MERSEYTRAM LINE 1: A HEALTH IMPACT ASSESSMENT OF THE PROPOSED SCHEME

FINAL

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Arvin Prashar
Debbie Abrahams
Diane Taylor
Alex Scott-Samuel

IMPACT,
The International Health Impact Assessment Consortium,
Department of Public Health,
University of Liverpool,
Whelan Building,
Liverpool, L69 3GB
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Executive Summary

1. What is the Merseytram Line 1 Health Impact Assessment?

1.1 This Executive Summary of the Merseytram Line 1 Health Impact Assessment (HIA) encapsulates the work undertaken by IMPACT, the International Health Impact Assessment Consortium at the University of Liverpool. Merseytravel commissioned IMPACT,

'... To assess the health impacts of the development and operation of Merseytram Line 1 ...'

1.2 The primary purpose of this HIA is to better inform the decision-making process for the Merseytram Line 1 scheme. The findings of the assessment will be taken into account in the detailed design of the scheme in order to protect and enhance the health of people who use Merseytram system and/or live close to the proposed Merseytram Line 1 alignment.

1.3 Merseytram is being promoted by Merseytravel, the Merseyside Passenger Transport Executive and Authority, under the Transport and Works Act 1992. In order to obtain the necessary powers to construct and operate the scheme, Merseytravel is applying to the Secretary of State for Transport for a Transport and Works Order.

2. The Merseytram Line 1 Scheme

2.1 The Merseytram Line 1 scheme has the following objectives:

- To provide a high quality, segregated tram system that will attract car and other users through offering a high quality of ride, a reliable, safe and frequent service and competitive journey times.

- To develop a network that will promote sustainable, inclusive regeneration in Merseyside by enhancing public transport accessibility to the city centre, other regeneration areas and forging a sustainable link between transport and land use along Merseytram corridors.

- To promote social inclusion by connecting areas of low car ownership and high deprivation to economic opportunities and social, health and leisure facilities, and by offering a fully accessible system to the mobility impaired and those travelling with luggage and/or children.

- To provide a system that integrates with the existing transport network through creating new and enhanced interchange opportunities with bus, rail, ferry, car, cycling and walking, and through providing fully integrated ticketing with other modes.

- To enhance the local environment by reducing local air pollution and where practicable, noise in Liverpool City Centre and in residential areas

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along Merseytram corridors, and improving the physical environment by adopting best practice urban design principles along the route.

2.2 Merseytram Line 1 will operate for approximately 18 km between Liverpool and Kirkby in Knowsley. The wards that Merseytram will pass through include Abercromby, Everton, Smithdown, Kensington, Tuebrook, Clubmoor and Gillmoss. It then passes through a further two wards in Kirkby: Cherryfield and Kirkby Central. The Merseytram Line 1 will also run adjacent to the following wards: Anfield, Croxteth, Pirrie, Knowsley Park and Northwood. The route will operate from King’s Dock and Pier Head on the waterfront through Liverpool City Centre travelling north east through mainly residential areas and terminating at Kirkby Town Centre. The scheme proposes 30 stops, including a 'Park and Ride' facility at Gillmoss, adjacent to the proposed Operations and Control Centre (OCC). It aims to be completed by 2007.

2.3 Approximately 90% of the route will be on street, but segregated from road traffic. However some sections will operate on land that does not form part of the highway. No existing railway track will be used.

2.4 The Environmental Statement (ERM, 2003) for Merseytram Line 1 describes a range of social, economic and environmental impacts predicted during the construction and operation of the scheme.
3. What methods were used in this Health Impact Assessment?

3.1 The HIA methods were based on the 'Merseyside Guidelines for Health Impact Assessment' (Scott-Samuel et al, 1998); this methodology is the most widely used in the UK (Ison & Griffiths, 2000). It is a systematic process involving a set procedure and the use of a number of different methods as follows:

Figure 1 A Generic HIA Methodology based on the Merseyside Guidelines

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>a. Profiling of communities</td>
</tr>
<tr>
<td>Identify policies for HIA</td>
<td>b. Analysis of policy proposals</td>
</tr>
<tr>
<td>Develop terms of reference</td>
<td>c. Primary Data Collection: Participatory, qualitative approaches Quantitative approaches</td>
</tr>
<tr>
<td>Identify assessment team</td>
<td>d. Impact analysis: data assembled and evidence of impacts assessed</td>
</tr>
<tr>
<td>Undertake assessment</td>
<td>e. Priority impacts established</td>
</tr>
<tr>
<td>Report on health impacts and policy options</td>
<td>f. Recommendations developed</td>
</tr>
<tr>
<td>Monitor and evaluate</td>
<td>g. Monitor and evaluate</td>
</tr>
</tbody>
</table>

Report appraisal & Policy revision
4. **What are the key findings from the Health Impact Assessment?**

4.2 Data from the profiling, documentary analysis and from fieldwork have been collated and analysed to identify evidence of the potential health impacts of the Merseytram Line 1 scheme on the population most likely to be affected by the scheme - people who live and work close to the tram line. Twenty-two interviews and focus groups were conducted with community and organisational stakeholders, as well as with key informants, independent witnesses with expertise in transport or transport and health. The matrices below define the Potential Health Impacts of the scheme on different health determinants and their subsequent effect on health outcomes (the impacts on health status are described after the impacts on health determinants and follow the arrow symbol →). The Direction indicates whether this impact is a health gain (+) or loss (-). Scale is a measure of the severity of the impact (in terms of effects on mortality, morbidity and well being) and the size/proportion of the population affected - is represented by the number of symbols as follows:

<table>
<thead>
<tr>
<th>Severity/population proportion</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>---- or +++</td>
<td>--- or +++</td>
<td>-- or ++</td>
</tr>
<tr>
<td>Illness/injury</td>
<td>--- or +++</td>
<td>-- or ++</td>
<td>- or +</td>
</tr>
<tr>
<td>Well being</td>
<td>-- or ++</td>
<td>- or +</td>
<td>negligible</td>
</tr>
</tbody>
</table>

The Likelihood of impact describes the probability that the impact will occur. The likelihood can be definite (in the case of retrospective HIAs), probable, possible or speculative - which in turn relates to the strength of the evidence. Where there is a close correlation between evidence from all data sets (which includes published literature and information from stakeholders/key informants), this is regarded as strong evidence. In addition to the analysis of the potential health impacts on the 'Merseytram' population as a whole, the potential impacts on health inequalities are also discussed. The impact analysis considers:

