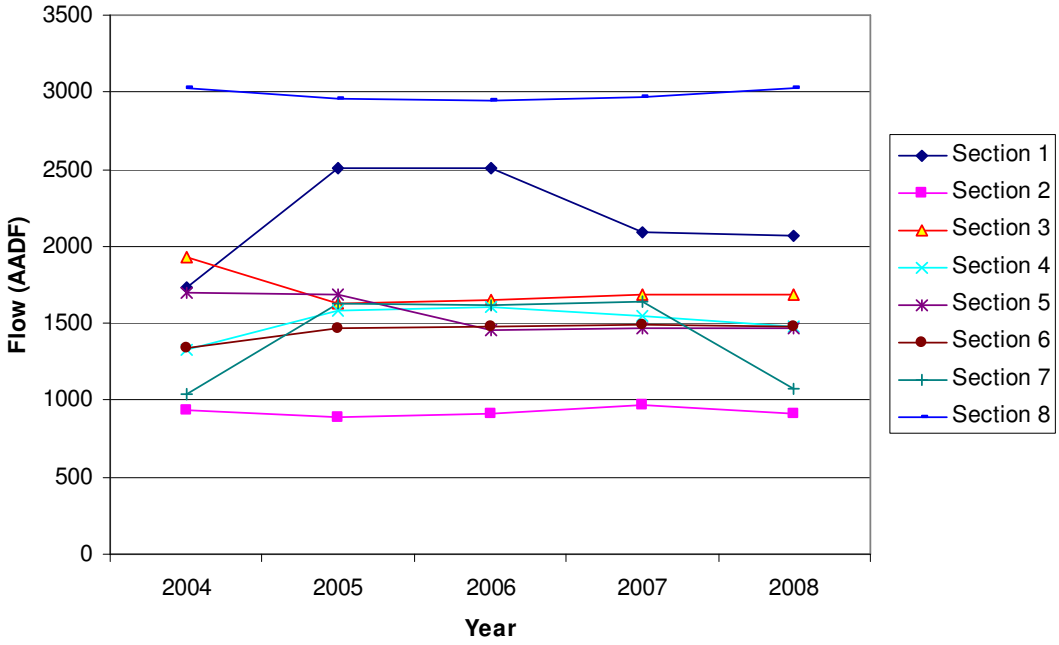
The data shows that there have been increases in HGV flow across four route sections with Section Eight having the most consistent HGV flow across the four year period (see table below). The most dramatic change has been the 19.14% increase experienced on Section One, the data shows a large increase between 2004 and 2005 and a large decrease between 2006 and 2007 (see flowing figure). Sections Four and Six have experienced an increase of approximately 10% within the four year period and Sections Three and Five have experienced a decrease of between 12.4% and 13.4% respectively.

Overall, between 2004 and 2008 there appears to have been marginal growth in HGV movements. Data was sourced from Cheshire West & Chester Council and Cheshire East Council.

Table B-10 – Daily HGV Traffic Growth: 2004 - 2008

Route Section	2004		2005		2006		2007		2008		Change (2004-2008)	% Change
	HGV	HGV %	HGV	HGV %	HGV	HGV %	HGV	HGV %	HGV	HGV %		
1	1,735	5.5	2,511	8.2	2,507	8.1	2,092	7.3	2,067	7.2	332.0	19.1%
2	936	7.1	892	6.8	912	7.1	974	7.6	913	7.0	-23.0	-2.5%
3	1,931	12.5	1,633	10.6	1,649	10.5	1,687	10.7	1,691	10.8	-240.0	-12.4%
4	1,333	10.3	1,578	10.8	1,600	10.7	1,543	11.9	1,474	11.8	141.0	10.6%
5	1,698	11.4	1,691	11.4	1,457	9.0	1,472	9.0	1,471	9.1	-227.0	-13.4%
6	1,344	8.7	1,470	8.8	1,479	8.7	1,489	8.7	1,484	8.8	139.7	10.4%
7	1,045	7.2	1,630	10.5	1,616	10.0	1,635	10.1	1,077	8.0	32.0	3.1%
8	3,028	10.3	2,956	10.1	2,949	9.9	2,969	9.9	3,026	10.7	-2.0	-0.1%

Figure B-13 – Traffic Growth: 2004 - 2008 (HGV)



Traffic – Speed

The following table highlights the average speeds across the A51/A500; the data shows that the average speed for seven out of the eight sections over 24 hours is below the specified section speed limit. Only Section Seven has a mean speed that is greater than the speed limit.

The data has been used to calculate the percentage of maximum free flow speed experienced for each route in each direction during the AM and PM peak hours. The data shows that for Section Eight the peak hour speeds are substantially lower than the highest free flow speed indicating that congestion is an issue during the peak periods in the eastbound direction. The other sections, with the exception of Section Four appear to function relatively well during the peak period (no data was available for Section One). Data was sourced from Cheshire West & Chester Council and Cheshire East Council.

Table B-11 – Speed Data along the A500/A51

Section	Existing Speed Limit (mph)	Direc-tion	Mean Speed (mph) (24hr)	AM Peak Speed (mph) (08:00)	PM Peak Speed (mph) (17:00)	Inter Peak (mph)	Off Peak (mph)	Highest Free Flow Speed (mph)	% of Free Flow Max	
									AM Peak Hour	PM Peak Hour
1	40/60	East	-	-	-	-	-	-	-	-
		West	-	-	-	-	-	-	-	-
2	60/40	East	38.50	39	38.3	37.68	41.67	44.5	87.6%	86.1%
		West	38.40	38.4	38.1	37.31	41.69	44.5	86.3%	85.6%

									% of Free Flow Max	
3	60	North	53.30	53.6	53	51.57	66.62	59.4	90.2%	89.2%
		South	52.40	50.9	52.1	50.46	58.4	59.5	85.5%	87.6%
4	60/40	North	43.10	41.6	42.3	41.07	49.86	54.3	76.6%	77.9%
		South	42.80	41.1	41	40.91	49.61	53.8	76.4%	76.2%
5	60	East	41.20	41.3	38.5	40.7	43.32	44.6	92.6%	86.3%
		West	44.50	42.2	44	43.73	48.27	50.7	83.2%	86.8%
6	60	East	43.40	50.6	47.95	42.15	47.83	50.7	99.8%	94.6%
		West	43.55	49.2	49.2	43.17	47.06	49.7	99.0%	99.0%
7	60	East	62.55	65	64	59.28	58.92	65.45	99.3%	97.8%
		West	64.60	64.15	66.95	62.82	57.77	69.2	92.7%	96.7%
8	60	East	41.70	30.8	30.4	41.6	52.83	58.1	53.0%	52.3%
		West	51.00	47.9	48.6	50.6	56.57	60.2	79.6%	80.7%

Note: Where free flow speed exceeds the stated speed limit, the speed limit has been used to calculated the peak hour percentage of free flow maximum speed

! Section Eight (Barthomley Link) suffers from significant peak period congestion in the eastbound direction

Major Trip Generators

Major trip generators have been identified within the immediate area and within the wider area surrounding the route. Any significant trip generators which fall outside the wider area have also been considered. The immediate area has been defined as 100m either side of the route.

The analysis highlights that there are two major trip generators located within the immediate area of the route. The Boughey Distribution Centre and North Western Famers are located at Wardle within Section Four of the route. Alvaston Business Park is situated close to Nantwich in close proximity to the A500 section of the route. The only access to this site is via Section Six of the route.

Table B-12 – Major Trip Generators within 100m of the Route

Type	Name	Location, Access	Travel Plan
Employment Areas	Alvaston Business Park	Nantwich, direct access via section 5.	Yes
Major Employers	Boughey Distribution Centre	Wardle, Section 4	

A variety of major trip generators fall within a 5km catchment area of the route. These major trip generators can be broadly defined into various categories. A summary table below indicates the major trip generators within the surrounding area.

Table B-13 – Major Trip Generators within 5km of the Route

Type	Name	Location, Access	Travel Plan
Major Employers	Bentley	Crewe, indirect access via route	Yes
	Bombardier Transportation	Crewe, indirect access via route	
Employment Areas	Bell Meadow Business Park	Eaton, indirect access via route	
	Barony Employment Park	Nantwich, indirect access via Section 5	
	Radway Green	Alsager, indirect access to route	
	Marshfield Bank Employment Park	Crewe, indirect access via route	
	Crewe Business Park	Crewe, indirect access via route	Yes
	Crewe Gates Farm Industrial Estate	Crewe, indirect access via route	
Education Establishments	University of Chester	Chester, indirect access via route	Yes
	West Cheshire College - Chester Campus	Chester, indirect access via route	Yes
	Reaseheath College	Nantwich, direct access via section 5	
	Manchester Metropolitan University – Cheshire	Alsager, indirect access to route	Yes
	South Cheshire College	Chester, Chester, Use of route only from journeys from east.	Yes
Shopping Centres	Chester City Centre	Chester, Chester, Use of route only from journeys from east.	
	Grosvenor Shopping Centre	Chester, indirect access via route	
	Market Centre Crewe	Crewe, indirect access via route	
	Sainsbury's Nantwich	Nantwich, indirect access via section 6	
Tourist Attractions	Chester Zoo	Chester, Use of route only from journeys from east.	
	Chester Race Course	Chester, Chester, Use of route only from journeys from east.	
	Beeston Castle	Beeston, indirect access to route	
	Oulton Park	Little Budworth, indirect access to route	
	Stapeley Water Gardens	Nantwich, indirect access to the route	
	Bridgemere Garden World	Nantwich, indirect access to the route	
Railway Stations	Chester Railway Station	Chester, indirect access to the route	
	Nantwich Railway Station	Nantwich, indirect access to the route	
	Crewe Railway Station	Crewe, indirect access to the route	
Hospitals	Countess of Chester Hospital	Chester, indirect access to route	Yes
	Leighton Hospital	Crewe, indirect access to route	Yes

!	Only eight of the 28 major trip generators are known to have specific or area-wide travel plans

Freight – Weight and Height Restrictions

There are no height or weight restrictions designated on the study route. There are, however, certain restrictions signposted for roads adjacent to the route. The height restriction which is signposted on the route at Section Four close to Tilstone Fearnall refers to the A49 to Tiverton. The weight restriction highlighted on Section Five refers to Wettenhall Road which leads to Reaseheath.

Spatial Planning

Regional

The North West Regional Spatial Strategy 2008 identifies priorities for areas of growth and investment within the region. The 3rd priority is 23 towns and villages within the region which includes Chester and Crewe. The North West Regional Funding Advice (NRDA) 2009 indicates that it is a priority to build on Cheshire's influence as a key sub-region which can contribute to regional Gross Value Added. Specific focus should be on economic growth opportunities in Chester and Crewe. Strategic Regional Sites are cited which include Chester Business Park and the Basford development site at Crewe.

The Strategic Regional Sites Review Technical Report 2009 identifies the 11 sites which were highlighted in The Regional Strategy document England's northwest: a Strategy Towards 2020, (2000). These sites were reviewed and potential additions were made. Following consultation some of the sites were retained, some withdrawn and some further sites were added. As a result the Basford site at Crewe was on the original list and was retained as a regionally strategic site. Following review and consultation, Central Chester was added to the list of new sites but Chester Business Park was removed.

The developments which are likely to have most impact on the study route are:

- Crewe Rail Gateway
- Chester Rail Gateway
- Crewe Town Centre Redevelopment
- Basford, Crewe
- Central Chester

!	Crewe and Chester Rail Gateway developments could have a significant impact on the route

Basford Strategic Regional Site
The proposed developments at Basford East and West form a significant part of Cheshire East's development and the site is recognised by the North West Regional Development Agency.

Basford West is allocated as a regional warehousing and distribution park, and includes the provision for appropriate rail sidings. There will be B8 storage and distribution units in areas adjacent to the West Coast mainline. Office (B1) and light industrial buildings (B2) will also be developed at the site gateways and adjacent to the new spine road.

Basford East is allocated for strategic and major industrial and business related development. This will provide office and light industrial use (B1), general industrial use (B2), storage and distribution (B8) and limited ancillary facilities such as food and drink (B3) and potentially a hotel (C1).

The two sites, Basford West (55 hectares) and Basford East (92 hectares) make up an area designated as a strategic Regional Investment Site, which broadly lie to the north of the A500 Basford, Hough, Shavington Bypass, between the B5071 Crewe Road to the West, the A5020 to the east, and the urban edge of the A534 and Crewe Railway Station. The Basford west and east sites are divided by the West Coast Mainline.

Traffic modelling has shown that the A500 Barthomley link is already operating at around its design capacity in the eastbound direction during both peak periods, with only a limited amount of spare capacity in the westbound direction. It has been recommended through VISSIM that full dualling of the A500 Barthomley Link along with improvements to the M6 Junction 16 is required to deliver comprehensive development of the Basford site. Assessments show that the scale and mix of the development put forward in the development briefs will require significant investment in local infrastructure funded through a mixture of private and public finance.

A scheme is currently being developed for the provision of additional capacity to the M6 by widening to dual four lanes through a combination of techniques, to cater for needs up to 2031. On the basis of SATURN studies, it would appear that widening the M6 to dual 4 lanes would be capable of accommodating the development related traffic of the Basford Site. (This does not take into account the A500 dualling).

!	The Basford Strategic Regional Site could have a significant impact on the route, particularly Sections Seven and Eight.

The Deeside Hub

The Deeside Hub is the name for a series of developments which span a large geographical area covering north-west Cheshire and north-east Wales. The developments aim to enhance Chester as a business location and improve employment opportunities within neighbouring Ellesmere Port, The Wirral and Flintshire. The major components of the Deeside Hub developments include:

- Deeside Enterprise Ring – a 'ring of opportunity round Chester' alongside improvements to the strategic transportation links (on the A55, A494, A550, A5117, M56 and M53).

- Chester Urban Renaissance Area – Regeneration and development including homes, industry and business.

- Developing the tourism and visitor experience – Flagship scheme of the Chester Culture Park, creation of Chester Super Zoo

- Chester Core Development Zone – A new Northgate retail and leisure development. Chester Railway Station as an employment node and as a transport gateway

- Chester Education Cluster – development of the Countess of Chester Health Park concept, the Chester University College and the development of West Cheshire FE College

!	The Deeside Hub schemes could have a significant impact on the route

!	Tourism developments including Chester Zoo could increase traffic on the route

Growth Point Status

Cheshire West & Chester has been designated one of England's 20 new growth point areas and has been awarded funding of £3.4m to cover the 2009/10 and 2010/11 period.

Cheshire West & Chester developed a vision to deliver a sustainable level of housing growth and to achieve the full economic potential of the sub-region. A key feature of the successful bid for Growth Point status was that the area has a steady economy but has the potential for increased growth. A shortfall in affordable housing was highlighted as an issue which is limiting continued economic growth. Areas of significant deprivation have also been highlighted within the sub-region. It was recognised that these issues and problems may be overcome through the appointment of Growth Point status.

Cheshire West & Chester Council has identified three key targets which they hope that funding through growth point status will help to achieve, these are:

- housing growth at a rate of 23% above proposed RSS figures, totalling 8000 units in the first five years
- bringing back into positive use of many derelict underused and neglected sites in sustainable locations
- 30-40% of all new homes will be affordable, up to 3200 new affordable homes in the first five years.

A program of development was submitted in October 2008 by Cheshire West & Chester Council after receiving the Growth Point status. The document details how the Council intends to manage and deliver the proposals whilst working with Government partners. The Programme of Development identifies the Council's vision and objectives in terms of implementation of the Growth Point status funding. It details the specific proposals in terms of housing, education health and culture and identifies how these will be put in place. The methods of management and sustained monitoring of the strategy are also described.

The Council has identified a number of potential housing sites across the four principal urban areas of Chester, Ellesmere Port, Winsford and Northwich. The scheme is proposed to deliver much higher levels of housing development than previously in the area. There is to be an increase in the number of new properties developed on brownfield sites within the area and an increase in the provision of affordable housing. Several areas within Cheshire West have been highlighted as areas of significant deprivation these are Vale Royal, Winsford, Northwich, Ellesmere Port, Blacon, Overleigh and Tarporley. The growth plan document highlights Tarporley as a potential site for the development of 92 new houses.

In terms of transport the vision for Cheshire West & Chester states that the new developments must be able to access key services and facilities easily. The promotion of walking and cycling, increased public transport use and accommodating the use of private car in the most environmentally effective way is highlighted as an aim of the Growth Point strategy.

The provision of well connected and well maintained infrastructure has been highlighted as important in ensuring sustainable growth is delivered in the area. The Cheshire West area is very accessible with the M56 and A55 being major highway routes within the area. There are also good internal links throughout the region through the network of A-roads. The report states that there are good rail services to London, Crewe, Manchester and North Wales.

The document identifies the need for a Strategic Transportation Study which will assess whether the current network will be adequate for the proposed growth. The study will also be able to identify any improvements or upgrades that are required.

The HA will be a key partner in future developments in Cheshire West & Chester as a growth point area. The M53 and A55 are key routes and accessible infrastructure is an important factor in the future development of Cheshire West & Chester.

The Strategic Transportation Study will assess the existing provision of cycling and walking routes in the area. The Study will suggest any improvements which may be required. The area has already developed the Cycle Chester scheme which is a 10 year programme of improvements and development opportunities.

The growth point programme for Cheshire West & Chester has made a number of bids to the Community Infrastructure Fund, including bids for schemes such as public transport and town centre improvements. The proposals include the Wrexham-Bidston railway line improvements, a Chester Quality Bus Scheme and a Transport Smartcard scheme.

Projects for 2008/9 to 2010/11 are currently ongoing and include Sustainable Transport Planning Support. The aim of which is to provide people with greater options for 'smarter choices'. Another key feature is the production and implementation of Council Travel Plans. Chester Transport Strategy and Chester Western Relief Road is a project which will assess the feasibility of the road development. It is thought that construction of this route will assist in the economic growth and regeneration of Chester Town Centre.

!	Growth Point status in the Cheshire West & Chester area may generate impacts on the route
!	The transport impact of Growth Point developments will be known following a Strategic Transportation Study

Housing & Employment Projected Growth

Housing

The table below shows the RSS figures for housing each year compared to that of the projected figures from Growth Point Programme of development. The RSS identifies Ellesmere Port, Chester and Vale Royal as requiring 1,317 extra dwellings per annum. The Growth Point objective is to deliver 23% above this figure to 1,600 dwellings a year.

Table B-14 – Projected Growth Point Housing Development

Area	RSS Housing Figures per annum	Potential annual delivery	% Housing on top of RSS Figure
Chester City	417	517	**24%**
Ellesmere Port & Neston	400	500	**25%**
Vale Royal	500	600	**20%**
Total	**1,317**	**1,617**	**23%**

The table below details the total housing provision for each area within Cheshire West from 2003–2021. It is shown that there is a target of 80% of new homes to be sourced from Brownfield land and buildings.

Table B-15 – Distribution of Regional Housing Provision 2003-2021

Cheshire West	Total Housing Provision 2003 - 2021	Annual Average rates of Housing Provision	Indicative target proportion of housing provision to use brownfield land & buildings
Cheshire	**7,500**	**417**	**At least 80%**
Ellesmere Port & Neston	**7,200**	**400**	
Vale Royal	**9,00**	**500**	

The table below shows that the land taken up for employment will be greater in the North West as opposed to Cheshire & Warrington. The projected increase in take-up is 6% in Cheshire and Warrington compared to 9% in the North West. The number of hectares expected within Cheshire and Warrington is 874 hectares over the period of 2005- 2021.