- The construction phase of the scheme; and
- The operational phase of the scheme.
### Executive Summary: Table 1  Construction Phase

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction workers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unemployment/Employment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increase in temporary employment opportunities (90 FTEs), with potentially 50% taken by up by Merseyside workers reduced risk of premature mortality, physical and psychological ill health</td>
<td>+++--</td>
<td>Probable</td>
</tr>
<tr>
<td>- Increased exposure to employment-related risk factors; Low-skilled, low pay work, 'job strain' working conditions increase in self-reported ill-health, increased risk of cardiovascular disease in long term, musculo-skeletal disorders, mental health problems</td>
<td>--</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increased risk of work-related accidents and injuries to workers (comparable to other similar construction projects)</td>
<td></td>
<td>Possible</td>
</tr>
</tbody>
</table>
**Merseytram communities**

**Social support**
- Disruption of social networks (stress 'buffers') in vicinity of construction work  
  short term: reductions in physical and emotional well being; longer term: increased risk of heart disease

**Safety**
- Increased risk of accidental injury to the public  
  (comparable to similar construction activities)

**Crime**
- Increase in 'opportunistic' crime, eg vandalism, theft on sites increase in fear of crime, psychological distress, social well being

**Local economy**
- Increase in indirect and induced employment opportunities
- Reduced access, restricted movement of goods

**Traffic**
- Increase (10-20%) in vehicle movements

**Air quality**
- Increase in N0\textsubscript{2} and PM\textsubscript{10} increase in respiratory symptoms from vulnerable groups
- Increase in deposited dust reduced quality of life, increase in respiratory symptoms from vulnerable groups

**Noise**
- Slight increase in noise levels for short duration  
  effects on communication, hypertension & cardiovascular disease, increase in annoyance/aggressive behaviour in vulnerable individuals

**Access**
- Reduced access to/from/within the affected areas reduced mobility, increased social isolation

**Health inequalities**
Health inequalities between the Merseytram area and elsewhere in Merseyside, and within the Merseytram zone may be temporarily exacerbated
**Executive Summary: Table 2  Operational Phase**

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifestyle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Travel behaviour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increase in sustainable, healthier transport modes</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>- Modal shift from bus to Tram</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>- Modal shift from car to Tram</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Some increase in cycling, walking reduced risk of developing heart disease, diabetes (type 2) obesity, fall in hypertension etc</td>
<td>++</td>
<td>Probable</td>
</tr>
<tr>
<td>- Reduction in health inequalities between Merseytram zone and elsewhere</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Mobility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increase in mobility increased access to job, education opportunities, social networks</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>- Reduction in health inequalities between Merseytram zone and elsewhere</td>
<td>--</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Low, but increased risk of accidental injury involving the tram and pedestrians, cyclists</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td>- Reductions in fear of crime associated with public transport -increased use of tram</td>
<td>Negligible</td>
<td>Probable</td>
</tr>
<tr>
<td>- Electromagnetic effects – the National Radiological Protection Board has concluded that there is no clear evidence that electromagnetic fields emanating from alternative or direct currents to which people are exposed everyday activities can give rise to adverse health effects.</td>
<td>---</td>
<td>Probable</td>
</tr>
<tr>
<td><strong>Socioeconomic environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Employment/unemployment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increase in employment opportunities (309 net FTEs) to deprived communities</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td>- Reduction in health inequalities between Merseytram zone and elsewhere</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td><strong>Local economy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Enhance local economy by increasing access to job opportunities/work</td>
<td>+</td>
<td>Speculative</td>
</tr>
<tr>
<td>- Facilitate inward investment to the area by increasing mobility of the workforce</td>
<td>Speculative</td>
<td></td>
</tr>
<tr>
<td><strong>Education/training</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Increase in access to education opportunities ‘health enhancing’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Physical environment

**Traffic/transport**
- Reductions in bus travel - Probable
- Some increase in cycling, but not in isolation of other policy initiatives + Possible
- Reduction in health inequalities between Merseytram zone and elsewhere + Possible

**Air quality**
- Marginal reduction in NO\(_2\) and PM\(_{10}\) (stabilising effect on air pollutant emissions) + Probable

**Noise**
- Reductions in noise levels, benefiting vulnerable groups in some locations. ++ Probable
- Increase in noise levels, affecting residential properties in other locations. -- Probable

**Access**
- Increased access to opportunities, goods, services at Merseytram population level, but vulnerable groups may not benefit as much + Probable
- Access to health services enhanced ++ Probable

**Services**
- Reduction in bus services - Speculative
- Maintain emergency vehicle response times + Probable

For the context and detail underpinning this impact analysis please refer to the full rapid HIA report.
5. Conclusion and proposed action

5.1. The Merseytram Line 1 Scheme represents a major development in Liverpool and Knowsley with an investment of over £234 million, £170 million from central Government and the remainder from local public and private sector bodies, as well as from EU grants. Interestingly the political momentum for increasing light rail as seen by the target in 'Transport 2010' is not reflected to the same extent in Europe. It is not clear if and how this may affect EC investment in the scheme, and the implications for the final scheme. There is generally a clear synergy between the proposal and other local and national transport plans; the phasing of these is clearly important to ensure the plans reinforce each other.

5.2. There is general support for the introduction of Merseytram, as it has the potential to meet many needs, including health needs within the Merseytram area (defined as the wards through which Merseytram will operate) and beyond. The construction phase may have some negative health impacts for both construction workers and affected communities, in spite of the extensive mitigation measures identified in the draft Code of Construction practice; however these are no greater than would be expected from similar construction projects. The operational phase is likely to have positive health impacts, contributing to improving the health status of the communities close to the alignment by the direct and indirect effects on a range of key health determinants.

5.3. Proposals for action to enhance health benefits further and reduce health risks are discussed below. Although there were isolated concerns about light rail transit systems, the level of investment, and ultimately whether this represented value for public money, it is clear from the analysis of alternative schemes (ERM, 2003, Volume 2A, Appendix E) that Merseytram represents the most suitable option.

5.4. Recommendations

Reduced employment-related health risks for construction workers:

- Consider IOSH 'Global Best Practice in Contractor Safety' guide and CONIAC/HSE 'Working Well Together' campaign best practice guide for inclusion in health and safety requirements in the Code of Construction Practice (CoCP).

- Examine feasibility of developing an exit strategy for temporary Merseytram Line 1 construction workers including skills development training.

Reduce adverse effects of Merseytram’s construction phase to communities:

- Include the development of a Merseytram Community Forum within the liaison remit of Merseytravel, eg make open to all people who live and work in the affected wards and supported by community development workers, providing a monthly forum to discuss
demolition/construction works with contractors, the Concessionaire and Merseytravel.

- Develop a Merseytram Area Agreement between contractors and affected communities detailing standards of service communities can expect (as defined in the CoCP, including safety, security, cleanliness, timing of night-time working, decision-making).

- Target additional community development support from agencies to the affected areas and particularly vulnerable groups.

- Explore options to use alternatively fuelled construction work vehicles NB Please can you explain why this action is not being explored?

**Enhance the positive and reduce the negative impacts of Merseytram’s operation:**

- Facilitate changes in travel behaviour of car users into Liverpool City Centre by examining the factors identified in section 7 paragraph 7.3.2, which includes provision of:
  
  - Safe cycle paths
  - Cycle loans
  - Better information about the effects of transport effects

- Enhance existing measures to change travel behaviour: review continental models for better integration with bus/train travel.

- Work with City Centre businesses to develop mobility plans with employees targeting people who travel to work by car and who travel within/close to the Merseytram area; review approach adopted by Mitsubishi and British Aerospace through Merseytravel’s Travelwise Team.

- Examine opportunities by which Merseytram can support access to NHS facilities for patients and staff, eg NHS 'healthy transport plans', bus/tram integrated services (ie linking of Merseytram Line 1 stops bus routes to Fazakerley hospital).

- Agree 'Blue Badge' parking relocation prior to removal of existing facilities, although this issue is primarily one for the City Centre Movement Strategy (CCMS).

**Enhance synergy between related strategies and plans**

- Examine phasing of related strategies, eg restrictions in workplace parking coinciding with the Tram's introduction.

- Consider measures that reinforce related strategies, eg concessionary Tram fares for cyclists (as well as vulnerable groups) NB Please explain why this is not being considered
Monitor and evaluate the HIA

- Support action described in section 9 which in particular defines how agreed recommendations should have been monitored and evaluated.
SECTION 1: INTRODUCTION

1.1 Background
1.1.1 IMPACT, the International Health Impact Assessment Consortium at the University of Liverpool was commissioned by Merseytravel to undertake a rapid Health Impact Assessment (HIA) of the proposed Merseytram Line 1 scheme. The brief from Merseytravel was to identify and assess the health impacts of the proposed Merseytram Line 1 scheme from existing data and also from new data from stakeholders and key informants.

This report describes the process, findings and recommendations from this HIA. It also defines proposals for the monitoring and evaluation of the HIA process and outcomes. It is supplemented by an executive summary.

1.2 Health Impact Assessment
1.2.1 It is now generally accepted that non-health care policies are key determinants of public health. This reflects evidence from the Black Report (Townsend et al, 1982), The Health Divide (Whitehead, 1987) and more recently the Independent Inquiry into Health Inequalities (Acheson et al, 1998). HIA builds on the understanding that a community's health is determined by a wide range of variable economic, environmental and psychosocial influences as well as fixed factors such as heredity and age. HIA aims to identify what potential changes in health determinants (see section 3) might result from a new policy or project, and what effects these changes might have on a defined population.

1.2.2 The elements of this approach have much in common with the established field of environmental impact assessment (EIA), and build on this methodology. However it has been recognised that impacts on human health were not an explicit concern of EIA. As such HIA methodology has been developed. The Departments of Health in England, Northern Ireland, Scotland, and Wales (eg, DoH, 1999) now recommend HIA on new policy or project developments at national and local levels. In addition the European Union advocates HIA of EC policies and actions (EC, 2002).

The HIA methodology used in the Merseytram Line 1 HIA (MT HIA) reflects the Merseyside Guidelines for HIA (Scott Samuel et al, 1998), the most well-used HIA methodology in the UK (Griffiths and Ison, 2000), which adopts a socio-environmental model of health; this will be discussed in section 3. It complements and builds on the work undertaken in the EIA of the Merseytram Line 1.

The remainder of this HIA report is set out as follows:

- Section 2 provides a summary of the Merseytram Line 1 scheme;
• Section 3 describes the methodology used in undertaking the HIA;

• Section 4 provides information on the health profile of the communities affected by Merseytram Line 1;

• Section 5 provides supporting documentary analysis;

• Section 6 describes evidence from stakeholders and key informants;

• Section 7 described the health impacts of Merseytram Line 1;

• Section 8 sets out the recommendations of the Merseytram Steering Group; and

• Section 9 considers the requirement for monitoring and evaluation of the proposed scheme.
SECTION 2: SUMMARY OF THE PROPOSED MERSEYTRAM LINE 1 SCHEME

2.1 Background and context

2.1.1 Proposals to develop a fully integrated public transport network, accessible to all and which supports economic, social and environmental regeneration were launched in the Merseyside Local Transport Plan (LTP) for 2001-2005 (Merseytravel et al, 2000). The LTP's four key objectives are to:

- “ensure that transport supports sustainable economic development and regeneration;
- moderate the upward trend in car use and secure a shift to more sustainable forms of transport such as walking, cycling and public transport;
- secure the most efficient and effective use of the existing transport network;
- enhance the quality of life for those who live, work in and visit Merseyside”.

The number one scheme for this development was the proposal for a three-line light rail transit system (Merseytram) and the delivering of Line 1.

2.2 The proposed Merseytram Line 1 scheme

2.2.1 Introduction
The following summary of the Merseytram Line 1 scheme is drawn directly from the Environmental Statement resulting from the environmental impact assessment (EIA) of the scheme (ERM, 2003).