Table B-16 – Provision of Employment Land 2005-2021 (Hectares)

	Cheshire & Warrington	North West
2005 supply	1,171	5,475
Current take up / annum	41	313
Projected increase in take up	6.00%	9.22%
Projected take up / annum	43	342
Need 2005 -21	688	5,472
Extra allocation required	-483	-3
Flexibility Factor	27%	-
Need 2005 – 21	874	6,654
Extra allocation required	-297	1179

Major Works and Redevelopment

Based on the details within the local planning documents various major works have been identified which are relevant to the wider study area. The developments are outlined in the table below.

Table B-17– Major Works and Redevelopment

Project Name	Project Details
Crewe Rail Gateway	Crewe station is to be developed and passenger facilities improved due to anticipated passenger increases. The proposals have been identified in the Local Development Framework.
Snow Hill, Nantwich	This site has been identified as having substantial development potential and discussions are at public consultation stage.
Redevelopment of Crewe Town Centre	Major plans to redevelop Crewe town centre are underway to create new office, shopping and residential spaces. An initial £3million scheme has been secured for this project.

Project Name	Project Details
Chester Renaissance	A £460million scheme which comprises of many projects within Chester which is expected to be delivered by 2015, projects include: **Northgate development –** refurbished town hall, shops, restaurants, homes, new market, library, arts centre and bus station. **Castle Gateway development –** luxury apartments and office space. **Chester Railway Station –** regeneration project in order to restore historically important buildings, enhance their visitor experience and improve their access and attraction. **Chester Zoo –** largest conservation, animal and leisure attraction of its kind in Europe. A hotel, domed ecosystem and positive economic impact by 2018. **Chester City Management –** Increase the visitors in the City Centre by liaising with shop owners and managing and delivering promotional activities. **REVIVE Programme –** in partnership with NWDA to transform 170 hectares of brownfield land to public green spaces – currently at consultation stage. **Weaver Valley Regional Park –** improve access, support urban regeneration, and create jobs.

!	Significant developments in Chester, Crewe and Nantwich may affect the route

.

7.3 North Wales – Spatial Planning

The study route has a junction with the A55, a secondary trunk road link from Cheshire, Merseyside and the North West into North Wales. From Chester, the A55 continues across North Wales and forms an important link to Holyhead providing a link between Ireland and mainland Europe.

There are five Local Authorities through which the A55 in North Wales passes; these being Flintshire, Denbighshire, Conwy, Gwynedd, and the Isle of Anglesey. The A51/A500 route as a whole is also influenced by the Wrexham area. The local planning documents of these Councils have been reviewed in order to assess any major future influences concerning the A55 route. Any issues regarding the route currently also commented on.

7.3.1 Flintshire

The Flintshire Unitary Development Plan – Proposed Modifications September 2009 highlights improvements to major transport corridors through the county, including the A55 as being important. The document identifies that improvements to the

A494/A55 Ewloe Interchange may take place during the lifetime of the plan and phase 2 is scheduled for completion in April 2010. In controlling the location of development the plan identifies the need to control sporadic development in rural areas, particularly along the A55 corridor and coast.

7.3.2 Denbighshire

Within Denbighshire Unitary Development Plan 1996–2011 the importance of the A55(T) and A5(T) corridor is highlighted as key in attracting investment and securing job opportunities within the region. The document also refers to potential improvements to the A55 to make the roads safer and also to make the south of the county more accessible to the national and strategic highway network. A need has been identified generally along the A55 (T) for HGV facilities.

7.3.3 Conwy

The Local Development Plan for Conwy covers the period from 2007–2022. The document identifies areas for strategic investment along the A55 route. The A55 route is strategic in providing access to Llandudno transport interchanges within Conwy. There is a road improvement proposal crossing the A55 connecting the A548 to the A547.

7.3.4 Gwynedd

The Gwynedd Unitary Development Plan (2001-2016) proposed modifications document highlights the peripheral nature of the area and identifies the A55 as being key in reducing the impact of this.

7.3.5 Isle of Anglesey

The Isle of Anglesey Local Transport Plan 2000 specifies that the A55 corridor will provide improvements to inter-city rail services and high quality links to the high speed Irish Sea ferry. The new A55 represents the most important strategic transport corridor crossing the island. It will carry substantial amounts of daily traffic with flows of over 30,000 vehicles per day predicted along some of its sections following completion. It is envisaged that the A55 improvement across Anglesey will provide opportunities for improved roadside facilities for lorry drivers.

The Highway Strategy section, identifies improvements to links with the A55 Euroroute as being important for Holyhead Port, employment sites, population centres and tourist attractions. There are to be measures implemented to improve the capacity of the A55 across Pont Britannia.

7.3.6 Wrexham

Wrexham is linked to the A51/A500 corridor by the A534 which approaches the corridor to the west of Nantwich and meets the A51 at the Burford Crossroads. The Wrexham Unitary Development Plan 1996-2011. The UDP highlights the A534 as being part of its primary highways network.

7.4 The North Wales Regional Transport Plan (RTP) (Feb 2009)

This document is a strategy for delivering transport improvements over next 25 years. The document has been composed through the TAITH Partnership, which includes Anglesey, Conwy, Denbighshire, Flintshire, Gwynedd and Wrexham Councils. The RTP sets out 9 Priorities:

1. Efficiently meeting North Wales' diverse transport needs
2. Passenger transport profile and performance
3. Reducing congestion and journey times
4. Supporting development
5. Safe, efficient, sustainable transport networks
6. Improving rail services for North Wales
7. Environmentally-friendly and efficient freight movement
8. Smart traffic planning and management
9. Sustainable transport

North East Wales Spatial Plan – Transport's Contribution

In the North East Wales Spatial Plan, the following seven key Regional Transport Plan projects have been identified for inclusion in the near term Delivery Plan subject to approval at the North East Ministerial Meeting in December 2008.

- Wrexham Industrial Estate Access Road
- Llandudno Town Station – this scheme also appears in the North West Area Plan list of projects
- Prestatyn Station Interchange
- Rhyl Rail/Bus Station Interchange
- DRT – ERDF Priority 4 Project
- Wrexham–Bidston Electrification/Frequency Enhancement
- Smarter Choices – Deeside Industrial Park

Event Management

Table B-18 outlines the major regular events that have an impact on the A51/A500 route. At present there are no individual event management plans, instead plans for each event are developed on a year by year basis.

Table B-18 – Locations and Frequencies of Major Events and Attractions

Location	Event	Frequency
Nantwich	Nantwich & South Cheshire Show	1 day annual event, July
Cholmondeley, A49	Cholmondeley Pageant of Power	2 day annual event, July
Oulton Park, A49	Oulton Park Race Circuit	Significant events April – October
Chester	Chester Racecourse	Significant events – seasonal

In addition to the major events listed, there are also a number of other tourist attractions within the Wider Route Area which include:

- Chester
- Chester Zoo
- Beeston Castle
- Stapeley Water Gardens
- Bridgemere Garden World

!	A number of events and attractions may increase traffic on the route on individual days

Maintenance

Cheshire West & Chester and Cheshire East have not supplied long term maintenance plans/programmes covering the study route. There is also a lack of information on the location and condition of significant structures either on the route or within the study area.

Maintenance Programme

There is a major structural maintenance scheme proposed on the A51 between Reaseheath Roundabout and the Burford Traffic Lights in Section Four of the route.

Drainage Issues

There are no identified drainage issues on the route.

Gritting Routes

The entirety of the A500 and A51 route is gritted by Cheshire West & Chester and Cheshire East Council. A total of 41% of the road network within Cheshire is treated if ice is expected. The cycleways in the county are only treated if they form part of the selected route.

Policy Documents

HA Regional Network Report NW 2008

The report sets out the strategic and operational functions of the Strategic Route Network in the North West region, managed by the Highways Agency. The document sets out the following investment priorities which have relevance to the study:

- Crewe Green Link Road
- Crewe Rail Gateway.

The document specifies Local Transport Plan proposals within the North West Region.

Table B-19 – Local Transport Plan Proposals

Area	Major Scheme Proposals	Proposals which may Influence the Regional Network
Cheshire	Crewe Rail Gateway Crewe Green Link (Southern Section)	Crewe Green Link supports development at Basford Strategic Site. May reduce pressure on M6

The document lists various sub-regional issues by area. In relation to Cheshire the Draft RSS highlights the need to promote Chester as a key public transport interchange and a gateway to the region. The improvement of transport links between different areas in West Cheshire, North East Wales and Liverpool is identified as an area of opportunity.

Crewe has the role of providing a gateway to the North West region. It provides crucial economic and transport links to other city regions. Regeneration and development would only further this role. Looking ahead the document suggests that future studies should assess Crewe's relationship to the North Staffordshire conurbation in the West Midlands region.

Key Strategic Transport Issues

In the North West, the routes deemed to be of national and international importance are the M6, M62, M56, M60, A74 and A5117. All other core trunk roads and motorways in the region are national routes of regional importance.

The following transport related issues are identified:

- Deliver demand management and capacity/infrastructure improvements on the Greater Manchester and Cheshire/Warrington motorway network (including the A556 link between the M6 and M56).

The document identifies that where there is regular stress on the network and economic costs are incurred. The parts of the network within the region which are currently less efficient are:

- M6 motorway through Cheshire, particularly the section between J16 (A500) and J19 (M56).

For the North West, the road-lengths with high daily stress levels in 2006 were:

- A55 Chester Southerly By-pass south east of Chester

The document identifies certain areas of the network where it is expected that high levels of stress will occur by 2016. These are:

- M6 motorway in Cheshire and the Mersey belt - J16 (A500) to J25 (Wigan)

By 2026, following current trends, there is expected to be high levels of stress on the following roads for prolonged periods. The following lengths of route are predicted to be operating at a stress level of over 150% in that year:

- A55 Chester Southerly By-pass south east of Chester M6 motorway from J16 at the Cheshire/Staffordshire border to J26 at Orrell.

Managed Motorways
The objective of the Highways Agency's Managed Motorways schemes is to make the best use of the existing road space by providing additional capacity for vehicles, including use of the hard shoulder and the use of signals to open and close lanes. A pilot on the M42 in the West Midlands commenced in 2005 has had positive outcomes.

Cheshire Local Transport Plan 2 – 2006-2011
Cheshire's Local Transport Plan 2 covering the period 2006-2011 outlines the key priorities for transport in Cheshire. The aim is to create 'safe reliable & effective transport networks, gateways & interchanges'.

The plan specifies Regional Drivers through its Regional Economic Development Strategy, identifying the following:

- Improved access to Strategic Regional Sites – Basford, Crewe and Chester Business Park (the latter is no longer a Strategic Regional Site)

- Access to Hooton Park, Chester Business Park, Alderley Park and Basford.

Within the Local Transport Strategy the key priority is to deal with traffic growth which is estimated to increase by around 28% in Cheshire by 2020 based on current levels. A key strategy is tackling congestion in the county through various approaches such as making best use of existing network and increasing capacity.

Cheshire is highlighted as a sub-regional driver which is expected to strengthen its economic position by 2014. The delivery of major gateway projects at Crewe and Chester Railway Stations are expected to contribute to the region's growth.

Major Schemes highlighted in the LTP include: Alderley Edge Bypass, SEMMMS schemes, Crewe Railway Station Gateway and Chester Transport Strategy. The aim of improving accessibility is hoped to be achieved by extending the scope of the Cheshire Travelcard and the Cheshire Bus Strategy.

Key national and regional transport issues and proposals which will impact on Cheshire's Local Transport Strategy are:

- M6 – West Midlands to Northwest Conurbations Multi-Modal Study (MidMan) – Support for MidMan proposals to widen M6; Support for complementary public transport measures including Crewe Station improvements.

- M56 – Ongoing multi-modal study – recommendations awaited.

There are major traffic growth concerns highlighted within the Transport Plan which are becoming increasingly common. Problem areas include Chester and Crewe however, this leads to other localised problems in other parts of the county. The A500, A55/A483, and A550/A5117, and the M53, M56 and M6 are identified as strategic routes which are currently experiencing problems.

Issues and constraints highlighted in Crewe concern weight restrictions affecting the number of routes heavy goods vehicles may use. The A51/A530 and A51/A534 junctions are stated as those experiencing congestion. Key development sites identified within the plan include the Chester Northgate development, Chester Culture Park and Chester inner urban renaissance area.

The focus for transport improvements is to make better use of the existing network through urban traffic management and control schemes. It is expected that the A51/A55/A41 junctions will be targeted.

The LTP identifies that developments at Basford East and West will increase pressure on Junction 16 at Crewe. It is suggested that a crossboundary bus quality partnership with Staffordshire for the Crewe to Newcastle inter-urban service will be introduced.

In an outline of improvements to the route network, junction improvements on the A500 are identified.

- Crewe Green Link (Southern Section);

- Crewe Rail Gateway;

- A556 (M6 to M56) improvement (Highways Agency scheme).

- Chester Transport Strategy

- A55 A483 Chester Business Park Junction Improvement (Highways Agency scheme).

- A500 on-line improvements;

As part of Improvements to the Trunk Road Network in Cheshire there are options for increasing capacity along the M6 corridor between Junctions 11A and 19. The A500 Barthomley Link highway from Crewe to M6 J16 also needs to address congestion, collisions, and the use by M6-bound traffic of the adjoining rural road networks.

LTP2 Monitoring Reports – Cheshire – A500 Barthomley Link Improvements
Work is progressing on the options for improving this corridor to support the major investments planned for the Basford Strategic Regional Site and the Crewe Rail Gateway scheme. This road provides the link to the M6 at Junction 16. The Highways Agency is working on options for improving the operational performance and capacity of this section of the M6. A recent study concluded the need to expand this link on the A500 into a dual carriageway to support the wider economic development aspirations.

Route Observations and Consultation Outputs

During the course of the study, site visits and observations have been made and consultation responses received on the route resulting in the following conclusions:

Significant congestion has been observed by the study team and reported stakeholders at various junctions on the route including the following:

- A51/B5132 signalised junction (Section One)
- The A51 at its junction with the A54 (Sections One/Two)
- The A51/A49 Rhuddal Heath signalised crossroad (Sections Three/Four)
- The A51 at the Burford Crossroads signalised junction with the A534 (Sections Four/Five)
- The A51 at the Alvaston Roundabout junction with the A530 (Section Six)
- The A51 at the Peacock Roundabout junction with the A534 (Section Six)
- The A500 at the junction with the M6 Junction 16 (Section Eight)

!	Peak period congestion has been observed at a number of junctions on the route

Congestion has also been observed on links feeding into and crossing the route, particularly during peak periods. The links where significant congestion has been observed and/or reported by stakeholders include the following:

- The A54 at its junction with the A51 (Sections One/Two)

- The A534 at the Burford Crossroads signalised junction with the A51 (Sections Four/Five)
- The A530 at the Alvaston Roundabout junction with the A51 (Section Six)
- The A534 at the Peacock Roundabout junction with the A51 (Section Six)

!	Significant congestion occurs at several locations on roads that link into or cross the route

The project team also observed vehicles parked on the carriageway within the villages on Sections Two and Four. This caused delays to vehicles as the carriageway was, essentially, reduced to single direction operation.

!	Obstruction caused by vehicles parked on carriageways through villages

Consultations have revealed that the A49 acts as a diversion route for HGVs between the West Midlands and north Cheshire.

The issue of rat-running through villages due to congestion on Barthomley Link was raised by stakeholders as were concerns relating to the ability of the link to cope with additional traffic generated by developments in the Crewe area including Basford.

There were also concerns over the general suitability of the route for the level of traffic that uses it, particularly Section Five.

Appendix C – Performance – Reduce Carbon Emissions (DaSTS Goal 2)

This section refers to the route's ability to conform to the goal of reducing carbon dioxide emissions and other greenhouse gases with the aim of tackling climate change. The carbon and carbon dioxide emissions from each route section have been processed and charted in order to illustrate peak period and 24hour emission levels.

Carbon Emissions

Figure C-1 – CO_2 Emissions – Tonnes per Day per Km emitted along the A500/A51 Study Route

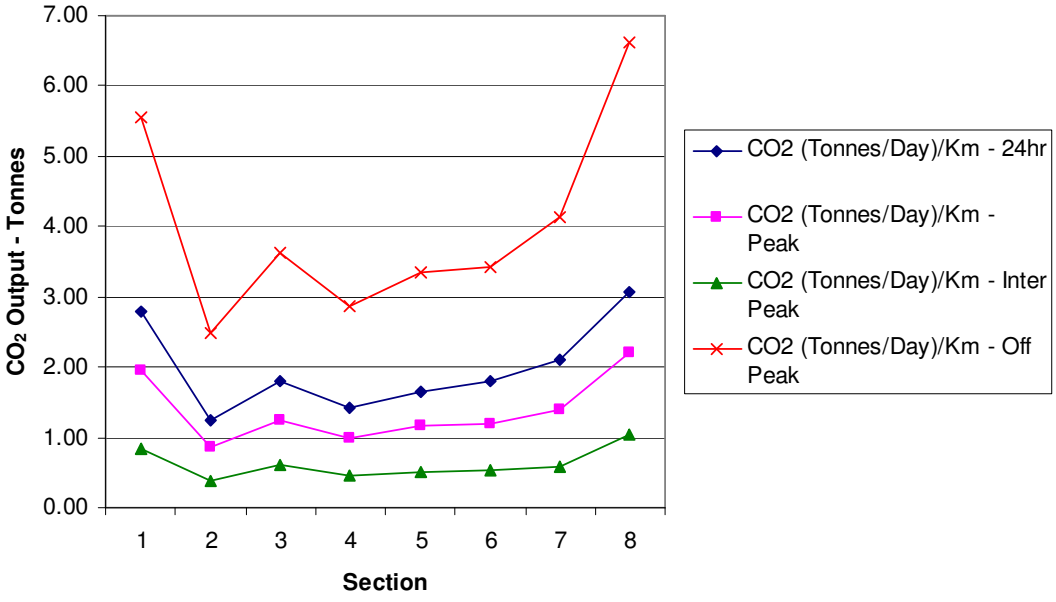
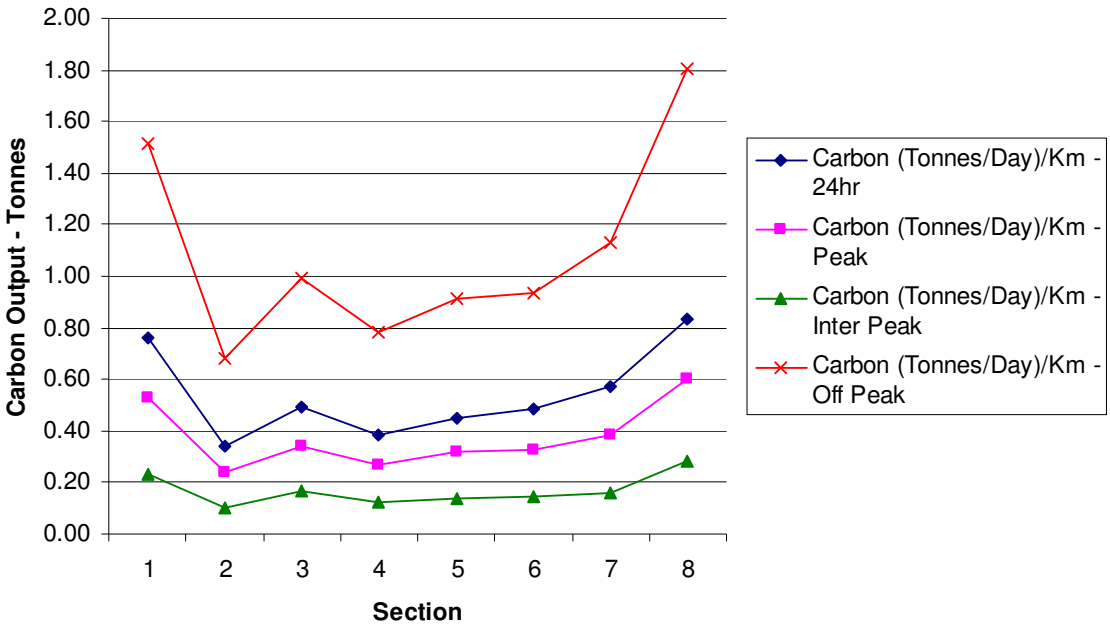


Figure C-2 – Carbon Emissions – Tonnes per Day per Km emitted along the A500/A51 Study Route



The CO_2 emissions for the A500/A51 study route show that Sections One and Eight experience the most significant amount of CO_2/ Carbon emitted per day per km during a 24hour period in comparison to all sections analysed as part of the study. Both sections experience the highest overall vehicle flows and the largest numbers of HGVs. Section Eight also experiences a high level of congestion during peak periods that will also add to the level of CO_2 and carbon emitted along the section. The results indicate that Section Two has the lowest CO_2/carbon emissions compared to the other sections, partly due to the lower overall flow but also the low proportion of HGVs utilising the route section. The charts also highlight a distinctive spike in the CO_2/carbon emissions on route Section Three. This is likely to be caused by the higher proportion of flow attributed to both HGVs and the higher overall vehicle flow when compared to Sections Two and Three.