2.2.2 Objectives
The Merseytram Line 1 scheme has the following objectives:

- To provide a high quality, segregated tram system that will attract car and other users through offering a high quality of ride, a reliable, safe and frequent service and competitive journey times.
- To develop a network that will promote sustainable, inclusive regeneration in Merseyside by enhancing public transport accessibility to the city centre, other regeneration areas and forging a sustainable link between transport and land use along Merseytram corridors.
- To promote a high level of social inclusion by connecting areas of low car ownership and high deprivation to economic opportunities and social, health and leisure facilities, and by offering a fully accessible system to the mobility impaired and those travelling with luggage and/or children.
To provide a system that integrates with the existing transport network through creating new and enhanced interchange opportunities with bus, rail, ferry, car, cycling and walking, and through providing fully integrated ticketing with other modes.

To enhance the local environment by reducing local air pollution and where practicable, noise in Liverpool city centre and in residential areas along Merseytram corridors, and improving the physical environment by adopting best practice urban design principles along the route.

2.2.3 Overview of route and alignment
Merseytram Line 1 will operate for approximately 18 km between Liverpool and Kirkby in Knowsley. The wards that the scheme will pass through include Abercromby, Everton, Smithdown, Kensington, Tuebrook, Clubmoor and Gillmoss. It then passes through a further two wards in Kirkby: Cherryfield and Kirkby Central. The Merseytram Line 1 will also run adjacent to the following wards: Anfield, Croxteth, Pirrie, Knowsley Park and Northwood. The route will operate from Pier Head and King's Dock on the waterfront through Liverpool City Centre travelling north east through mainly residential areas and terminating at Kirkby Town Centre. The scheme proposes 30 stops, including a 'Park and Ride' facility at Gillmoss. It aims to be completed by the end of 2007.

2.2.4 Approximately 90% of the route will be on street, but segregated from road traffic. However some sections will operate on land that does not form part of the highway. No existing railway track will be used.

Table 2.1 Tramway Classifications for the Merseytram Line 1 Alignment

<table>
<thead>
<tr>
<th>Tramway Classification</th>
<th>Approximate length (m)</th>
<th>Percentage of total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated on-street tramway (all vehicles)</td>
<td>290</td>
<td>1.6</td>
</tr>
<tr>
<td>Integrated on-street tramway (buses, taxis)</td>
<td>170</td>
<td>0.9</td>
</tr>
<tr>
<td>Segregated on-street tramway</td>
<td>16,330</td>
<td>89.7</td>
</tr>
<tr>
<td>Off-street tramway</td>
<td>1,410</td>
<td>7.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18,200</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

2.2.5 Service characteristics
The scheme will operate seven days a week between 0600 and 2400, Monday to Saturday, and 0700 to 2330 on Sunday. However, as stated in the ES, the movement of tram vehicles from the proposed Operations and Control Centre (OCC) at Gillmoss to the start of finish of services at Kirkby and King’s Waterfront, will be outside these times. Services may also operate outside normal hours for special events, for example on New Years Eve. An indicative service schedule has been developed, which is set out in Table 2.2 below.
### Table 2.2 Indicative Service Schedule

<table>
<thead>
<tr>
<th>Day</th>
<th>Period</th>
<th>Frequency (trams/hr) Each section</th>
<th>Frequency (trams/hr) Combined sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday - Friday</td>
<td>0600-0700</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>0700-0930</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>0930-1630</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>0000-0600</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Saturday</td>
<td>0600-0900</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>0900-1800</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1800-0000</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Sunday</td>
<td>0700-1000</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1000-1800</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1800-2330</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

2.2.6 The journey from Kirkby town centre to the Waterfront will take approximately 43 minutes via the Pier Head and around 41 minutes via Whitechapel. By bus the same journey takes around 60 minutes during the morning peak period (56 minutes at other times although there is some variation in this by route and operator), 30 minutes by train and 35 minutes in the car during the morning peak period. The maximum speed of the tram will be 70 km/hr in segregated sections of the alignment, the maximum permitted speed for other traffic in highway sections (including the proposed 20 mph zones in Liverpool City Centre) and appropriate speeds in fully pedestrianised areas. Assuming 200 passengers per vehicle and a five minute operating frequency, Merseytram will be capable of carrying 4800 passengers per hour in both directions, rising to 9600 if coupled vehicles are used. This capacity equates to between around 3700 and 7400 cars per hour, assuming average car occupancy of 1.3 persons per vehicle. Each tram will operate with a conductor in service.

2.2.7 System specification

A Design Guide (Merseytravel, 2003) has been prepared to provide minimum design standards for the infrastructure (stops, surfacing and materials, overhead lines and power supply) that the Concessionaire (Merseytram provider) must adhere to. Within the limits established by the Transport and Works Order, Merseytram will be designed in detail with reference to the base specification and standard of design, mitigation and remediation measures reflected in the Design Guide.

2.2.8 The Merseytram scheme will be fully compliant with the Disability Discrimination Act (1995). Merseytram vehicles will have low floor access, although the final design of the scheme, including the make and model of the vehicles, will be decided by the Concessionaire. The passenger capacity of tram vehicles will be approximately 200 with up to 80 seated; there will be 21 vehicles with 19 in use during peak periods. In addition to a conductor service, there will be on-board CCTV to evidential standards, an information system displaying next stop information and, possibly, interchange and connecting service information.
2.2.9 At stops, platforms will be integrated with surrounding footpaths wherever possible, and will be well lit. It is envisaged that stops will include contain a passenger shelter, service equipment room, seating, litter bins, CCTV, real time information, local maps and a help point. Secure cycle parking will be provided at some stops as will ticket machines. Where the stop is a transport interchange the standard stop design may be enhanced. Similarly the stop design will complement conservation area and contemporary architecture needs. The detailed design of stops, including the facilities to be provided, will be subject to agreement with Liverpool City Council and Knowsley Metropolitan Borough Council.

2.2.10 The tram vehicles will be powered by current from overhead line equipment (OLE) cables supplied from 8 substations adjacent to the alignment. In Liverpool city centre, building fixings will be used to support the OLE in preference to poles wherever possible, as recommended by the Commission for the Built Environment (CABE) (Royal Fine Art Commission - now CABE, 1999). Elsewhere, the OLE will be supported by poles. A ninth substation will be positioned at the proposed OCC based at Gillmoss, off East Lancashire Road.

2.2.11 The Park & Ride facility will also be based at Gillmoss. The facility will have around 750 car parking places, including disabled parking next to the Croxteth stop. The Park & Ride facility is to encourage car users to transfer from car to tram before they reach the city centre.