The overall emissions pattern fits with the profile of the route, with the more significant emissions occurring close to the urban areas, key junctions and sections associated with high HGV use. It is also important to note that although the same general pattern of emissions is prevalent across all periods of the day, the off-peak emissions figures are more even across all the route sections. The peak period emissions show greater changes between a number of areas indicating the impact of congestion across the route during peak periods.

!	Route Sections One and Eight have the highest levels of carbon and carbon dioxide emissions

!	Greater understanding of the carbon emissions of the route is required

Route Observations and Consultation Outputs

No significant observations have been made or consultation outputs received in relation to reducing carbon emissions.

Appendix D – Performance – Contribute to Better Safety, Security and Health (DaSTS Goal 3)

This section addresses the routes ability to contribute to better safety, security and health. This is in terms of increasing life expectancy and reducing risk of death, injury or illness as a result of transport. The goal also refers to promoting the travel modes which are beneficial to peoples' health.

Within this section, personal injury collision rates have been reviewed over a five-year period (2004 to 2008) and compared to national averages for equivalent routes (rural A-roads). The severity of the collisions, vehicles involved and any clusters have been identified and analysed. A detailed HGV analysis has also been conducted due to the functionality. The route has been considered in terms of current speed limits and availability of rest facilities. Collision data was sourced from Cheshire West & Chester Council and Cheshire East Council

Collisions

The collision data shows that six of the sections have a collision rate that is higher than the national average for rural A-roads (see table below). Only Sections Three and Seven have a collision rate that is lower than the national average for equivalent roads as stated by the DfT. Section Six has the highest collision rate in comparison to all other route sections and Section Three the lowest. Section Four accounts for the highest number of fatal and serious collisions with the study area and Section Three, over the time period analysed has the least.

Table D-1 – Collision Rates for each Section of the Study Route

Section	Length (km)	Collisions in 5 years			Existing Speed Limit (mph)	AADT Flows	5 year average flows	Collision Rate per 100 million VKM	
		Fatal & Serious	Slight	Total				All Injury	F&S
1	4.5	6	64	70	40/60	28,727	235,920,487.50	29.67	2.54
2	7.8	14	29	43	60/40	11,913	169,581,555.00	25.36	8.26
3	2.6	3	6	9	60	14,937.25	70,877,251.25	12.70	4.23
4	10.5	16	51	67	60/40	12,071.16	231,313,603.50	28.97	6.92
5	2.3	8	22	30	60	17,096.31	71,761,761.23	41.80	11.15
6	3.4	5	47	52	60	18,578.88	115,281,950.40	45.11	4.34
7	7.4	10	27	37	60	16,217.2	219,013,286.00	16.89	4.57
8	3.2	8	31	39	60	27,201.15	158,854,716.00	24.55	5.04
National Average Collision Rate for Rural A Roads (DfT Road Casualties GB 2007)								23.21	

! Six of the route sections have collision rates above the national average for rural A-roads

! Sections Five and Six have collision rates significantly above the national average for rural A-roads

The table below illustrates that six of the route sections have a severity index greater than the regional average, five of which have an index that is also greater than the national average for rural A-roads. Section Three has the highest index but also has the lowest collision rate within the study area. Section One has the lowest severity index but has the highest number of slight collisions.

Table D-2 – Collision Severity Index

Section	Length (km)	Collisions in 5 years		Existing Speed Limit (mph)	Severity Index
		Fatal & Serious	Slight		
1	4.5	6	64	40/60	8.6%
2	7.8	14	29	60/40	32.6%
3	2.6	3	6	60	33.3%
4	10.5	16	51	60/40	23.9%
5	2.3	8	22	60	26.7%
6	3.4	5	47	60	9.6%
7	7.4	10	27	60	27.0%
8	3.2	8	31	60	20.5%
Regional Average					15.5%
National Average - Rural A-roads					21.7%
Source: Road Casualties Great Britain 2007					

! Five of the route sections have collision severity indices higher than the national average, four significantly higher

There have been a total of 60 HGV collisions along the study route with the largest number occurring with Section Four. HGV collisions accounted for 17.29% of all collisions analysed within the study area. The data highlights that there have been 10 collisions involving pedal cycles the majority of which occurred in Section Six.

Table D-3 – Number of HGV/ Pedestrian/ Pedal Cycle Collisions

Route Section	1	2	3	4	5	6	7	8	Total	National Average
HGV	5	10	0	16	5	9	9	6	60	-
Pedal Cycle	0	1	0	1	1	7	0	0	10	-
Pedestrian	0	0	0	1	1	0	0	1	3	-
PSV	0	3	0	1	1	0	0	0	5	-
Total (HGV, PC, PSV, Ped)	5	14	0	19	8	16	8	8	79	-
Total	70	43	9	67	30	52	37	39	347	-
% HGV	7.1	23.3	0.0	23.9	16.7	17.3	24.3	15.4	17.3	5.60
% Pedal Cycle	0.0%	2.3	0.0	1.5	3.3	13.5	0.0	0.0	2.9	3.90
% PSV	0.0%	7.0	0.0	1.5	3.3	0.0	0.0	0.0	1.4	0.97
Note: National average figures are for rural roads[5]										

[5] Reported Road Casualties Great Britain 2008, DfT

The table above shows the collision data for the study route compared to national averages for non-built up roads (i.e. those where the speed limit is 40mph or higher.) It can be seen that the percentage of collisions involving pedestrians is lower than the national average, however, the equivalent for collisions involving pedal cycles is slightly above the national average. As has been previously stated, the percentage of collisions involving HGVs is significant and substantially above the national average.

! The percentage of HGV collisions is significantly above the national average for rural roads on six of the eight route sections

Table D-4 – Collision Clusters A51/A500

Section	Cluster Location
1	Junction of A51/A55
	Junction of A51/B5132
2	Junction of A51/A49
4	Junction of A49/A51
	Junction of A51/A534
	A51
5	Junction of A51/A500
6	A51/A530 Alvaston Roundabout
	Junction of A51/A534
	Junction of A51A500
7	A500 Roundabout – 3.7km west of Junction with A520
	A500 Roundabout – 1.7km west of Junction with A520
	Junction of A500/A5020
8	Junction of A500/ Junction 16 of M6

! There are 14 collision cluster locations on the route, all but two are at junctions

Figure D-1– Collision Cluster Analysis – Section One

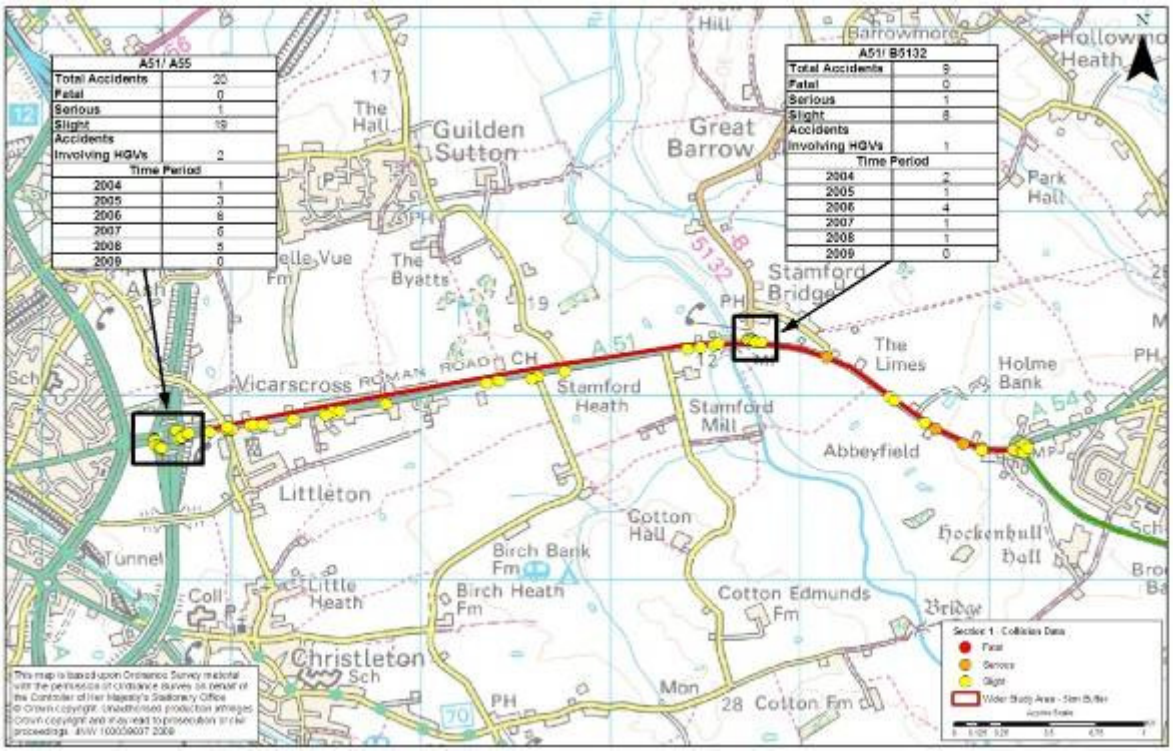
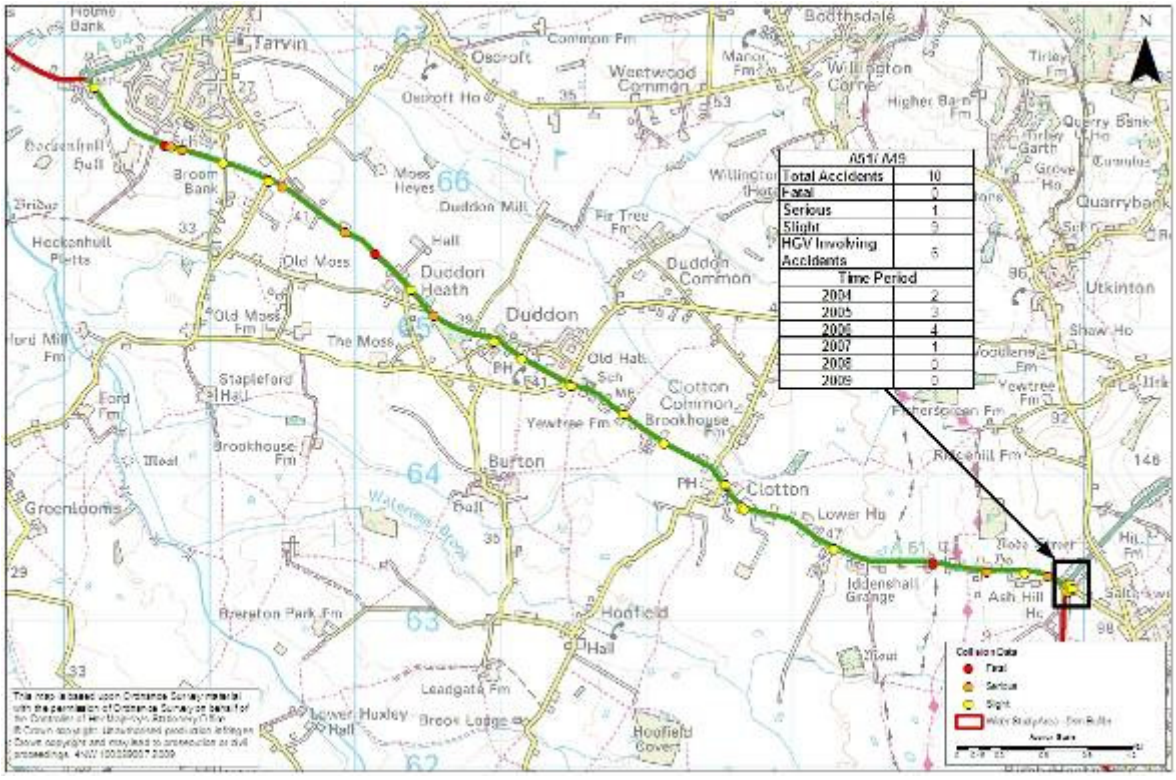


Figure D-2 – Collision Cluster Analysis – Section Two



No collision clusters have been identified within Section Three.

Figure D-3 – Collision Cluster Analysis – Section Four

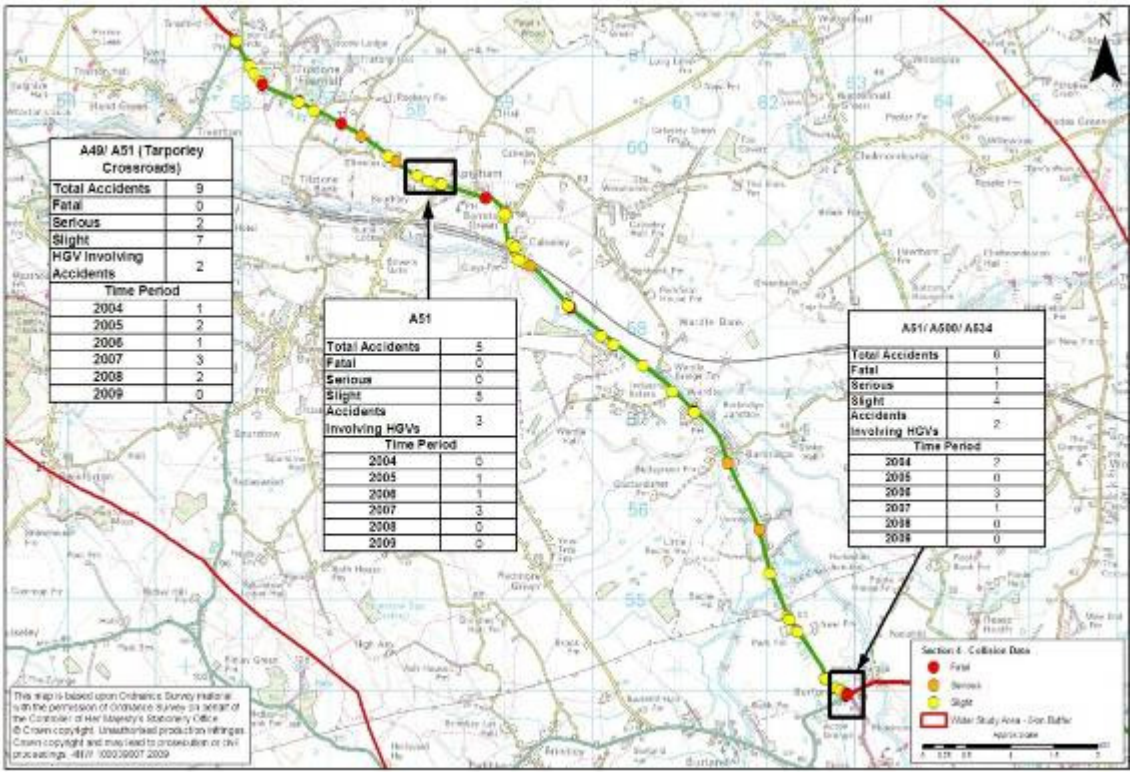


Figure D-4 – Collision Cluster Analysis – Section Five

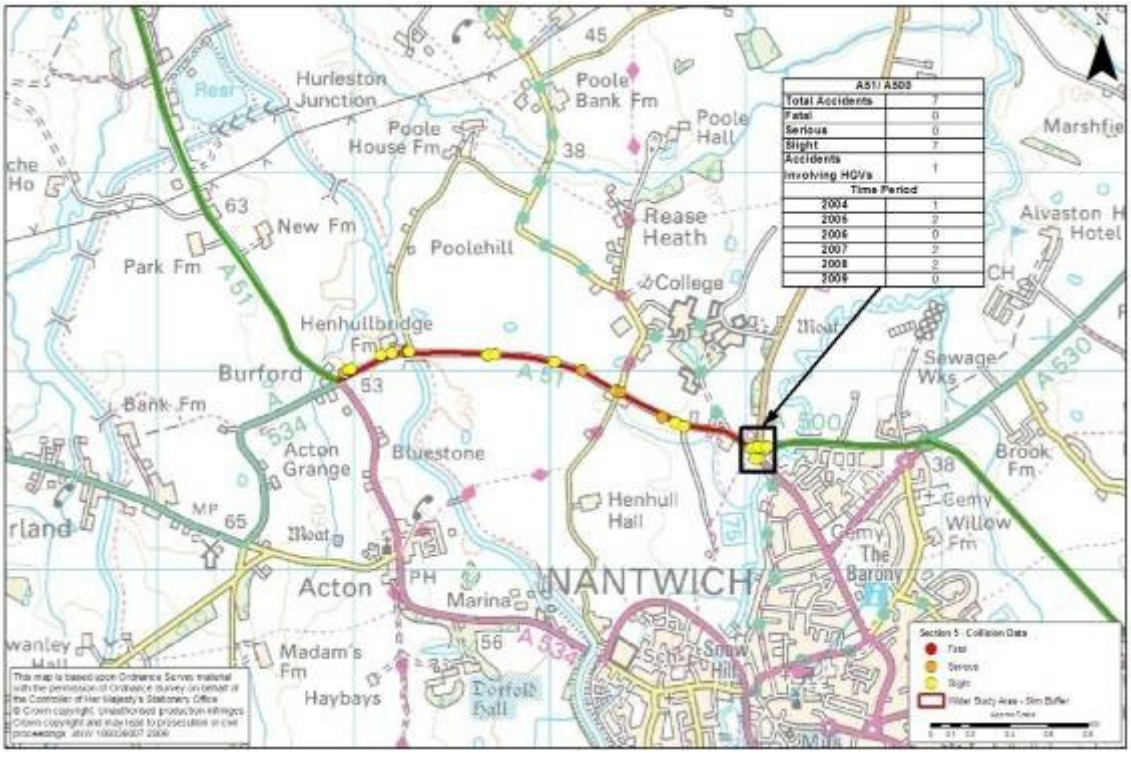


Figure D-5 – Collision Cluster Analysis – Section Six

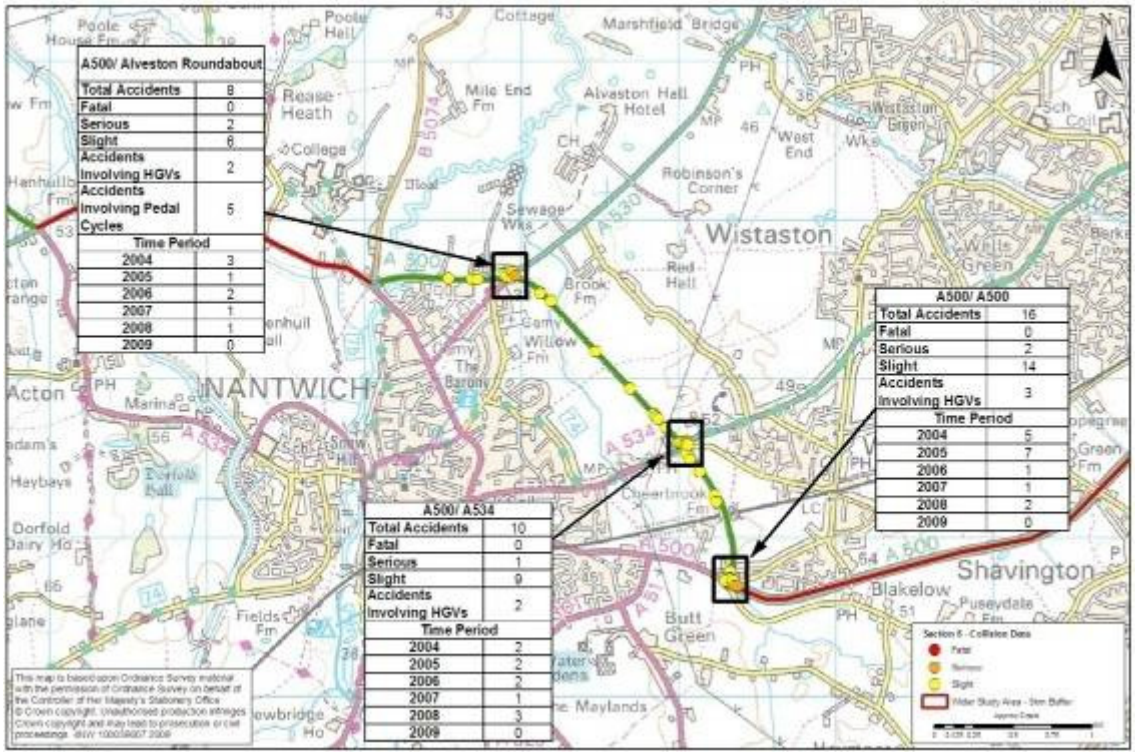


Figure D-6 – Collision Cluster Analysis – Section Seven

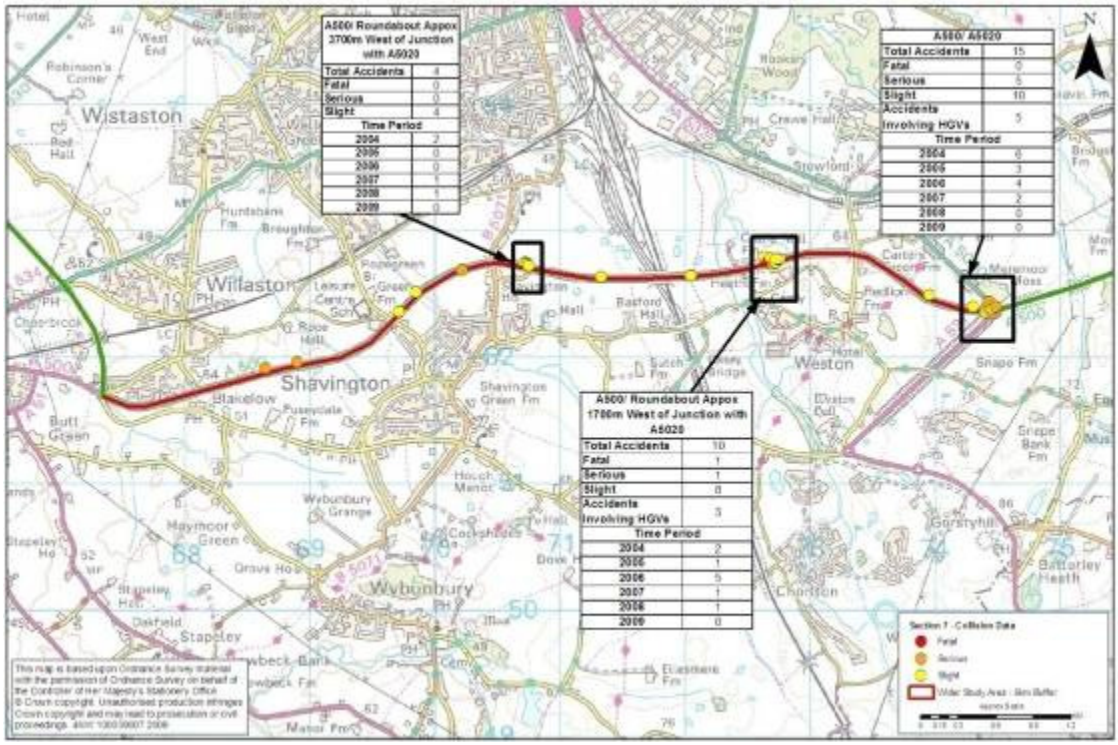
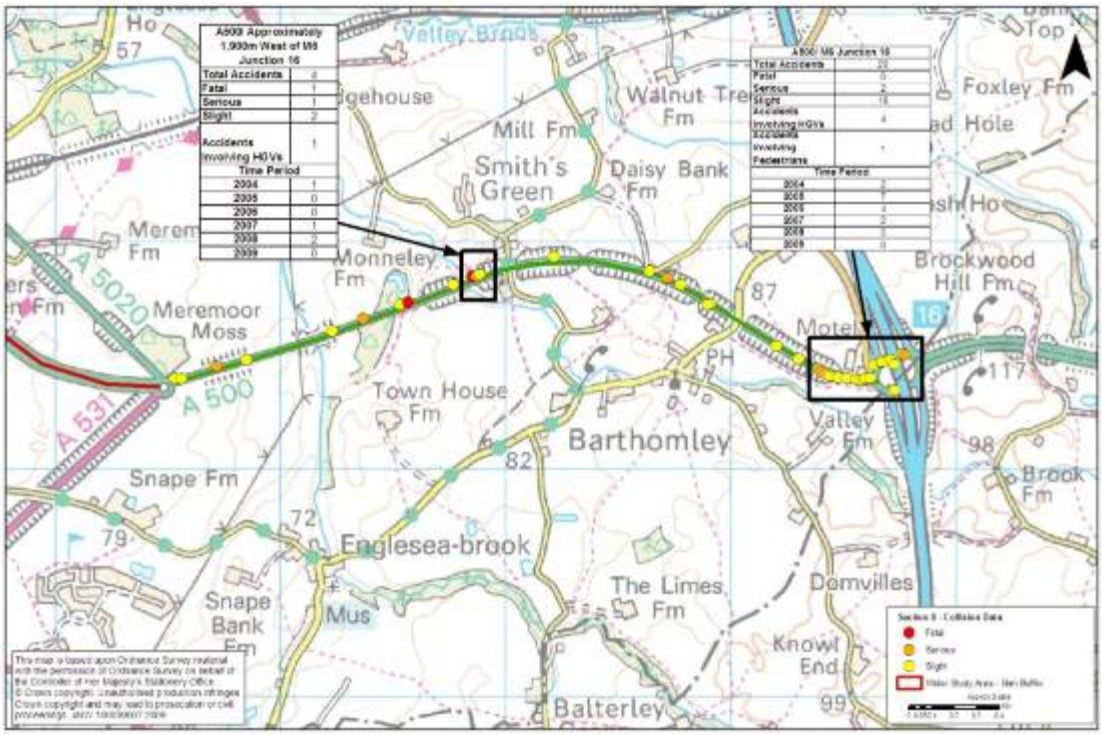


Figure D-7 – Collision Cluster Analysis – Section Eight



HGV Collisions

Due to the relatively high number of HGV collisions recorded on the route, further, more detailed analysis has been undertaken. A total of 60 personal injury collisions were recorded as involving HGVs along the whole route in the five year period. A summary of the HGV collisions per route section is presented in the table below. This shows that 30% of the collisions had casualties that were either killed or seriously injured (KSI). The remaining 70% of the collisions had casualties with slight injuries.

Table D-5 – Summary of PIAs Involving HGVs per Section

Section	Collisions Involving HGVs	Severity		
		Fatal	Serious	Slight
1	5	0	0	5
2	10	1	1	8
3	0	0	0	0
4	16	4	1	11
5	5	0	1	4
6	9	0	3	6
7	9	0	4	5
8	6	2	1	3
All	60	7	11	42

HGV Collisions – Junctions

A total of 33 (55%) of the 60 collisions involving HGVs occurred at major junctions, with two junctions having five or six collisions each. Eight of the 11 junctions are roundabouts and two are signalised crossroads. The other is a signalised T-junction at a B-road.

The roundabout where the A51 meets the A49 at Tarporley experienced five of six collisions where the driver lost control of the vehicle. These were influenced by the downhill gradient on the approach and the geometry of the roundabout. All casualties had slight injuries. The remaining collision involved a HGV hitting a motorcycle on the roundabout resulting in serious injury.

The roundabout where the A500 meets the A5020 near Weston experienced five HGV collisions. Three of these involved a collision between a HGV and a car on the circulatory carriageway where at least one vehicle was trying to exit. Another involved a toppled HGV trailer when the driver missed the exit and the last was caused by a HGV overtaking the queue on the northern approach (A5020) and colliding with a LGV. Three of these five collisions resulted in serious injuries with the other two resulting in slight injuries.

The roundabout where the A500 meets the A530 experienced two collisions that both involved a HGV and a pedal cyclist. In each case the cyclists was struck by the nearside of the HGV trailer on the roundabout and was knocked off their bicycle resulting in serious injuries. It is unclear whether the HGV drivers failed to notice the cyclists or that there is insufficient space for both vehicle types to manoeuvre together.

HGV Collisions – Severity
Of the seven HGV collisions that resulted in fatalities only one of these occurred at a junction. The passenger of a car was killed when the driver turned right at the A51/A534 signalised crossroads into the path a HGV. The other six fatalities occurred between junctions with five of these caused by either the car or HGV crossing the centreline of the carriageway. The sixth fatality was caused by the HGV hitting a car that was joining a stationary queue approaching Junction 16 of the M6.

HGV Collisions – Causes
The various causes of the 60 HGV related collisions are summarised in the table below. The major cause of each collision per section is used to assess the most frequent type of collision over the route. The figures indicate that rear shunts are the most common type of HGV collision with 18 occurrences. These include shunts into slowing, stationary and giving-way vehicles.

There were 10 occasions where the vehicle driver lost control on a roundabout. Other common causes were either collisions on roundabouts or vehicles crossing the centreline and hitting vehicles travelling in the opposite direction, with both occurring eight times. Some 16 collisions with less common causes were identified including those related to braking, overtaking and checking their path is clear.

Table D-6 – Causes of Personal Injury Collisions Involving Heavy Goods Vehicles per Route Section

Causes of Collisions	1	2	3	4	5	6	7	8	Total
Failure to Give-Way at Roundabout	1					1			**2**
Missed Roundabout Exit	1								**1**
Lost Control on Roundabout		4				3	3		**10**
Collision on Roundabout		1				3	4		**8**
Rear Shunt	2	2		8	1	1	1	3	**18**
Crossed Centreline	1	1		4	1			1	**8**
Failed to Brake at Junction				2					**2**
Failed to Give-Way at Signals				1					**1**
Lost Control when Braking		1			1				**2**
Performing U-Turn					1				**1**
Jack-knifed					1				**1**
Collision when Overtaking						1	1		**2**
Failed to Look when Pulling Out				1				2	**3**
Debris on Road		1							**1**
Total	**5**	**10**	**0**	**16**	**5**	**9**	**9**	**6**	**60**

HGV Collisions – Time and Month

Of the 60 collisions involving HGVs, 47 (78%) occurred between the hours of 07:00 and 19:00 (daytime) and 13 (22%) occurred between 19:00 and 07:00 (night-time). Although the date of each collision has been provided, information about daylight and street lighting is unavailable.

The distribution of the collisions across the year is presented in the table below. The last two months of the year only had three collisions per month compared to between four and eight in the first ten months. There was a peak of eight collisions in August however, which coincides with school summer holidays.

Table D-7 – Distribution of Collisions Across the Year

Month	Number of Collisions	Percentage of Collisions
January	8	13%
February	6	10%
March	4	7%
April	5	8%
May	4	7%
June	7	12%
July	4	7%
August	8	13%
September	4	7%
October	4	7%
November	3	5%
December	3	5%

HGV Collisions – Year

The number of collisions per year is shown in the table below. There is no obvious trend in the distribution, but there were nine more collisions in 2008 than in 2004. The highest number of collisions occurred in 2006 and 2008 where 17 (28%) were recorded per year.

Table D-8 – Number of Collisions Each Year

Year	2004	2005	2006	2007	2008
Number of Collisions	8	10	17	8	17
Percentage of Collisions	13%	17%	28%	13%	28%

HGV Collisions – Conclusions

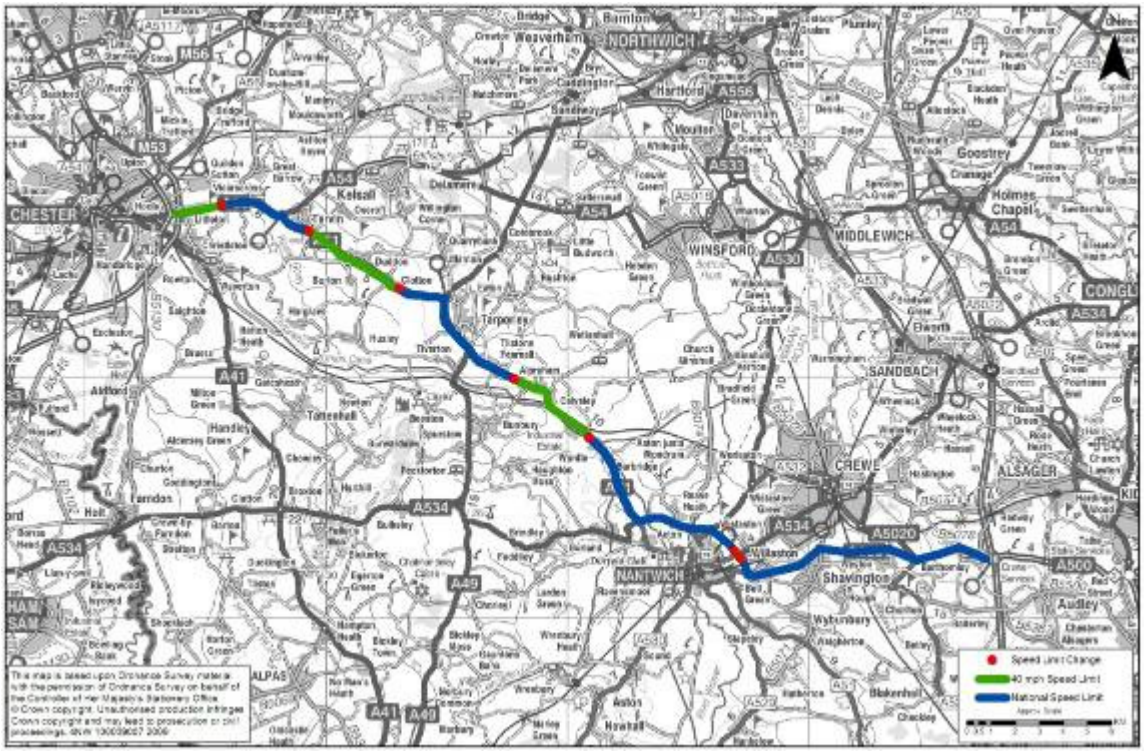
The recorded personal injury collisions involving HGVs along the A51/A500 route between the A41 in Chester and Junction 16 of M6 have been analysed for the period between 2004 and 2008. The analysis shows that of the 60 collisions, the highest frequency occurred in the daytime, in the months of January and August and in 2006/2008.

A total of 33 of the collisions occurred at major junctions with most of these being roundabouts. Some 30% of collisions had casualties that were killed or seriously injured (KSI) and the number of fatal collisions is a particular concern although such severities are more likely with the involvement of HGVS. The most common cause of collisions was rear shunts with 18 such occurrences.

Speed Limits

There are two speed cameras located on either side of the route at Section Four (A51) of the route close to Alpraham. There was one permanent and two non-permanent flood warning signs located along Section Five of the route section. The flood warnings are situated close to Hunhullbridge Farm near Burford where the Shropshire Union Canal passes directly under the route.

Figure D-8 – Speed Limit Changes along the A500/A51 Study Route



Changes to National Guidelines are being considered following 'A Review of Policy' in 2000 and the speed limit review panel is currently assessing the recommend changes within Cheshire. The recommendations affecting the study route are outlined within Table C-9.

Table D-9 – Speed Limit Review Recommendations

Route Section	Current Speed Limit through Section (mph)	Recommended Speed Limit Changes	Extra Measures - Recommendations
1	40/60	No Change	Consider additional measures on approach to junction with A54
2	60/40	Reduce speed limit to 30mph through Duddon and Clotton.	No Change
3	60	Reduce speed limit to 50mph through at the junction of A49/ A51 southern end of Section Three.	Consider measures at the roundabout of the A51/A49 to the north of Tarporley
4	40/60	Reduce speed limit to 50mph on approach to junction of A51/A534 as part of A534 scheme.	Consider additional measures near garage exit on A51 south of Calveley
5	60	Reduce speed limit to 50mph on approach to junction of A51/A534 as part of A534 scheme.	No Change
6	60	No Change	No Change
7	60	No Change	No Change
8	60	No Change	No Change

!	Proposed speed limit changes may have an impact on the regional function of the route if they result in increased journey times

Diversion Routes

Section Eight of the route (Barthomley Link) is part of a Strategic Diversion Route for the M6, as agreed between the Highways Agency and Cheshire East Council. The route, identified if the M6 is closed between M6 Junction 16 and 17, uses Section Eight of the route and the A5020 to the east of Crewe and the A534, including through Sandbach.

!	Section Eight forms part of a Strategic Diversion Route for the M6.

Rest Facilities

There are a total of 22 lay bys on the entire section of the route. Most lay bys occur on Section Four, the longest section of the A51 with six lay bys along this part of the route. There are a further four lay bys in Section Eight close to Junction 16 of the M6. Each section has at least one rest facility with fewest on Sections One and Five where there is just one.