2.2.12 Construction
Construction is expected to last for approximately two to 2.5 years. A Code of Construction Practice (CoCP) has been developed. In addition to track construction, associated highway works, construction of the OLE and substations and stop equipment rooms, the detailed activities are described in the ES, but can be summarised as follows:
<table>
<thead>
<tr>
<th>SECTION OF THE LINE 1 ALIGNMENT</th>
<th>DEMOLITION</th>
<th>CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kings Dock - Pier Head</td>
<td>Retail Kiosk on Mann Island</td>
<td>Bridge over Duke's Dock Bridge over Salthouse Dock 2 Stops: Kings Waterfront, Albert Dock</td>
</tr>
<tr>
<td>Pier Head - Old Haymarket via Dale Street</td>
<td>Churchill Way (South) flyover</td>
<td>4 Stops: Pier Head (on Mann Island), Water St. (India Buildings), Dale St. (Moorfields Station), William Brown St.</td>
</tr>
<tr>
<td>Canning Place - Lime St./St. George's Place via Whitechapel</td>
<td>None</td>
<td>3 Stops: Paradise St. (may be moved to canning Place), Whitechapel, St. John's Place</td>
</tr>
<tr>
<td>Lime Street - Prescot St./Daulby Street</td>
<td>Several properties on the north side of the highway.</td>
<td>3 Stops: Lime St. (St. George's Hall), London Rd., Prescot St.</td>
</tr>
<tr>
<td>Daulby Street - West Derby Rd./Everton Rd.</td>
<td>Gregson's Well public house</td>
<td></td>
</tr>
<tr>
<td>Everton Rd. - Sheil Rd.</td>
<td>Several properties, including petrol station, shops, public houses.</td>
<td>2 Stops: Caird St., Boundary Lane</td>
</tr>
<tr>
<td>Sheil Rd. - Green Lane</td>
<td>None</td>
<td>2 Stops: Sheil Rd., Tuebrook</td>
</tr>
<tr>
<td>Green Lane - Utting Ave./Broadway</td>
<td>None</td>
<td>3 Stops: Lisburn Lane, Clubmoor, Townsend Ave. Raise bridge at Broadway</td>
</tr>
<tr>
<td>Broadway - Lower House Lane</td>
<td>None</td>
<td>3 Stops: Broadway, Lewisham Rd., Lower House Lane</td>
</tr>
<tr>
<td>Lower House Lane - East Lancs. Rd.</td>
<td>Residential properties and public house</td>
<td>New access if Stonebridge Cross development fails 2 Stops: Parkstile Rd., Stonebridge Lane</td>
</tr>
<tr>
<td>East Lancs. Rd. - Moorgate Lane/Ribbler's Lane</td>
<td>Existing electricity substation</td>
<td>Replacement electricity substation OCC and Park &amp; Ride at Gillmoss New bridges across River Alt and Croxteth Brook Replacement of existing bridge over Knowsley Brook. 2 Stops: East Lancashire Road (Croxteth), Walton Hall Farm</td>
</tr>
<tr>
<td>Ribbler's Lane - Broad</td>
<td>None</td>
<td>Bus/train interchange at Broad</td>
</tr>
</tbody>
</table>
2.2.13 The normal working hours for construction works will be 0800 to 1800, Monday to Friday, and 0800 to 1300 on Saturdays, with no working on Sunday or Bank Holidays. There will be the need to do some work outside normal hours, for example where work to the highway is required. However, this will be for a few nights only. In addition to the OCC, park and ride facility, bridge, and stop construction work summarised in the above table, it will also include track, OLE supports and junction construction. Some statutory undertakers’ equipment will also need to be relocated, the diversionary routes for which are currently being developed.

2.2.14 Environmental Impacts

The environmental impacts of the proposed Merseytram Line 1 scheme are summarised in the Non-Technical Summary, which forms part of the Environmental Statement (ES) (ERM, 2003).

Merseytram Line 1 will provide significant socio-economic benefits to areas surrounding the proposed alignment. These are some of the most deprived areas in England and have a higher than average unemployment and poor access to public transport. The construction and operation phases of the scheme are expected to promote positive economic benefits through the creation of employment opportunities for the immediate area. The scheme will aid urban regeneration in the areas it serves by encouraging investment and raising the image of the area. Improved accessibility to shopping facilities, cultural and historic sites, educational and health facilities are also benefits of the Merseytram Line 1 scheme.

There is predicted to be a small improvement in air quality as a result of the operation of the scheme in conjunction with other traffic management measures implemented in Liverpool City Centre. The main benefit of these measures will be that a small number of roads and properties will experience significant improvements in air quality. There will also be a marginal decrease in the number of roads where the roadside pollutant concentrations exceed relevant objectives. In terms of regional and global air quality, the scheme will induce a decrease in emissions of carbon dioxide (CO$_2$) through a reduction in the number of vehicle kilometres travelled on the road network. However, this will be offset by the increase in CO$_2$ emissions resulting from the generation of electricity required to power Merseytram.

The proposed Merseytram Line 1 scheme will alter the townscape if Liverpool and Kirkby and the visual experience of the local roads and
spaces through which the route passes. Historically, trams were a key aspect of the Merseyside townscape and the proposed scheme has the potential to give rise to significant improvements in townscape quality. The degree of improvement will vary along the route and the effects will also vary in significance, with changes occurring in several sensitive townscales including the heart of the nominated World Heritage Site.

However, the overall townscape and visual effects of the scheme will be positive, improving the streetscapes of several major roads in Merseyside. Significant amounts of tree and shrub planting along streets will occur and high quality paving and hard landscaping will be incorporated into the final design of the scheme.

The construction of the scheme will result in the loss of some habitats that are of importance in the local and urban context. Over time, and with suitable management, the landscape planting will provide replacement habitat, likely to contribute positively to the overall biodiversity of the area.

As with all schemes of this nature there will inevitably be some short-term adverse effects during construction activities. However, with the implementation of mitigation measures, significant effects could be avoided during track laying and enabling works at properties more than 15 m away from the proposed alignment. However, where sensitive receptors are located within 15 m of the work areas, residual effects may occur during normal daytime working hours, albeit for limited periods of time at any particular receptor.