There are four petrol filling stations located along the entire section of the route with one of them close to Stamford Bridge on Section One of the route A51. There are further stations located on Sections Four, Six and Seven of the route

Figure D-9 – Rest Facilities – Route Section One

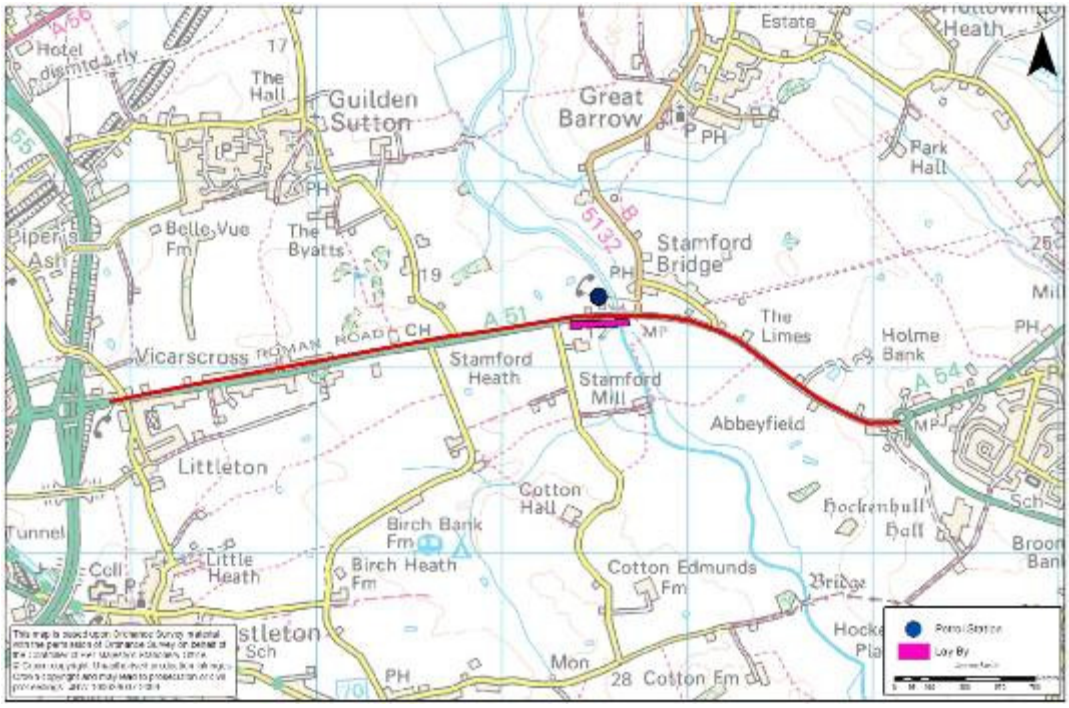


Figure D-10 – Rest Facilities – Route Section Two

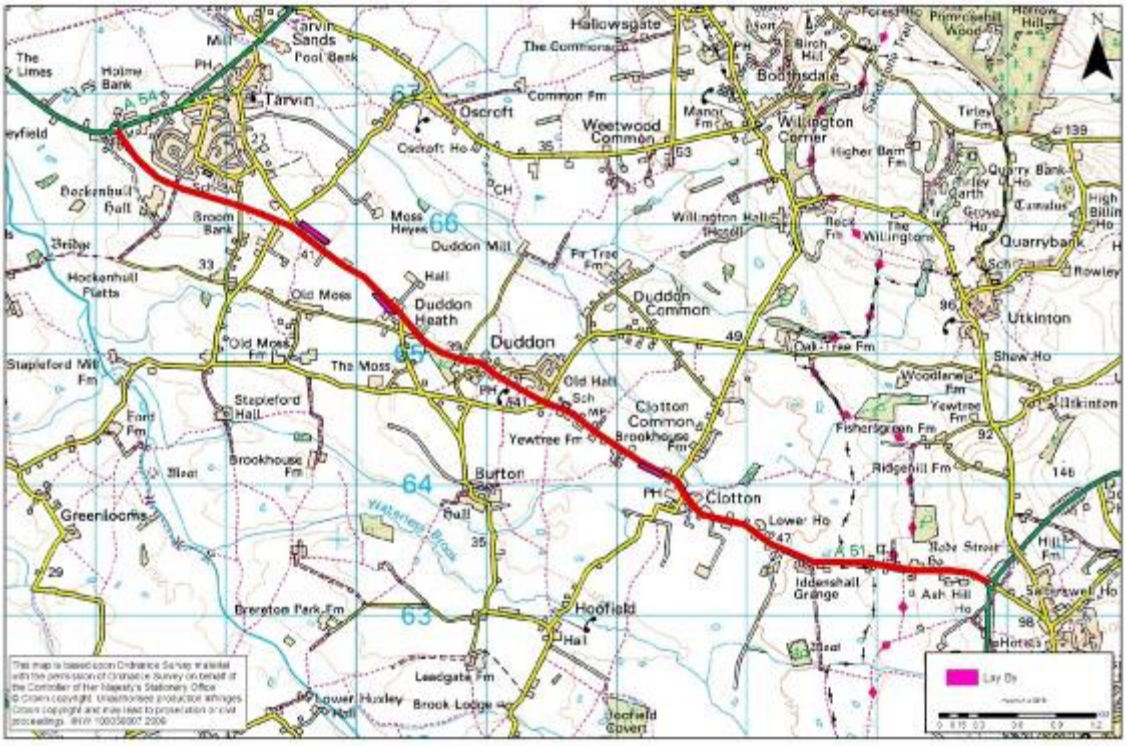


Figure D-11 – Rest Facilities – Route Section Three

Figure D-12 – Rest Facilities – Route Section Four

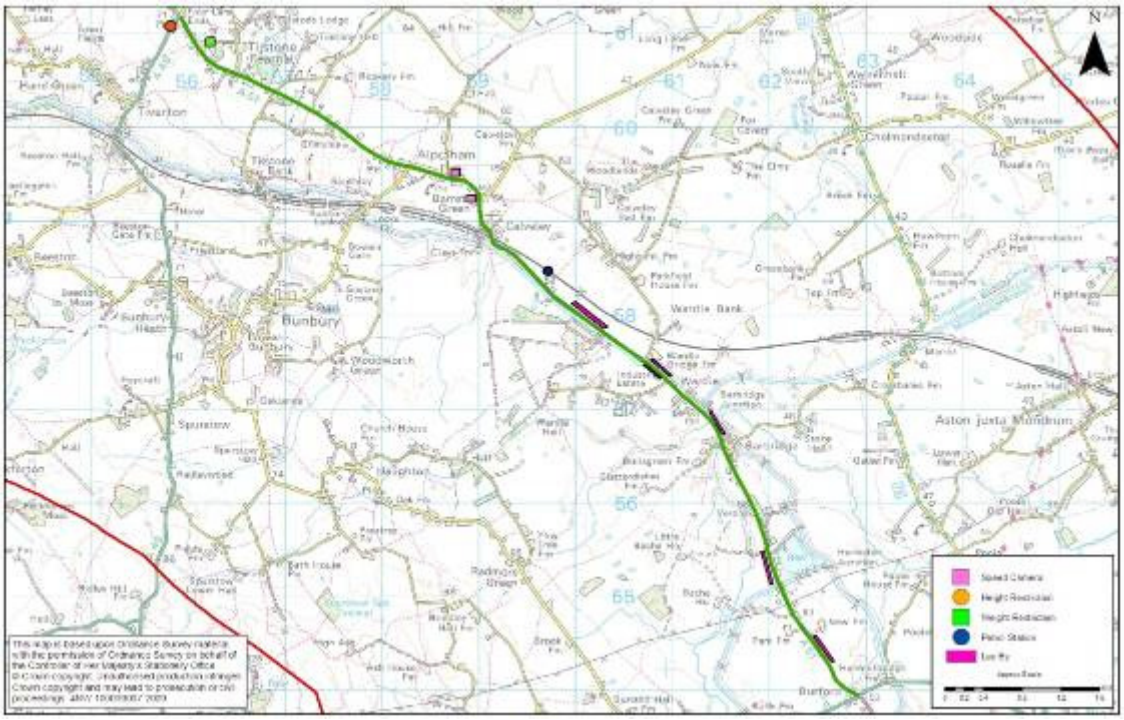


Figure D-13 – Rest Facilities – Route Section Five

Figure D-14 – Rest Facilities – Route Section Six

Figure D-15 – Rest Facilities – Route Section Seven

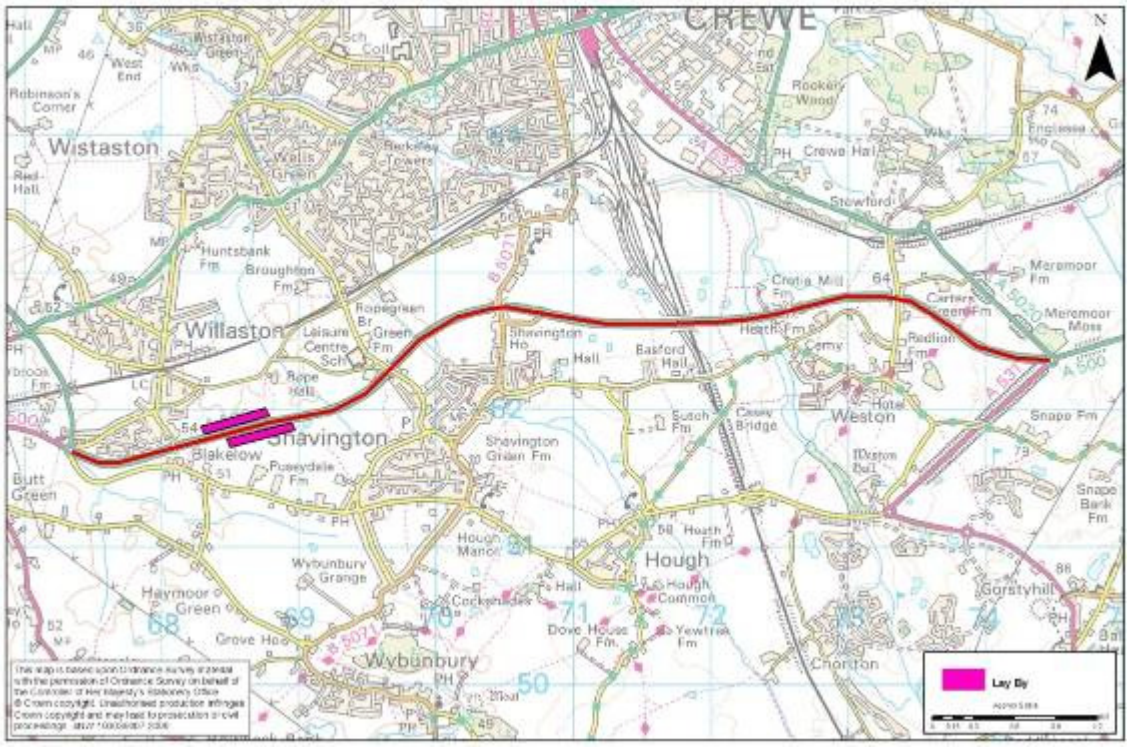
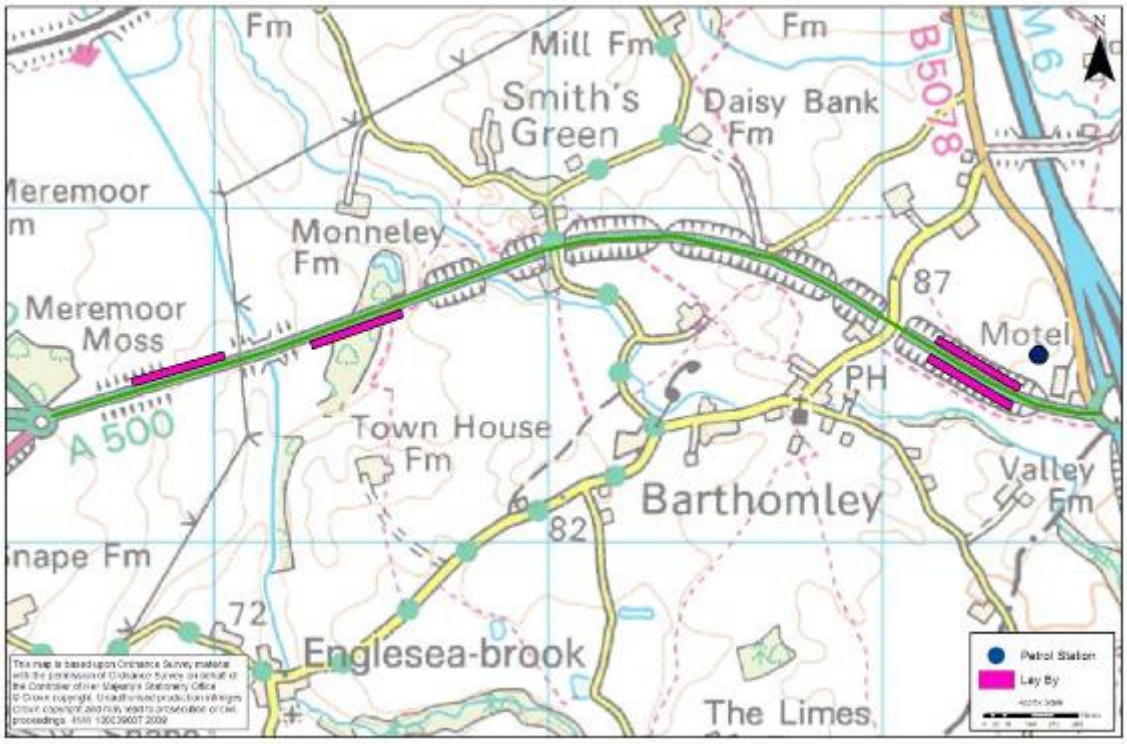


Figure D-16 – Rest Facilities – Route Section Eight



Route Observations and Consultation Outputs

The stakeholder consultation resulted in two outputs:

- Collision issues at the A51/A534 Burford Crossroads caused by confusion at the give-way for vehicles heading south-east on the route
- The appropriateness of the speed limit at Reaseheath, particularly in relation to the presence of the pedestrian crossing.

Appendix E – Performance – Promote Equality of Opportunity (DaSTS Goal 4)

This section assesses the route in terms of promoting equality of opportunity for all. The section addresses the potential for smarter choices in terms of proposed initiatives. The bus and rail patronage for the route and the provision of services and strategies for improvements are reviewed. The section also assesses current provision of routes and further opportunities for walking and cycling.

Smarter Choices

The Cheshire Bus Strategy 2006-2011 along with LTP2 are key documents for promoting smarter choices within the Cheshire area. It identifies bus use as a key tool in providing access to education, employment, key services and to minimise social exclusion. It also identifies bus use as a tool to help protect the environment in relation to traffic and air pollution, provide a long term sustainable transport solution, help to provide an integrated transport network and achieve targets set out in the current Local Transport Plan. Its overall aim is to ensure that bus travel becomes an attractive and viable option.

The document also highlights the following strategies as a method to increase the attractiveness of bus travel within Cheshire:

- Introduction of a travel card system.
- Bus timetable information strategy
    - Introduction of new style timetables with the aim for 90% of stops to contain the new timetables by 2011.
- Upgrading the 3900 bus stops in Cheshire, with the aim to upgrade 2600 by 2011.
- Ensuring that traffic calming measures are not installed on bus routes where possible. Traffic calming schemes were identified as measures that have an effect on journey times and therefore reducing the need for these measures on bus routes was also identified as a priority.

Park & Ride

The Bus Strategy for Cheshire 2006-2011 also highlights the desire to promote the use of and develop Park & Ride schemes and free link buses within Cheshire.
At present there are the following schemes:

Chester Rail Station to City Link – A free service funded by the rail operator and council that provides a free bus link service between the railway station and the city centre.

Chester Park and Ride Scheme – The scheme links Chester City Centre to the following four sites located outside of the city centre:

- Wrexham Road
- Boughton Heath (A41)
- Upton (A41)
- Sealand Road (A548)

The site closest to the study route is Boughton Heath which is located close to the junction of the A51 and A55.

Route Branch Review

The Route Branch Review is a joint review between operators and Councils of all aspects of road based public transport, the studies have been undertaken on an area by area basis and followed the timetable outlined below:

- Vale Royal (Winsford & Northwich) June 2005
- Congleton (Town) October 2005
- South Cheshire Rural
- (Rural Chester and Crewe & Nantwich) March 2006
- Ellesmere Port & Neston June 2006
- Vale Royal North September 2006
- Macclesfield Town January 2007
- Congleton (Rural) April 2007
- Crewe & Nantwich Urban July 2007
- Macclesfield District (Areas not covered by Macclesfield Town) October 2007
- Chester City February 2008

Bus – Services

Table E-1 – Bus services that operate along or cross the A51/ A500

Service Number	Service From / To	Route Section	First Bus	Last Bus	Operator	Frequency
6, 6E	Shavington - Crewe - Leighton Hospital	Crosses Section 7	06:05	20:10	Arriva / D & G	Every 20mins (Mon-Sat) No Sun Service
39	Crewe - Walgherton	Crosses section 7	09:25	14:25	D & G	Mon & Thurs 2 AM 1 PM, Fri 1 AM, 1 PM, Sat 3 AM, 3 PM
41	Nantwich - Congleton	Crosses section 6	08:14	20:07	D & G	1 AM, 2 PM (Mon-Fri)
44	Nantwich – Shavington - Crewe	Crosses Jct A51/ A500 (Section6/ 7)	07:40	17:40	D & G	Hourly (Mon- Sat) No Sun Service
45A	Crewe – Marshfield - Nantwich	Crosses section 6	09:32	13:42	D & G	Hourly (Mon – Sat) No Sun Service
82	Chester – Tarvin - Kelsall – Sandiway - Northwich	1	07:20	17:45		Hourly (Mon-Sat)
84	Chester – Nantwich - Crewe	1,2,3,4,5,6	07:55	22:50	Arriva	Every 30mins (Mon-Sat) Hourly Sun
127	Crewe - Chesterton	Section 7	13:15	13:15	D & G	Fridays Only. 1 Service
313	Market Drayton - Crewe	Crosses section 7	11:40	11:40	Butters Coaches	Saturday Only
X20	Middlewich – Winsford – Chester Zoo – Cheshire Oaks	No details of route – 1,2 expected	-	-	RS Travel	Tues, Thurs and Sat Only

There are ten bus services which run directly along or cross through at least one section of the route. Most of the services provide links to Crewe. There is only one bus which runs after 20:35pm, the 84 covering the entire route until 22:50pm. Whilst the services start relatively early there are only two services out of the ten which run at 30minute or higher frequencies. Only the 84 from Crewe-Chester runs on a Sunday.

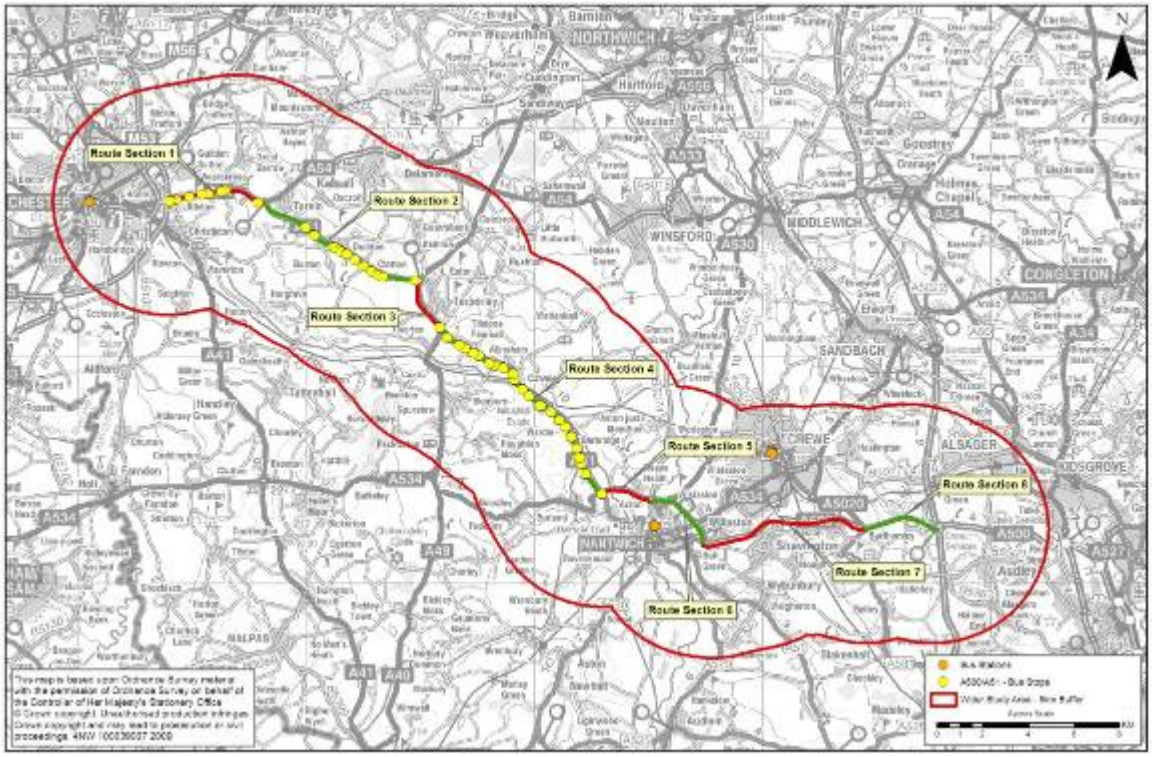
The 84 bus service operates between Chester and Crewe and is the only service that operates along the more than three sections of the study route. The service was upgraded to Quality Bus Partnership status in 2004 through the Rural Bus Challenge scheme, however the bus patronage figures for this route are not available due to the commercially sensitive nature of the data.