Night-time working is expected at six locations. Even with mitigation significant night-time residual impacts are predicted at these locations, generally lasting for a few nights only.

In terms of operational noise, the addition of Merseytram is predicted to increase ambient noise levels noticeably in several areas. Significant noise effects are expected at receptors at King’s Dock, Brunswick Road, Old Farm Road and at residential properties on Stonebridge Lane. In almost all cases the potential for adverse noise effects is greatest during the night-time periods at the start and end of the day.

During the construction of the scheme occupiers of properties located adjacent to the alignment will experience temporary disruption. Residential amenity along the proposed alignment will also be subject to a number of effects, which when considered cumulatively may reduce the amenity value that is currently experienced by the residential population. However, these effects will be temporary in nature.
2.2.15 Financial requirements
The Merseytram Line 1 development will cost approximately £228.6
million (including purchase of tram vehicles). The UK government will
provide £170 million, and the remainder will come from local public and
private sector resources (including European grants).

The following table (taken from the Merseytram website) summarises the
cost estimates.

| Table 2.4 Merseytram Line 1 costs |
|-------------------------------|-----------------------------|
| A. General Costs              | Amount (£)                  |
| Subtotal                      | 43,647,000                  |
|                              |                             |
| B. Transport Systems Costs    |                             |
| Subtotal                      | 228,663,000                 |
|                              |                             |
| C. Other Costs (Funded From Other Sources) |         |
| Subtotal                      | 5,640,000                   |
|                              |                             |
| Grand total                   | 234,303,000                 |
SECTION 3: METHODS

3.1 **Introduction**

3.1.1 This section describes the methods used to collect and analyse the primary and secondary data used in this rapid HIA. The total time designated to this was 59 days and was reflected in the scope of the HIA; this was to ensure a timely delivery of the HIA report for submission with the ES to the Secretary of State. It describes the process by which the views, opinions and beliefs of local communities alongside Merseytram Line 1 were collected. These methods were underpinned by IMPACT's values:

- **Participation**: involving people in decisions that affect their lives is fundamental to good health
- **Equity**: fairness and justice are essential in working to reduce inequities in health experience
- **Power sharing**: by working towards a more equitable balance of power in our communities we can improve health
- **Meaningful process**: engaging in empowering processes with people and communities will have a beneficial effect on their wellbeing
- **Integrity**: we have to demonstrate our accountability to all those with whom we work, based on openness, honesty and mutual respect

3.2 **Research design**

3.2.1 The methods and procedures used in the HIA broadly reflected the Merseyside Guidelines HIA methodology. This is summarised in table 3.1 below.

<table>
<thead>
<tr>
<th><strong>Table 3.1</strong> Merseyside Guidelines Methods and Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIA procedures</td>
</tr>
<tr>
<td>Establish a Steering Group and Terms of Reference</td>
</tr>
<tr>
<td>Carry out the health impact assessment</td>
</tr>
<tr>
<td>Negotiate the favoured option(s)</td>
</tr>
<tr>
<td>Monitor and evaluate</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
3.2.2 Social model of health
At every stage of life, health is determined by complex interactions between social and economic factors, the physical environment and individual behaviour. Factors such as housing, income, employment, where you live, the range of services you have access to such as schools, shops etc., influence the degree of health, wellbeing and quality of life achievable by individuals and communities. These factors are referred to as 'determinants of health' (Black, 1980; Acheson, 1998; Whitehead et al, 2000). 'Determinants of determinants' refer to those factors that affect determinants, eg speed is a determinant of the incidence of road traffic accidents (RTAs), which in turn affects the severity of injuries from RTAs. HIA uses a socio-environmental model of health (Dahlgren & Whitehead, 1991) to encompass these broader determinants to gain a clearer picture as to how a project such as Merseytram may impact upon health.

3.3 Establishing a steering group
3.3.1 An important influence in planning to undertake a HIA is the success or otherwise, in engaging and maintaining commitment of key stakeholders to the process and outcome of the assessment. It is important to have a steering group comprising of key stakeholders with a range of expertise and perspectives that can also 'open doors' and ensure the outcomes of the HIA are acted upon. A partnership approach is more likely to facilitate ownership and develop a more realistic understanding of what can and cannot be achieved when reviewing any recommendations for changing a policy, programme or project. However because of the time constraints for this HIA, a formal HIA Steering Group was not established; instead informal regular meetings were convened between the commissioner's lead HIA officer and the HIA project co-ordinator.

3.4 Data collection
3.4.1 Documentary analysis
The documentary audit and analysis normally draws on four document sources:

- The policy proposals and supporting documentation - in this case the ES of the Merseytram Line 1 scheme proposals was initially analysed; supporting documents subsequently reviewed included the Code of Construction Practice, the Design Guide and the findings from the Merseytram consultation exercise
- Official policy documents at international, national and local level related to the main proposed outcomes of the Merseytram Line 1 scheme
- Evidence of the social, economic, political, cultural scientific context of the policy
- Evidence from the literature defining the relationship between policy interventions, the effects on health determinant and health outcomes, and 'determinants of determinants' - in this case a literature search was undertaken to establish the evidence-base associated between the introduction of similar light rail interventions and the effects on health determinants
The audit involves document and literature searches followed by their systematic qualitative and quantitative analysis in order to identify:

- the rationale, context and strategies of the policy
- the targeted populations and sub-populations who are affected, positively or negatively, by the policy
- key informant and stakeholder sample groups
- the health determinants affected and if known the magnitude of the effects
- health promotion opportunities
- the impacts of the proposed policy on other policies and vice versa
- the results from output evaluations of other similar policies

The time allocated was 9 days.

3.4.2 Health and demographic profile
Existing data was collected from a variety of different sources to define the baseline position of the following data categories:

- Populations, eg EU, member state, population sub-groups
- Health status, eg mortality rates, perceived health & well being
- Health Determinants, eg personal circumstances and lifestyles, socio-economic environment, physical environment, physical & social infrastructure,
- 'Determinants of determinants'

The data for the HIA profile was cross-referenced with the baseline data in the ES.

Data sources included: aggregated datasets of routinely collated information held by the North West Public Health Observatory (NWPHO) at different levels (health authority, local authority and PCT), Merseyside Information Services (MIS) and the Office for National Statistics (ONS). This enabled a contextualised exploration of health along the Merseytram Line 1 alignment.