The study route also contains 78 bus stops and the following table outlines the total number within each section. The immediate study area (100m of the specified route) contains a further eight bus stops.

Table E-2 – Total number of bus stops on the A51/ A500

Route Section	Number of Bus Stops
1	13
2	20
3	2
4	41
5	2
6	0
7	0
8	0
Total	**78**

Figure E-1 – Bus Stop Locations along A51/A500



Quality Bus Partnerships

The Cheshire Bus Strategy 2006 – 2011 outlines 22 quality bus partnerships within Cheshire, they are as follows:

Table E-3 – Bus partnerships within Cheshire

Route	Operator	Year upgraded	Patronage	Notes
Chester – Saltney (16)	First	2000	Commercial*	LTP
Weaverham – Northwich – Barnton (1)	Arriva	2001	Commercial*	LTP
Leighton Hospital – Crewe - Shavington (6)	Arriva	2001	Commercial*	LTP
Frodsham – town service (56)	Anthony's Travel	2002	26%	Market Towns initiative
Nantwich Town Services 2002 17% Market Towns initiative	Malbank/D& G Travel	2002	17%	Market Towns initiative
Neston – Arrowe Park Hospital (272)	Mathews Travel	2002	159%	Market Towns initiative

Route	Operator	Year upgraded	Patronage	Notes
Leighton Hospital – Crewe - Hanley (20)	First	2002 - 2005	Commercial*	LTP
Macclesfield – Stockport (391/392)	Arriva	2002 - 2005	307%	SEMMMS
130 Manchester – Wilmslow - Macclesfield	Arriva	2002 - 2005	Commercial*	SEMMMS
Chester – Whitchurch (41)	Chester City Transport	2003	43%	Rural Bus Challenge
Great Sutton - Ellesmere Port - Chester (4)	First	2003	Commercial*	LTP
Chester Boughton Corridor, parts of routes 9, 10, 21,22, 23,24	Chester City Transport	2003	Commercial*	LTP
Knutsford – Macclesfield (26)	Bakerbus	2003 - 2004	27%	SEMMMS
Chester – Crewe (84)	Arriva	2004	Commercial*	Rural Bus Challenge
Northwich – Frodsham (48)	Anthony's Travel	2004	N/a	CCC
Rural Rider (41 & 78)	D&G	2004 - 2005	26%	Midman
Stockport – Poynton - Middlewood (191)	Stagecoach	2005	8%	SEMMMS
Macclesfield – Upton Priory (4)	Arriva	2005	Commercial*	LTP
Macclesfield – Hurdsfield (21)	Arriva	2005	Commercial*	LTP
Chester – Ellesmere Port (X11)	Arriva	In progress	n/a	EDZ (EU)
Ellesmere Port local area (3, 411)	First and Arriva	In progress	n/a	EDZ (EU)
Northwich - Crewe (29/31)	Arriva	In progress	n/a	Kickstart
* Patronage figures cannot be given on commercial services as the information is commercially sensitive				
Source: Bus Strategy for Cheshire 2006 - 2011				

Of the 22 quality bus partnerships within Cheshire there are four which run within a 5km catchment area of the route under study, these are:

- Leighton Hospital – Crewe - Shavington (6)
- Nantwich Town Services
- Leighton Hospital – Crewe - Hanley (20)
- Chester – Crewe (84)

The Cheshire Bus Strategy 2006 – 2011 outlines that voluntary partnerships are in operation, and that quality contracts may be used if voluntary partnerships fail to deliver the desired outcome.

Strategies & Improvements

The Bus Strategy for Cheshire 2006-2011 outlines a number strategies and initiatives covering the period up to 2011.

Table E-4 – Bus strategies and initiatives up to 2011

Provisional Programme of Bus Improvements 2009/10		
Scheme	**Output**	**Funding Source**
Quality improvements on supported bus services.	Higher quality	CCC
Accessibility Review	Access to GP's pt 2, Access to Further Education part 2, Access to tourism & leisure pt 1.	CCC,
Chester Bus Station	New bus station	Developer
Parish Council bus	6 bus stops upgraded to Cheshire standards	Parish Councils and LTP
School travel initiatives in Vale Royal and Congleton.	Safer travel to school	LTP
Macclesfield Town Centre Strategy	Bus route improvements	LTP
Crewe Rail Gateway	Interchange improvements	LTP and others
Bus stop improvements on quality routes	200 bus stops upgraded to Cheshire standards	LTP
MIDMAN	Public transport improvements	LTP (MIDMAN)
SEMMMS	North Macclesfield bus corridor upgrade pt1	LTP (SEMMMS)

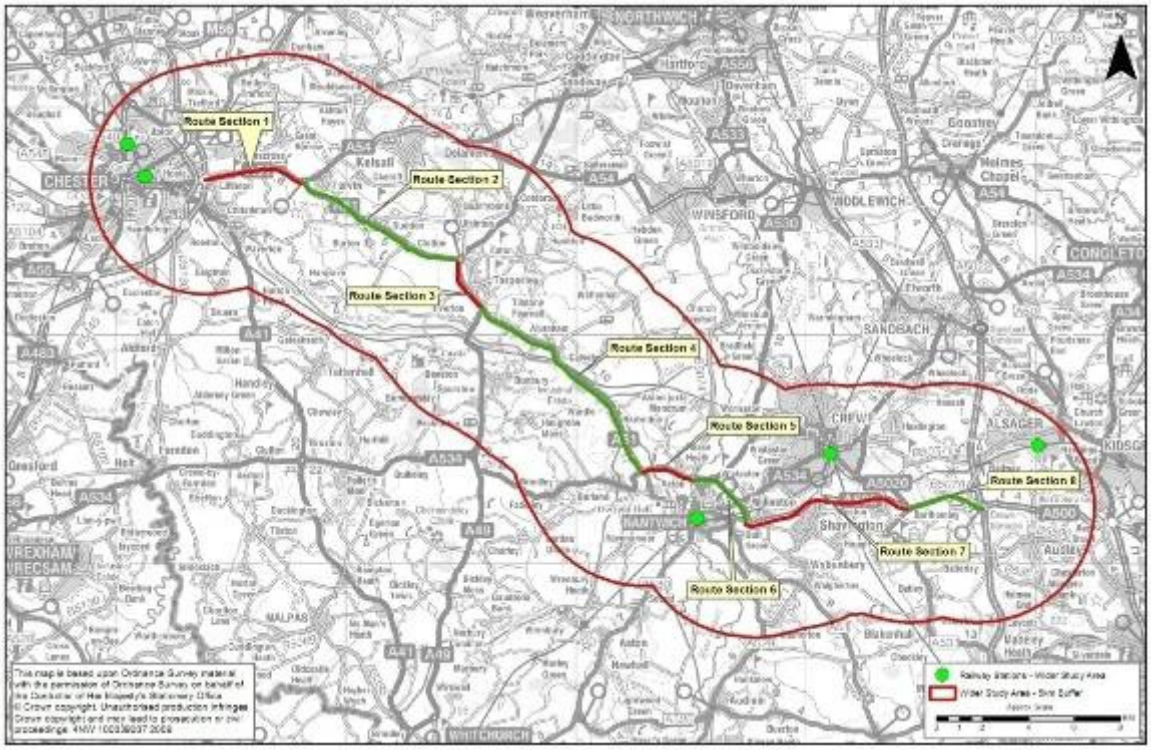
Source: Bus Strategy for Cheshire 2006 - 2011

Provisional Programme of Bus Improvements 2010/11		
Scheme	**Output**	**Funding Source**
Quality improvements on supported bus services	Higher quality	CCC
Accessibility Review	Access to Tourism & Leisure part 2, Access to food stores.	CCC
Crewe Rail Gateway	Improved interchange	LTP and others
Parish Council bus stops	5 bus stops upgraded to Cheshire standards	Parish Councils and LTP
Macclesfield Town Centre Strategy	Bus route improvements pt2	LTP
School travel initiatives in Macclesfield and Congleton.	Safer travel to school	LTP
Northwich Vision	Public transport improvements	LTP
Bus stop improvements on quality routes	200 bus stops upgraded to Cheshire standards	LTP
MIDMAN	Public transport improvements	LTP (MIDMAN)
SEMMMS	North Macclesfield bus corridor upgrading pt2	LTP (SEMMMS)

Source: Bus Strategy for Cheshire 2006 – 2011

Rail – Overview

Figure E-2 – Railway Station Locations within the Wider Study Area



The wider study area contains the following railway stations

- Crewe
- Chester
- Nantwich

The following services operate between Crewe and Chester:

Table E-5 – Rail services between Chester and Crewe

Service From/To	Station Stops	Operator	Frequency
Chester-Crewe	Chester - Crewe	Arriva Trains Wales	Hourly (Mon- Sat), Every 30mins Sundays.
London Euston – Chester/Holyhead	Crewe - Chester	Virgin Trains	Hourly (Mon – Sat). A limited number of Sunday services

Rail – Patronage Data

Table E-6 – Rail Patronage Data for Journeys from Crewe Station

	2005 Base - Destinations from Crewe				Distance		Journeys/Day		
Rank	**Station**	**Total Journeys**	**Total Receipts**	**Ave. Fare**	**Rail**	**Highway**	**365 Days**	**312 Days**	**260 Days**
4	Chester	112,495	381,358	3.39	34	39	308.21	360.56	432.67
18	Rhyl	12,997	713,54	5.49	82	91	35.61	41.66	49.99
41	Llandudno	4,523	299,87	6.63	105	110	12.39	14.50	17.40
43	Prestatyn	3,983	24,296	6.1	76	88	10.91	12.77	15.32
49	Colwyn Bay	3,367	26,296	7.81	98	104	9.22	10.79	12.95
51	Flint	3,337	12,747	3.82	54	64	9.14	10.70	12.83
56	Holyhead	2,926	34,995	11.96	169	173	8.02	9.38	11.25
57	Llandudno Junction	2,898	24,372	8.41	110	109	7.94	9.29	11.15

* Rank is based on total number of journeys to that location in comparison to journeys to all other recorded destinations
Data was sourced from Cheshire West & Chester Council and Cheshire East Council

Rail – Maintenance Work & Projects

Network Rail has detailed a list of potential electrification projects in the national network and the routes have been highlighted as those which carry a significant number of passengers. Network Rail has divided the potential options into six categories, with Tier One being the best option in terms of value for money per passenger. The Crewe to Chester line is listed in Tier One making it a strong potential option for electrification. The list also suggests converting Euston to Chester services to electric traction and adjusting of services to North Wales and Chester to diesel and electric diagrams.

The North West Route Utilisation Strategy (2007) produced by Network Rail provides a series of short, medium and long-term solutions to help grow the use of the railway and meet the increasing demand from passengers and freight services in the region. It highlights the gaps in the network at a generic level but also details the gaps that exist on each corridor within the region. The strategy element of the document relates to the range of interventions that will address the identified gaps and makes the railway more effective and efficient. The document identifies the Crewe to Chester route as a fast regional link.

- Challenges
    - Passenger growth
    - Meet demands without compromising freight
- Opportunities
    - Fast regional link opportunity for more services.
    - Currently under capacity, provision of more national trains can have positive effect on wider network.

The Wales Route Utilisation Strategy (2008) produced by Network Rail follows the same structure as the North West document and covers the country as a whole. Growing passenger demand is also highlighted in this document. In North Wales, changes to the West Coast Mainline are identified, such as hourly London trains to Chester, which are hoped to increase frequencies across the network. The Crewe to Chester forms part of the longer Crewe to Holyhead route which is identified as a major branch of the West Coast Mainline. The Crewe to Nantwich route is also covered in this network.

The Northern RUS Area comprises of journeys to and from North West Wales and North West England. The document states that the largest volume of journeys is to and from Chester and Crewe. There are indications of a 5 and 10% increase per year in journeys along this route. Chester and Crewe are among the most used stations in the RUS area second only to Cardiff with 2,862,000 and 2,411,000 journeys annually.

The document highlights that 64% of journeys at Crewe are journeys to/from and within RUS area - Chester has 93%. Along the route the number of freight train paths is stated as low with less than 12 trains per day from Crewe-Chester-Nantwich. The line from Crewe to Chester is identified as a high speed line. Utilisation is classed as medium between Crewe and Bangor/Holyhead (2008). The Chester to Crewe route has a high existing capacity utilisation; the Crewe to Nantwich line is classed as medium. The document outlines improvements at Chester station.

In terms of gaps in provision, the Crewe to Chester line is highlighted as a route with a mismatch of line speed with rolling stock availability. The potential to create links from Liverpool Airport to Chester and additional calls by fast trains at Nantwich are discussed.

- Challenges
    - Passenger growth and demand
- Opportunities
    - High speed line, Crewe to Chester – potential to increase frequencies.
    - Increase national services, positive impact on wider network.
    - Freight usage currently relatively low
    - Improvements at Chester Station

Freight Route Utilisation Strategy 2007: The Freight Route Utilisation Strategy 2007 is a document which identifies issues and sets out strategies for the future of freight transportation by rail. The document includes strategies for the short, medium and long term for all areas including the West Coast Mainline.

The findings suggest that currently and in the future, the West Coast Mainline via Crewe will be a key route. It is anticipated that there will be 15 more additional trains

each day by 2014/15. The Crewe to Chester line is projected as having a relatively low total gross tonnage compared to the rest of the network of 0-2.9m by 2014/15.

The document identifies areas where there may be gaps in capacity and the Crewe link with the North West is highlighted. Here there is a gap between passenger services and freight service speeds. The freight traffic through Crewe is expected to rise significantly with the document quoting growth in freight tonnes from 2004/5 to 2014/5 of between 5 and 7million.

Challenges

- Increase in freight tonnage
- Gaps between passenger service speeds and freight.

Opportunities

- Crewe-Chester link relatively low impact expected.
- Increasing trains lengths will improve capacity.
- Community Rail Partnerships

Coaches

The following coach route that operates along the study route:

National Express NX303 service – Crewe to Chester via Nantwich

Magabus vehicles have been observed using the route. Megabus has been consulted and it confirmed that the A51/A500 is only used as a diversion route.

Cycling

The route under study is not designated as a cycle route. There is an on-road cycle route (National Route 45) which runs within a 5km catchment of the route. This route leads into Chester via Saighton and Rowton to the south of the city.

Regional Route 71 is a part traffic free, part on road cycleway which runs within a 5km buffer area of the route. It crosses the study route briefly at Section Two running parallel to the A51 through villages such as Oscroft. The route runs in a north easterly direction towards the A49, away from the study area.

Walking

There are a number of designated walking routes surrounding study area which run close by to the route under study.

Table E-7 – Strategic walking routes

Strategic Walking Routes	
Walking Route	**Proximity to Route**
Baker Way – Chester, Delamere Forest	Chester Station, Christleton, Brown Heath, Tarvin, Delamere. Crosses A54 – With 5km of route sections 1 and 2.
Longster Trail – Helsby Hill via Barrow to Chester	Within 5km catchment - route Section One
The Sandstone Trail – Frodsham to Whitchurch	Intersects the route at A51 Section Three (between Clotton and Tarporley)

Equestrians

There are no designated bridleways on or in close proximity to the route.

Route Observations and Consultation Outputs

No significant observations have been made or consultation outputs received in relation to equality of opportunity.

Appendix F – Performance – Improve Quality of Life and a Healthy Natural Environment (DaSTS Goal 5)

This section refers to the goal of improving quality of life for both transport and non transport users and also to promote a healthy natural environment. Environmental considerations such as noise and air quality are assessed in terms of the route. Environmental designations such as green belt locations and areas liable to flooding close to the route are also examined. Data was sourced from Cheshire West & Chester Council and Cheshire East Council.

Noise

Noise action plan data is produced by DEFRA and identifies First Priority Locations for action on noise issues. First Priority Locations are defined as areas where road traffic noise is at least 76 dB according to the results of strategic noise mapping. The 76 dB is a threshold value which should be used to identify first priority locations for investigation in the context of Noise Action Plans.

The information obtained from DEFRA shows that there are no major noise issues associated with the majority of the study route. Only Section One is highlighted as having any noise related issues associated with it. There is a first priority location within Section One between Littleton and Stamford Bridge on the A51. A further smaller area is on Section One close to Abbeyfield.

!	There are noise issues within Section One of the route

Air Quality

Cheshire West & Chester Council identifies an Air Quality Management Area on the A51 Tarvin Road/Christleton Road. This area is outside of the immediate route corridor.

Crewe and Nantwich have two Air Quality Management Areas, these are on A534 through Crewe and Nantwich but are some distance from the route.

There are no Air Quality Management Areas within the immediate route area.

Table F-1 – AQMAs in Wider Study Area

Route Section	AQMA Location
Within 5km of route	A51, Tarvin Rd/Christleton Rd, Chester
Within 5km of route	A534, Nantwich Rd, Crewe
Within 5km of route	A534, Hospital Street, Nantwich

Water Protection

There are a number of canals and waterways which intersect the route, these include:

- Shropshire Union Canal
- Llangollen Canal
- River Gowy
- River Weaver
- River Wheelock

Flooding

There are a number of waterways which run adjacent to the route, these have been highlighted above. There are no man-made flood defences at any point along the A51/A500 or within the immediate study area, however the route does cross Flood Zone 3b located within the Weaver & Gowy catchment floodwatch area (Section One). The Flood Zone 3b designation means that the area has a role as a functional floodplain where water has to flow or be stored in times of flood. The land is estimated[6] to have an annual probability of flooding of 1 in 20 (5%) or greater in any year and is designed to flood in an extreme at (0.1%).

The Cheshire East Council produced a report indicating areas of flood risk in the area entitled, 'Cheshire Strategic Flood Risk Assessment 2007'. A report published by JBA Consulting in 2008 was a strategic flood risk assessment of Crewe and Nantwich. Sections One, Four, Six, Seven and Eight pass through National Flood Zone 3.

!	Sections One, Four, Six, Seven and Eight pass through designated flood risk areas.

There are three flood warning signs on the entirety of the study route. These are all located within Section Five of the route. One of the warnings is located close to Poole Hill whilst the other two are either side of the route at the A51/A51 crossroads near Burford.

Environmental Designations

There are no designated AONBs in Cheshire and the route under study is not within a National Park. There are 63 SSSIs in Cheshire as a whole (Natural England). There are also 78 designated conservation areas and eight Local Nature Reserves within the area.

[6] Cheshire West & Chester Council, Strategic Flood Risk Assessment 2008

The following sites of environmental interest are located within a 5km catchment of the route section:

- Wybunbury Moss National Nature Reserve
- Bateswood Local Nature Reserve
- Cranberry Moss Local Nature Reserve,
- Caldy Valley Nature Park (Country Park)
- St Annes (Doorstep Green)
- Little Budworth Country Park

Green Belt

There are two sections of the route which pass through designated green belt areas. There is an area surrounding Chester which is highlighted in Cheshire Structure Plan to 2016. Route Section One the A51 passes through this green belt area. Cheshire East Local Development Scheme illustrates a green belt area close to Barthomley which Section Eight of the route passes through. (Cheshire 2016 – Structure Plan Alteration).

Table F-2 – Green belt areas

Route Section	Green Belt Area	Location
1	Yes	Chester, A51
2	No	-
3	No	-
4	No	-
5	No	-
6	No	-
7	No	-
8	Yes	Barthomley, A500

Sections One and Eight pass through areas of Green Belt

Sites of Biological Importance

Sites of Biological Importance are recognised by Cheshire West & Chester Council, Cheshire East, Cheshire Wildlife Trust and English Nature and highlight areas of importance in relation to habitat, plants communities. The sites are graded using the following system:

- Grade A – Of county level importance
- Grade B – Of district level importance
- Grade C – Of local level importance

Figure F-1 – Grade A Sites of Biological Importance

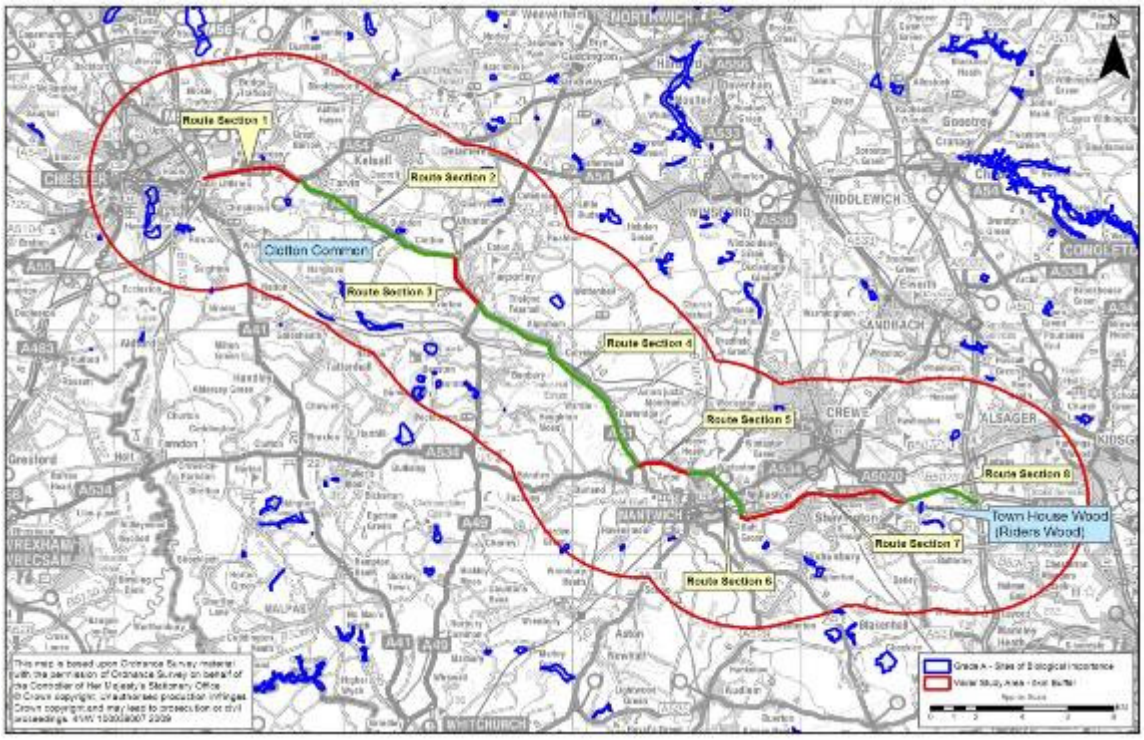


Table F-3 – Sites of Biological Importance within the Wider Study Area

GRADE	NAME
A	BEESTON CASTLE WOOD
A	PECKFORTON MERE
A	EARL'S EYE AND HANDBRIDGE MARSH
A	FISHPOOL MOSS
A	NIXON'S BRIDGE MEADOW AND CANAL
A	PAGES WOOD
A	NUT TREE COTTAGE MEADOWS
A	BROOK HOLE / GOWY
A	MRS MARRIOTTS FIELDS
A	LOWER HALL BLACK POPLAR SITE
A	STAMFORD BRIDGE BLACK POPLAR SITE
A	SPURSTOW HALL BLACK POPLAR SITE
A	CLOTTON COMMON
A	HOLBITCH SLACK
A	PECKFORTON WOODS
A	BOWLERS MOSS
A	BUNBURY HEATH MARSH
A	TOWN HOUSE WOOD (RIDERS WOOD)
A	CREWE SWIFT COLONY
A	DEAN ROUGH
A	COBBS MOSS AND WYBUNBURY MERE
A	HOUGH LODGE POOL
A	BIBBY'S MOSS
A	BRIDGE FARM FLUSHES

GRADE	NAME
A	HUNTINGTON SETTLEMENT LAGOONS
A	CALDY BROOK MEADOWS
A	HOCKENHULL PLATTS

! There are two sites of biological importance within the immediate study area.

7.4.1 *Bio-diversity*

The route crosses the Mid-Cheshire Sandstone Ridge which is part of the Ecological Network for Cheshire. The crossing point is between Frodsham and Bickerton which is on the A54, Section Two of the route.

There are no designated heath sites which cross directly on the route itself. There are two sites of designated natural grassland at Hurleston Reservoir and the Shropshire Union Canal both of which cross section Four of the route. There are three sites of peatland located at Tiverton Moss, North of Town House Farm and at Meremoss which are located within Sections Four and Eight respectively.

There are a number of locations of Heath, Natural Grassland and Peat which fall within a 5km catchment of the study route, these are identified below:

Table F-4 – Heath Sites within 5km Buffer of Route

Heath Ref.	Name
135	Little Budworth Common
195	Hough Common

Table F-5 – Natural Grassland Sites within 5km Buffer of Route

Natural Grassland Ref.	Name
208	Picton Green Lane
235	The Yeld
262	Fishpool Moss
280	Earl's Eye and Handbridge Marsh
295	Hockenhull Platts
308	Handbridge Cemetery
314	Earl's Eye
320	Caldy Valley
323	Stapleford Meadows
345	Caldy Brook Meadows
346	NWWA Reservoirs
347	Nr. Handbridge
355	Clotton Common
375	NWWA Dee Escarpment
389	Brereton Park Farm
416	Tilstone Fearnall Roadside Verge
418	Huxley Gorse
423	Brook Hole / Gowy
424	Nixon's Bridge Meadow and Canal

Natural Grassland Ref.	Name
427	Brook Hole / Gowy
428	Tollemache Meadows
429	Simpsons Rough and Foxy Wood
433	Tilsone Bank and Gowy Flushes
444	Bunbury Lock Meadow
445	Bunbury Brickworks
447	Higher Bunbury Hollows
448	Shropshire Union Canal (Middlewich Branch)
454	Bunbury Heath Marsh
455	Wardle Canal Banks
456	Hassal Grassland
457	Bunbury Heath Marsh
459	Hassall Grassland
471	Hurleston Reservoir
472	Yew Tree Farm, Moss End
474	Valley Brook Meadow
475	Reaseheath Pasture
476	Shropshire Union Canal (Llangollen branch)
477	Henbury Lee Meadows
485	Basford Brook
489	Haymoor Green Farm Meadow
491	Bridge Farm Flushes
493	Nut Tree Cottage Meadows
495	Mrs Marriotts Fields
499	Roadside Verge, Coole Lane
500	Hough Lodge Pool
505	Jericho Wood and Pasture
507	Hatherton Flush

Table F-6 – Peatland Sites within 5km Buffer of Route

Peatland Ref.	Name
88	South of Thornton-Le-Moors
125	South of Bridge Trafford
142	Plemondestall Bridge
190	South of Fish Pool Farm
191	Sandy Mere
196	South of Hawkswood
197	South of White Hall
198	Central Little Budworth Common
199	West Little Budworth Common
200	East Little Budworth Common
224	Tiverton Moss
231	North east of Moathouse Farm
232	Bowlers Moss
233	Peckforton Mere
234	Bottomless Mere

Peatland Ref.	Name
235	North of Well Bank
240	South of Well Bank
243	North of Stockton Farm
244	By Orchard Cottage
245	Oakhanger Moss
248	White Moss
249	Oakhanger Moss
251	Cranberry Moss
252	North-west of Butterton-lane Farm
253	White Moss
255	Alsager Spring
256	Engelsea Brook
258	Henbury Lee
259	Lees Wood
260	Engelsea Brook
261	Monneley Mere
262	North of Town House Farm
264	Meremoor Moss
265	East of Redlion Farm
273	North-east of Balterley Mere
275	East of Mere Gutter
276	Wybunbury Moss
278	East of Chorlton Hall Farm
281	West of West Heath
283	West Heath
286	Wybunbury Mere/Cobb's Moss
288	South of The Anchorage
289	East of Gonsley Green Farm
290	West of Betley Common
291	North of Blakenhall Moss
292	North-west of Betley Mere
293	Blakenhall Moss
294	South of Lea Farm
296	West of The Nook
299	East of Doddington Mill Farm
300	Speakman's Moss

! There are a number of important Heath, Peat and Grassland sites located within the wider study area.

Areas of Special County Value

There are a total of 14 Areas of Special County Value within Cheshire West & Chester and Cheshire East as shown in Table E-7, four of which fall within the wider study area.

Table F-7 - Areas of Special County Value

Area of Special County Value	Immediate Study Area	Wider Study Area
Beeston/ Peckforton/Bolesworth/ Bickerton Hills	-	✔
Bollin Valley	-	-
Cholmondeley Estate		✔
Dane Valley	-	-
Dee Valley		✔
Delamere/ Utkinson	-	-
Helsby & Frodsham Hills	-	-
Neeston/ Parkgate Coast	-	-
Peak Park Fringe	-	-
Rostherne/ Tatton Park	-	-
Tabley Hall	-	-
Weaver Valley		✔
Wirswall/ Marbury/ Combermere	-	-
Wych Brook Valley	-	-

Route Observations and Consultation Outputs

The stakeholder consultation resulted in the identification of the following issues:

- The number/proportion of Heavy Goods Vehicles through the villages of Barbridge, Wardle and Calveley is an issue and cause for complaint from residents
- Strategic traffic including HGVs passing through Acton between Nantwich and the A51

Appendix G – Route Challenges Detail Tables

Support Economic Growth

Table G - 1 – Route Challenges – Support Economic Growth

1. Higher than average daily traffic flows, including HGVs, lead to congestion and delays at key junctions and on major links.			
Issue	**Detail**	**Route Location**	**Specific Locations**
AADT flows are higher than national and regional averages for rural A-roads leading to a range of issues	The AADT flow is on average 26% higher across the study route than the national average. Section 1/ 3/5/6/7/8 all have a higher AADT flow than the national average for similar roads.	Section 1 Section 3 Section 5 Section 6 Section 7 Section 8	-
Sections 1 & 2 experience traffic flows more than double the national average for A-roads leading to a range of significant issues	-	Section 1 Section 2	-
Peak period congestion has been observed at a number of junctions on the route	Peak period congestion occurs at a number of junctions along the route, resulting in significant queues	All Sections	-
Significant congestion occurs at several locations on roads that link into or cross the route	Peak period congestion is experienced on a number of links approaching and crossing the route	Section 1 Section 6 Section 7	A54 A530 A534 A5020
HGV flows on the route are significantly higher than the national average leading to a number of issues	HGV flow is significantly higher than the regional and national average.	All Sections	-
HGV flows on Sections 1 & 8 are nearly three and four times the national average respectively leading to a number of issues	HGV flows on Sections 1 and 8 are approximately 2,100 and 3,000 respectively, compared to a national average of 750.	Section 1 Section 8	
High HGV flow through the A49	The A49 is used as an unofficial alternative/ diversion route from the M6. Subsequently there is a higher HGV flow through Section 3.	Section 3	-

2. Eastbound peak hour congestion occurs on the Barthomley Link.			
Issue	**Detail**	**Route Location**	**Specific Locations**
Section Eight (Barthomley Link) suffers from peak period congestion in the eastbound direction.	Section 8 suffers from significant congestion during peak periods on the eastbound approach to junction 16 of the M6.	Section 8	The eastbound approach to Junction 16 of the M6 suffers significant congestion during the AM and PM Peak.

3. Congestion on the Barthomley Link may lead to diversion of strategic traffic onto other routes			
Issue	**Detail**	**Route Location**	**Specific Locations**
Congestion on the Barthomley link may be causing the diversion of traffic onto alternative routes	-	Section 8	-
Section Eight forms part of a Strategic Diversion Route for the M6.	The diversion has been agreed between Cheshire East and the Highways Agency for use when the M6 is closed between Junctions 16 and 17.	Section 8	-

4. There is a low uptake of travel plans by major employers in the study area.			
Issue	**Detail**	**Route Location**	**Specific Locations**
Only eight of the 28 major trip generators are known to have specific or area-wide travel plans	-	All Sections	-

5. Obstruction caused by vehicles parked on carriageways through villages.			
Issue	**Detail**	**Route Location**	**Specific Locations**
Obstruction caused by vehicles parked on carriageways through villages	The A51 passes through a number of villages within Section 2 and 4. The narrowness of the carriageway and the tendency for vehicles to be parked on the carriageway can cause a significant obstruction. Service vehicles (e.g. waste collection) will also cause obstruction along a number of route sections.	Section 2 Section 4	Duddon, Clotton Alpraham, Calveley

6. The Basford Strategic Regional Site could generate additional traffic using the route leading to environmental, safety and congestion issues			
Issue	**Detail**	**Route Location**	**Specific Locations**
The Basford Strategic Regional Site could have a significant impact on the route, particularly Sections Seven and Eight	The development of the designated strategic regional site at Basford East and West will increase traffic flows along the eastern sections of the route	Section 7 Section 8	Shavington, Hough and Basford Bypass Barthomley Link

7. Major developments in Chester, Crewe, Nantwich and the wider route area could have a significant impact on the route.			
Issue	**Detail**	**Route Location**	**Specific Locations**
Crewe and Chester Rail Gateway developments could have a significant impact on the route.	Major improvements to these stations, may increase the attractiveness of rail travel and potentially altering traffic movements. The potential movement of Crewe Railway Station would have a direct impact on the movement of traffic and increase flow along A500.	All Sections	Shavington, Hough and Basford Bypass Barthomley Link if Crewe Station moves to Basford

The Deeside Hub scheme could have a significant impact on the route	The Deeside Hub schemes include a wide range of developments that could have an influence of traffic movements	All Sections	-
Significant developments in Chester, Crewe and Nantwich may affect the route	-	All Sections	Chester Crewe Nantwich

8. Growth Point status in Cheshire West & Chester area may generate impacts on the route.			
Issue	**Detail**	**Route Location**	**Specific Locations**
Growth Point status in the Cheshire West & Chester area may generate impacts on the route	A number of locations for housing growth points have been identified within the Cheshire West & Chester area. A total of 8,000 homes have been outlined for several areas within Cheshire West & Chester.	Section 1 Section 2 Section 3	Chester City Centre Tarporley
The transport impact of Growth Point developments will be known following am Strategic Transportation Study	A study is to be undertaken into the transport impacts of the Growth Point developments and will assess the need for improved infrastructure provision	Section 1 Section 2 Section 3	Chester City Centre Tarporley

9. Tourism developments may have a significant impact on the route.			
Issue	**Detail**	**Route Location**	**Specific Locations**
Tourism developments including Chester Zoo could increase traffic on the route.	Chester is a significant tourist centre and contains a number of major attractions. The development of Chester Zoo will ensure that it becomes the largest conservation, animal and leisure attraction of its kind in Europe. This will increase the number of visitors and may impact on congestion on the study route.	All Sections	-
A number of events and attractions may increase traffic on the route on individual days	-	All Sections	-

10. Proposed speed limit changes may have an impact on the perception of the A51/A500 as a regional route			
Issue	**Detail**	**Route Location**	**Specific Locations**
Proposed speed limit changes may have an impact on the regional function of the route if they result in increased journey times	The speed limit review recommends reducing the speed limit to 30mph through Duddon/Clotton. The speed limit is also recommended to be reduced to 50mph within areas of Section 3, 4 and 5. This will have an impact on journey times across the route.	Section 2 Section 3 Section 4 Section 5	Section 2 – Reduction to 30mph through Duddon/Clotton Section 3 – Reduce speed limit to 50mph through at the junction of A49/ A51 southern end of section 3. Section 4 – Reduce speed limit to 50mph on approach to junction of A51/A534 as part of A534 scheme. Section 5 – Reduce speed limit to 50mph on approach to junction of A51/A534 as part of A534 scheme.

Reduce Carbon Emissions

Table G - 2 – Route Challenges – Reduce Carbon Emissions

11. Greater understanding of the carbon emissions of the route is required.			
Challenge Evidence	**Detail**	**Route Location**	**Specific Locations**
Route Sections One & Eight have the highest levels of carbon and carbon dioxide emissions.	Analysis has highlighted that two sections emit significantly higher levels of both carbon and carbon dioxide than all other sections along the study route.	Section 1 Section 8	Further work will be required including comparison with other routes

Contribute to Better Safety, Security and Health

Table G - 3 – Route Challenges – Better Safety, Security and Health

12. The route has high collision rates and collision severity indices above the national average.			
Challenge Evidence	**Detail**	**Route Location**	**Specific Locations**
Six of the route sections have collision rates above the national average for rural A-roads.		Section 1 Section 2 Section 4 Section 5 Section 6 Section 7	-
Sections Five & Six have collision rates significantly above the national average for rural A-roads	The collision analysis highlights both route sections as having collision rates almost double the national average. There is one collision cluster within Section 5 and three within Section 6 that need further investigation.	Section 5 Section 6	Junction of the A51/A500 A500/ Alvaston Roundabout. Junction of A500/A534 Junction of A500/A500

12. The route has high collision rates and collision severity indices above the national average.			
Five of the route sections have collision severity indices higher than the national average.	The severity of collisions on Sections 2 to 6 require further investigation	Section 2 Section 3 Section 4 Section 5 Section 6	-
Significant number of pedal cycle collisions along the A51 Nantwich Bypass	The collision analysis highlights the cluster of pedal cycle collisions at the A500/Alvaston Roundabout.	Section 6	A500/ Alvaston Roundabout.

13. HGV collision rates on the route are significantly above the national average			
Challenge Evidence	**Detail**	**Route Location**	**Specific Locations**
The percentage of HGV collisions is significantly above the national average for rural roads on six of the eight route sections	HGV collisions on the route are a significant concern	Section 2 Section 4 Section 5 Section 6 Section 7 Section 8	-

14. There are 14 collision cluster locations on the route			
Challenge Evidence	**Detail**	**Route Location**	**Specific Locations**
There are 14 collision cluster locations along the route, all but two are at junctions	-	Section 1 Section 2 Section 4 Section 5 Section 6 Section 7 Section 8	-

Promote Equality of Opportunity

There are no specific challenges related to equality of opportunity have been identified within the study area.