The time allocated was 4 days.

3.4.3 Stakeholder and key informants
The purpose of participatory, qualitative approaches is to gather evidence from the experience, knowledge, opinions and perceptions of populations affected by the policy (stakeholders) and people with expert knowledge (key informants). This evidence:

- provides a more in-depth picture of the range of health determinants effected by the policy
- provides a detailed understanding of how they think this impacts on health outcomes and why
- contributes to prioritisation of impacts
- provides a valuable perspective on health inequalities
- contributes to a robust HIA process by using triangulation (multiple methods)
- supports better policy-making
Purposive (non-random sampling of groups of people with particular characteristics), snowballing ('referrals' from initial sample group) and convenience (sampling of subjects who are easy to recruit) sampling methods were used to generate the community and organisational stakeholder groups once the sectors most likely to effect, and be affected by, the Merseytram scheme proposals had been confirmed. Representatives from the groups and organisations listed in table 3.2 were invited to participate.

**Table 3.2  Stakeholder and Key Informant Groups invited to participate in the HIA**

<table>
<thead>
<tr>
<th>Stakeholder/Key Informant Category</th>
<th>Stakeholder/Key Informant Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisational stakeholder - health</td>
<td>Respiratory Medicine Consultant</td>
</tr>
<tr>
<td></td>
<td>General Practitioner with Special Interest (respiratory medicine)</td>
</tr>
<tr>
<td></td>
<td>Director of Public Health</td>
</tr>
<tr>
<td>Organisational stakeholder - economic development/regeneration</td>
<td>Liverpool 1 Partnership</td>
</tr>
<tr>
<td>Organisational stakeholder - policy proponents</td>
<td>Merseytravel</td>
</tr>
<tr>
<td></td>
<td>Liverpool City Council</td>
</tr>
<tr>
<td>Organisational stakeholder - public transport provider</td>
<td>Arriva</td>
</tr>
<tr>
<td>Organisational stakeholder - air quality</td>
<td>Knowsley MBC</td>
</tr>
<tr>
<td>Community stakeholder - adult (special interest - health)</td>
<td>Cardiac rehabilitation group</td>
</tr>
<tr>
<td></td>
<td>Breathe Easy group</td>
</tr>
<tr>
<td></td>
<td>Kirkby Health Forum</td>
</tr>
<tr>
<td>Community stakeholder - adult (special interest - disabilities)</td>
<td>People with Disabilities</td>
</tr>
<tr>
<td>Community stakeholder - adult (older people)</td>
<td>Age Concern</td>
</tr>
<tr>
<td>Community stakeholder - adult (employed people)</td>
<td>Via Unions</td>
</tr>
<tr>
<td>Community stakeholder - adult (unemployed people)</td>
<td>Kirkby unemployed centre</td>
</tr>
<tr>
<td>Community stakeholder - adult (Black and Minority Ethnic groups)</td>
<td></td>
</tr>
<tr>
<td>Community stakeholder - adult (residents along Line 1)</td>
<td>Tenants and residents associations</td>
</tr>
<tr>
<td>Community stakeholder - women &amp; young children</td>
<td>Sure Start</td>
</tr>
<tr>
<td>Community stakeholder - children &amp; young people</td>
<td>Year 6 students</td>
</tr>
<tr>
<td></td>
<td>Year 9 students</td>
</tr>
<tr>
<td></td>
<td>Liverpool University students</td>
</tr>
<tr>
<td>Community stakeholder - policy makers</td>
<td>Ward councillors</td>
</tr>
<tr>
<td>Key informants</td>
<td>Transport</td>
</tr>
<tr>
<td></td>
<td>Transport &amp; health</td>
</tr>
</tbody>
</table>

Data collection methods from community and organisational stakeholders consisted of:

- Focus groups
- One to one semi-structured interviews
• Observation notes and written submissions

3.4.4 Stakeholder engagement process
• Existing networks and naturally occurring groups were identified by the assessors either from their own knowledge or via local community workers
• Organisational stakeholders and key informants were also identified by the assessors
• Initial contact was made by telephone
• Confirmation of the interview or focus group was made in writing
• Details of the HIA, a summary of the Merseytram proposals, interview conditions and the question themes for the interview or focus group were circulated with the confirmation letter
• Consent forms were completed by interviewees (or their parents for minors) agreeing that anonymous data from the interviews could be contained within the HIA
• Expenses were reimbursed

3.4.5 Development of question guides
The HIA research team developed two question guides: one for community stakeholders and one for organisational stakeholders and key informants. Each was designed with a number of themes (table 3.3), which started with broad open questions and then focused down to more specific questions. The schedules can be found in appendix 3. Table 3.3 summarises the key themes used for community and organisational groups and individuals.
### Table 3.3 Themes for workshops and focus groups

<table>
<thead>
<tr>
<th>Theme</th>
<th>Community Stakeholders</th>
<th>Organisational Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEME 1</td>
<td>What is health?</td>
<td>What is your role?</td>
</tr>
<tr>
<td>THEME 2</td>
<td>What is it like where you live?</td>
<td>Perspectives on living and working in Liverpool or Knowsley.</td>
</tr>
<tr>
<td></td>
<td>NB Not key informants</td>
<td></td>
</tr>
<tr>
<td>THEME 3</td>
<td>What is the health &amp; well being of people like?</td>
<td>Perspectives on health &amp; well being in Liverpool or Knowsley.</td>
</tr>
<tr>
<td></td>
<td>NB Not key informants</td>
<td></td>
</tr>
<tr>
<td>THEME 4</td>
<td>What are your views about the Merseytram Line 1 proposals?</td>
<td>Perspectives on the Merseytram Line 1 proposals.</td>
</tr>
<tr>
<td>THEME 5</td>
<td>What and how may the Merseytram Line 1 proposals affect the health and well being of people who live and work along the alignment?</td>
<td>What and how may the Merseytram Line 1 proposals affect the health and well being of people who live and work along the alignment?</td>
</tr>
</tbody>
</table>

#### Transcription and data analysis

As soon as possible after each focus group and interview the facilitator wrote down their broad impressions about how the group process worked and any limitations or procedural variations they were aware of. Notes that were taken during the focus group were written up in full. Small focus groups, organisational and key informant interviews were tape recorded and transcribed verbatim. Qualitative data was coded according to the themes generated, and analysed systematically for similarities and differences (Knodel, 1993; Robson, 1996). All evidence was anonymised.