Improve Quality of Life and a Healthy Natural Environment

Table G-4 – Improve Quality Life and a Healthy Natural Environment

15. There are noise related issues within Section One of the route			
Challenge Evidence	**Detail**	**Route Location**	**Specific Locations**
DEFRA has identified Priority 1 noise issues within Section One of the route	DEFRA data shows that there are Priority 1 issues on the section	Section 1	

16. The route passes through designated flood risk areas.			
Challenge Evidence	**Detail**	**Route Location**	**Specific Locations**
Sections One, Four, Six, Seven and Eight pass through designated flood risk areas.	-	Section 4 Section 6 Section 7 Section 8	

17. The route passes through and past areas with environmental designations			
Challenge Evidence	**Detail**	**Route Location**	**Specific Locations**
Sections One and Eight pass through areas of Green Belt	The sections pass through the Green Belt areas surrounding Chester and Crewe	Section 1 Section 8	-
There are two sites of biological importance within the immediate study area.	Clotton Common Town House Wood	Section 2 Section 7	-
There are a number of important Heath, Peat and Grassland sites located within the wider study area.	-	All Sections	-

Appendix H – Route Outcomes Detail Tables

Table H-1 – Route Outcome Table 1

Improved understanding of existing travel on the route and the potential for change in the future	
Explanation	At present, data on the traffic movements on the route is limited to a traffic count sites (seven covering the eight sections) and some localised modelling information and there is no recent data concerning origins and destinations for traffic on the route. Improved data collection and analysis is required to provide a greater understanding of the travel patterns on the route which should result in more appropriate and targeted interventions being implemented. Further information would also enable improved monitoring of traffic patterns on the route. While an assessment of the carbon emissions generated by the use of the route has been undertaken, a greater understanding of these outputs is required. Primarily, this is related to increasing understanding the carbon emissions from this route on a comparative basis with other routes in the region. The implementation of transport improvements to complement the developments associated with Cheshire West & Chester Council's Growth Point Status will be informed by the West Cheshire Transport Study. Outputs from this study will need to be assessed for relevance to and impact on the A51/A500 route. Furthermore, a greater understanding is required of other proposed or potential developments within the wider route area and the extent to which they may have an impact on the route.
Location	• All sections
DaSTS Goals	• Support economic growth • Reduce Carbon Emissions • Promote equality of opportunity • Contribute to better safety, security and health • Improve quality of life
Functions	• Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays • Providing connectivity between the Cheshire area and the North Staffordshire conurbation • Providing connectivity between the Cheshire area and

Improved understanding of existing travel on the route and the potential for change in the future	
	Merseyside • Providing connectivity between the Cheshire area to Manchester city-region • Providing connectivity between Chester and the Cheshire area • Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe • Providing a link to large employers within Chester and Crewe from the Cheshire area • Providing a link to the key sub-regional higher education and health services located within Chester and Crewe • Providing a strategic diversion route for the M6 (between Junctions 16 and 17) • Providing access to the housing growth points and employment sites within Cheshire West & Chester
Challenges	1. Higher than average daily traffic flows, including HGVs, lead to congestion at key junctions and on major links. 2. Eastbound peak hour congestion occurs on the Barthomley Link. 3. Congestion on Barthomley Link may lead to diversion of strategic traffic onto other routes 6. The Basford Strategic Regional Site could generate additional traffic using the route leading to environmental, safety and congestion issues 7. Major developments in Chester, Crewe, Nantwich and the wider route are could have a significant impact on the route. 8. Growth Point status in Cheshire West & Chester area may generate impacts on the route. 9. Tourism developments may have a significant impact on the route.
Evidence	Traffic data is limited to seven permanent traffic counter sites and scheme-related data at a number of junctions. Journey purpose or origin/destination data is not available for the route. Lack of available data has limited the extent to which the study has been able to assess traffic patterns on the route and the potential future impacts of proposed developments. The transport study to support proposals for Growth Point status may provide a better understanding of movements along the route.
Potential Actions	• Full roadside interview survey for the route and analysis • Full registration plate matching survey for the route and analysis • Annual monitoring and reporting of traffic and collision

Improved understanding of existing travel on the route and the potential for change in the future	
	trends • Incorporate outputs from the Growth Point related West Cheshire Transport study into the future planning of the route • Consultation with stakeholders (e.g. users' forum, parishes, bus operators, etc) • Further modelling of carbon emissions and comparison with other routes • Further investigation of HGV use of the route
Implementing Body	Cheshire West & Chester Council, Cheshire East Council
Partners	Highways Agency
Risks	

Table H-2 – Route Outcome Table 2

Reduced carbon emissions from the use of the route	
Explanation	While no comparison has been made with similar routes, the carbon emissions on Sections One and Eight appear to be high. The cause of these high figures may be related to general levels of traffic, the number of HGVs, vehicle speeds and the levels of congestion. In line with the DaSTS goals, a primary aim of the authorities with responsibility for the A51/A500 route will be to reduce the carbon emissions associated with its use over the coming 20 years.
Location	• All sections, but focussing on Sections...
DaSTS Goals	• Reduce Carbon Emissions
Functions	• Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays • Providing connectivity between the Cheshire area and the North Staffordshire conurbation • Providing connectivity between the Cheshire area and Merseyside • Providing connectivity between the Cheshire area to Manchester city-region • Providing connectivity between Chester and the Cheshire area • Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe • Providing a link to large employers within Chester and Crewe from the Cheshire area • Providing a link to the key sub-regional higher education and health services located within Chester and Crewe • Providing a strategic diversion route for the M6 (between Junctions 16 and 17) • Providing access to the housing growth points and employment sites within Cheshire West & Chester
Challenges	1. Higher than average daily traffic flows, including HGVs, lead to congestion at key junctions and on major links. 2. Eastbound peak hour congestion occurs on the Barthomley Link. 4. There is a low uptake of travel plans by major employers in the study area. 6. The Basford Strategic Regional Site could generate additional traffic using the route leading to environmental, safety and congestion issues

Reduced carbon emissions from the use of the route	
	7. Major developments in Chester, Crewe, Nantwich and the wider route are could have a significant impact on the route. 8. Growth Point status in Cheshire West & Chester area may generate impacts on the route. 9. Tourism developments may have a significant impact on the route. 11. Greater understanding of the carbon emissions of the route is required.
Evidence	• Figures from modelling – Section One 39% and Section Eight 65% more CO_2 per km than the average for the route. • Only six of the 28 identified major trip generators/ employers are known to utilise travel plans
Potential Actions	• Diversion of "through" HGV movements onto M6/M56/A55 including changes to strategic signing – an assessment will need to be made of any potential carbon saving • Increase the number of travel plans utilised by major employers and trip generators • Personalised Travel Planning and area or corridor-wide travel planning (e.g. Crewe and Nantwich)
Implementing Body	Cheshire West & Chester Council, Cheshire East Council
Partners	Bus operators
Risks	• The rural location of many major employers/ trip generators and the lack of suitable public/ sustainable transport alternatives may inhibit the development and use of travel plans.

Table H-3 – Route Outcome Table 3

Reduced collision rates and severity of collisions on the route	
Explanation	In managing the highway network, a central driver for local authorities is to not only reduce collisions but also their severity. The study has shown that the collision rate on the Nantwich Bypass and the section between the Bypass and Burford cross-roads are particularly high and the severity of collisions on a number of sections is significantly higher than the national average for a rural A-road. The route also has a significant number of collision cluster sites, largely at junctions, where there have been concentrations of collisions over the past five years. The study has highlighted that the proportion of HGV collisions that have occurred along the route is significantly higher than the national average. Collisions involving HGVs have the potential to impact on a wide area, due to the road closures and diversion routes etc. This could have a significant impact on the use M6 diversion route within the area. This Route Outcome highlights the need for the local authority to improve road safety on the A51/A500.
Location	• All Sections
DaSTS Goals	• Support economic growth • Contribute to better safety, security and health
Functions	• Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays • Providing connectivity between the Cheshire area and the North Staffordshire conurbation • Providing connectivity between the Cheshire area and Merseyside • Providing connectivity between the Cheshire area to Manchester city-region • Providing connectivity between Chester and the Cheshire area • Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe • Providing a link to large employers within Chester and Crewe from the Cheshire area • Providing a link to the key sub-regional higher

Reduced collision rates and severity of collisions on the route	
	education and health services located within Chester and Crewe • Providing a strategic diversion route for the M6 (between Junctions 16 and 17) • Providing access to the housing growth points and employment sites within Cheshire West & Chester
Challenges	12. The route has high collision rates and collision severity indices above the national average. 13. HGV collision rates on the route are significantly above the national average. 14. There are 14 collision cluster locations on the route
Evidence	• One serious or fatal collision occurs on the route more frequently than every four weeks; these types of collisions often lead to the closure of routes. • HGV collisions account for 17% of collision that occurred along the study route. The national average for Rural A-roads is 6.2%. • HGV collisions within sections 2/4/7 account for more than 20% of all collisions. • There are two significant HGV collision clusters: • Section two – Junction of A51/A59 (6 HGV collisions) • Section Seven – Junction of A500/A5020 (5 HGV collisions) • 70% of all collisions involving pedal cycles occurred within Section Six. The majority of these collisions occurred on the A500/ Alvaston Roundabout • Sections 1/2/4/5/6/8 have collision rates higher than the national average for rural A-roads. • Sections 2/3/4/8/7 have collision severity indices higher than the national average.
Potential Actions	• Route-wide safety study including analysis of frequency and severity, or • Route-wide HGV collision study • Collision studies at collision cluster sites
Implementing Body	Cheshire West & Chester Council, Cheshire East Council
Partners	Freight Transport Association, local cycle groups
Risks	Continued high HGV collision rate along the study route. The study route remains an important freight route, any solution may impact on local businesses and important employment areas.

Table H-4 – Route Outcome Table 4

Improved management of freight movements along the route	
Explanation	The route caters for very high freight movements for the standard and location of carriageway. A key use of the route for HGVs is for access from the M6 Junction 16 to Crewe; the flow of HGVs to the west of Crewe deceases significantly. The flow on Section One of the route is also particularly high as the link provides access from both the A51 and A54 to the A55. The high level of freight movements also contributes to significantly higher than average collisions involving HGVs. This Route Outcome promotes the improved management of freight movements on the route including trying to increase engagement with the haulage industry and promoting the use of appropriate routes.
Location	• All sections of the route but particularly Sections One and Eight
DaSTS Goals	• Support economic growth • Reduce Carbon Emission • Promote equality of opportunity • Contribute to better safety, security and health • Improve quality of life
Functions	• Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays • Providing connectivity between the Cheshire area and the North Staffordshire conurbation • Providing connectivity between the Cheshire area and Merseyside • Providing connectivity between the Cheshire area to Manchester city-region • Providing connectivity between Chester and the Cheshire area • Providing a link to large employers within Chester and Crewe from the Cheshire area • Providing a strategic diversion route for the M6 (between Junctions 16 and 17) • Providing access to the housing growth points and employment sites within Cheshire West & Chester
Challenges	1. Higher than average daily traffic flows, including HGVs, lead to congestion at key junctions and on major links. 2. Eastbound peak hour congestion occurs on the Barthomley Link.

Improved management of freight movements along the route	
	3. Congestion on Barthomley Link may lead to diversion of strategic traffic onto other routes 13. HGV Collision rates on the route are significantly above the national average.25. The percentage of HGV collisions is significantly above the national average for rural roads on six of the eight route sections.
Evidence	• On average, HGV movements on the route are 2.25 times higher than the national average for rural A-roads • Section One has 2.8 times the national average number of HGVs for rural A-roads • Section 8 has over four times the national average number of HGVs for rural A-roads • The Basford developments will include a significant quantity of warehouse and distribution floor space which will generate additional HGV movements • Section Three, the A49, has a higher number of HGVs than other central sections of the route indicating north to south HGV movements on the A49 • DEFRA Priority One noise locations are present in Section One
Potential Actions	• Develop a Freight Quality Partnership for the route and/or wider area • Consultation with freight operators • Designated routing • Improved signing • Identification of diversion routes • Local HGV bans on side roads
Implementing Body	Chester West and Chester Council, Cheshire East Council
Partners	Highways Agency, Freight Transport Association
Risks	• Potential for unintended consequences if the existing situation is not fully understood before actions are taken.

Table H-5 – Route Outcome Table 5

Reduced congestion on and across the route	
Explanation	As a major regional route, significant traffic flows use the route on a daily basis. The quantity of traffic travelling along and across the route has led to significant congestion at a number of junctions and along sections of the route and adjoining carriageways. Delays are also caused on some sections of the route by vehicles parking on the route or making deliveries or servicing properties along the route. Thus Route Outcome highlights the need to reduce congestion at key junctions and links along and across the route.
Location	• All sections are affected
DaSTS Goals	• Support economic growth; • Reduce carbon emissions; • Promote equality of opportunity • Improve quality of life and a healthy natural environment
Functions	• Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays • Providing connectivity between the Cheshire area and the North Staffordshire conurbation • Providing connectivity between the Cheshire area and Merseyside • Providing connectivity between the Cheshire area to Manchester city-region • Providing connectivity between Chester and the Cheshire area • Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe • Providing a link to large employers within Chester and Crewe from the Cheshire area • Providing a link to the key sub-regional higher education and health services located within Chester and Crewe • Providing a strategic diversion route for the M6 (between Junctions 16 and 17) • Providing access to the housing growth points and employment sites within Cheshire West & Chester
Challenges	1. Higher than average daily traffic flows, including HGVs, lead to congestion at key junctions and on major links. 2. Eastbound peak hour congestion occurs on the

Reduced congestion on and across the route	
	Barthomley Link. 3. Congestion on the Barthomley Link may lead to diversion of strategic traffic onto other routes. 4. There is a low uptake of travel plans by major employers in the study area. 5. Obstruction caused by vehicles parked on carriageways through villages. 6. The Basford Strategic Regional Site could generate additional traffic using the route leading to environmental, safety and congestion issues 7. Major developments in Chester, Crewe, Nantwich and the wider route are could have a significant impact on the route. 8. Growth Point status in Cheshire West & Chester area may generate impacts on the route. 9. Tourism developments may have a significant impact on the route.
Evidence	• Average AADF on the route is 35% above the national average and 73% above the regional average. • Peak period congestion occurs at the A51/B5132, A51/A54, A51/A49 (Rhuddal Heath), A51/A534 (Burford), A51/A530 and A51/A534 (Peacock Roundabout) junctions • Peak period congestion occurs on the A54, links crossing the Nantwich Bypass and the A5020. • Delays caused by vehicles stopped on the carriageway have been observed by the study team and reported by consultees
Potential Actions	• Crewe Green Link Stage II may relieve A5020 • Improvements to junctions A51/B5132, A51/A54, A51/A49 (Rhuddal Heath), A51/A534 (Burford), A51/A530, A51/A534 (Peacock Roundabout) and A500/A5020 junctions. • Incorporate outputs from the Growth Point related West Cheshire Transport study into the future planning of the route • Improvements to bus network • Improved bus services between Crewe and the North Staffordshire Conurbation • Promotion and marketing of rail use between Chester, Crewe and the North Staffordshire Conurbation • Lay-bays and 'off-street' parking improvements in the villages • Parking and waiting restrictions within the villages while limiting impacts on residents

Reduced congestion on and across the route	
	• Improvements to cycling facilities for local movements across routes • Ensure all major traffic-generating events have Event Management Plans in place and reviewed regularly
Implementing Body	Cheshire West & Chester and Cheshire East
Partners	Bus operators, event organisers
Risks	• Providing additional priority to cross-route movements may affect the regional and sub-regional functions of the route • There may be limited scope for finding a solution to obstructions caused by vehicles parking along the carriageway due to the spatial constraints within the villages and along the study route.

Table H-6 – Route Outcome Table 6

Reduced Congestion on the Barthomley Link	
Explanation	Section Eight of the route, the Barthomley Link, suffers from significant congestion during peak periods on the eastbound approach to Junction 16 of the M6. The link is close to capacity in both the eastbound and westbound directions and there are delays for eastbound traffic on entry to M6 Junction 16. Significant development is proposed both within Crewe and the Strategic Regional Sites at Basford East and West which could have impacts on the operation of the link. This outcome highlights the need to resolve the congestion issues on Barthomley Link taking into account the future proposed development in the surrounding area.
Location	• Section 8
DaSTS Goals	• Support economic growth; • Reduce Carbon Emissions; • Contribute to better safety, security and health
Functions	• Providing connectivity between the Cheshire area and the North Staffordshire conurbation, Merseyside, North Wales and the Irish Sea Ports at Holyhead and Birkenhead Twelve Quays • Providing connectivity between the Cheshire area and the North Staffordshire conurbation • Providing connectivity between the Cheshire area to Manchester city-region • Providing accessibility between the Cheshire area and the West Coast Mainline at Crewe • Providing a link to large employers within Chester and Crewe from the Cheshire area • Providing a link to the key sub-regional higher education and health services located within Chester and Crewe • Providing a strategic diversion route for the M6 (between Junctions 16 and 17)
Challenges	1. Higher than average daily traffic flows, including HGVs, lead to congestion at key junctions and on major links. 2. Eastbound peak hour congestion occurs on the Barthomley Link. 3. Congestion on the Barthomley Link may lead to diversion of strategic traffic onto other routes. 4. There is a low uptake of travel plans by major employers in the study area. 6. The Basford Strategic Regional Site could generate

Reduced Congestion on the Barthomley Link	
	additional traffic using the route leading to environmental, safety and congestion issues 7. Major developments in Chester, Crewe, Nantwich and the wider route are could have a significant impact on the route.
Evidence	• AADF on the route section is 116% above the national average and 178% above the regional average. • AM peak hour flow is 53% of the highest free flow speed on the eastbound direction of the link. • PM peak hour flow is 52% of the highest free flow speed on the eastbound link of the link. • Eastbound traffic queues the full length of the link during peak periods • Eastbound traffic 24hr flows are significantly lower than westbound indicating diversion of vehicles onto other routes
Potential Actions	• Implementation of improvements secured as part of Basford East Development • Capacity improvements on Barthomley Link • Management of the potential impacts of Basford East and West • Implementation of comprehensive travel planning approach at Basford East and West • Implementation of public transport improvements between Crewe and the North Staffordshire Conurbation • Study of traffic flows in wider highway network to assess the extent of vehicle trips diverting onto other routes
Implementing Body	Cheshire East
Partners	Highways Agency, Northwest Development Agency
Risks	• Availability of funding for major schemes • Impact of congestion on ability of Crewe to attract investment • Potential movement of Crewe Railway Station to Basford site

Appendix I – Risk Assessment

Table H-1 – Risk Assessment

Description of Risk	Effect of Risk	Potential Locations	Inherent risk rating	Existing control measures / mitigating actions	Residual risk rating	Actions planned	Risk Owner
Flooding of carriageway caused by increased rainfall generated by climate change	Carriageway closure, increased occurrence of collisions	Sections One, Four, Six, Seven and Eight	5	Highway design, drainage inspection and maintenance	5	-	Cheshire West & Chester Council, Cheshire East Council
Risk to structures due to flooding	Damage to structures resulting in closing of the carriageway	Sections One, Four, Six, Seven and Eight	5	Structure design, drainage inspection and maintenance	5	-	Cheshire West & Chester Council, Cheshire East Council
Train collision with highway infrastructure	Closure of bridge infrastructure and carriageway	Sections Four, Six and Seven	6		6	-	Cheshire West & Chester Council, Cheshire East Council, Network Rail

Likelihood				
	High	4	7	9
	Medium	2	5	8
	Low	1	3	6
		Noticeable	Significant	Critical
		Impact		