The time allocated for the tasks identified in 3.4.3-3.4.6 was 27 days.

#### 3.5 Impact Analysis

3.5.1 Impact analysis involves assembling evidence of impacts from the different data sources, qualitative and quantitative, and defining:
- Health impacts - the health determinants affected and the subsequent effect on health outcomes
- Direction of change - indicates a health gain (+) or loss (-)
- Scale - severity of the impact (mortality, morbidity/injury and well being) and the size/proportion of the population affected (high, medium, low)

<table>
<thead>
<tr>
<th>Severity/population proportion</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>---- or +++</td>
<td>--- or +++</td>
<td>-- or ++</td>
</tr>
<tr>
<td>Illness/injury</td>
<td>--- or +++</td>
<td>-- or ++</td>
<td>- or +</td>
</tr>
<tr>
<td>Well being</td>
<td>-- or +</td>
<td>- or +</td>
<td>negligible</td>
</tr>
</tbody>
</table>
• Likelihood of impact - definite (retrospective HIA only), probable, possible or speculative, based on the strength of evidence (e.g. evidence from systematic reviews or meta analyses) and number of sources (e.g. literature, stakeholders/key informants, documents)
• Latency - when the impact will occur - immediate, short, medium or long term

This should include an analysis at population and sub-population levels to consider the implications for health inequalities.

3.6 Limitations to the study
3.6.1 For this study, the timing of the fieldwork immediately after the publication of the Environmental Statement (ES) and engaging particular stakeholder groups and individuals proved difficult. In addition the availability of and access to a wider range of routine health and health service data at ward level was an issue; either these data were not available at ward level or could not be delivered by the Primary Care Trust (PCT) within the required timescales. The timing of the fieldwork also affected the sensitivity of the questions as these had to be prepared within a few days of receipt of the completed ES. Other threats to reliability and validity have been minimised by a robust research design including the use of multiple methods.
SECTION 4: HEALTH PROFILE OF COMMUNITIES MOST AFFECTED BY THE MERSEYTRAM LINE 1 SCHEME

4.1 Introduction

4.1.1 The impact of Merseytram is likely to be experienced across Merseyside. However, this health profile presents data on the communities local to the area immediately surrounding the Merseytram Line 1 alignment and stops. The health profile seeks to contribute to the general profile of the Merseytram route through identifying, retrieving and analysing routinely collected socio-economic and health data, complimenting the baseline data collected as part of the EIA.

4.1.2 The Merseytram Line 1 alignment passes through the following seven wards in Liverpool: Abercromby, Everton, Smithdown, Kensington, Tuebrook, Clubmoor and Gillmoss. It then passes through a further two wards in Kirkby: Cherryfield and Kirkby Central. The Merseytram Line 1 will also run adjacent to the following wards: Anfield, Croxteth, Pirrie, Knowsley Park and Northwood.

Briefly, this reflects the rapid HIA specification, but also what epidemiological data and models may be available. With a comprehensive HIA, such as the Foresight Vehicle HIA, models are used to forecast changes in health status more precisely. Rapid HIAs such as this one DO assess potential changes in health status, but in general terms and by examining eg, the reductions in disease risk factors.

4.2 Methodology and Source Materials

4.2.1 This health profile has been produced using a range of source materials. Merseyside Information Services (MIS) have provided a significant amount of ward-related health and illness data, largely pertaining to Standardised Mortality Ratios (SMRs). Further socio-economic data, at ward level, has been accessed from the 2001 census provided online by the Office for National Statistics (see www.neighbourhood.statistics.gov.uk).

4.2.2 This health profile seeks to compare the health experiences of those communities residing within the nine wards through which the Merseytram Line 1 will pass (see above). However, in order to provide contextual analysis to this exercise, this profile will compare socio-economic, health and travel behaviour indicators for the ward average value in relation to:

- Liverpool City Council
- Knowsley Metropolitan Borough Council
- Merseyside
- North West Region
- England
4.3 Small Area Statistics: Explanatory Note on ‘Merseytram Average’

4.3.1 It should be emphasised that ward-level statistics are concerned with small populations, and it is important to bear this in mind when considering the analysis. Nonetheless, undertaking small area analysis enables the exploration of demographic differences between areas having small populations with surrounding areas having comparatively larger populations, as well as between wards.

By combining the total values / percentages of each ward, it is possible to compute an average ward / percentage for all 9 wards. This ‘Merseytram Average’ statistic appears in all the tables and charts within this community profile. Given that it is based upon over 47,000 households, it enables a more robust comparison that is less skewed by the small population sizes of each individual ward.

4.4 Strategic Investment Areas (SIAs) and Pathways Areas

4.4.1 The 2000/06 EU Objective Programme identifies five areas within Merseyside as priorities for infrastructure investment to facilitate economic growth. These are known as Strategic Investment Areas (SIAs). Merseytram Line 1 will pass through two of these SIAs. These are Liverpool city centre and Kirkby/Gillmoss.

The Merseytram alignment also passes through or adjacent to seven Pathways Areas, including Duke Street/Cornwallis, Parks, North Liverpool, Stanley, Queens, A580 Partnership and Kirkby. ‘Pathways’ is a package of economic and social support targeted on key communities in Merseyside to develop opportunities for education, vocational training and employment for the residents of communities.

The majority of the proposed alignment is located within a Pathway Area or SIA. These have been targeted because of the recognition of the difficult social and economic circumstances concentrated in these areas.

4.5 Population: Age Structure

4.4.1 Table 4.1 shows the percentage of residents within some of the younger age ranges. It shows that the age structure amongst the younger residents of the Merseytram zone (those wards through which Merseytram Line 1 passes) is broadly in concordance with the wider picture for England, the North West Region and Merseyside.
### Table 4.1 Younger Age Groups

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>Percent aged 0-4</th>
<th>Percent aged 5-7</th>
<th>Percent aged 8-9</th>
<th>Percent aged 10-14</th>
<th>Percent aged 18-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>49,138,831</td>
<td>6.0</td>
<td>3.7</td>
<td>2.6</td>
<td>6.6</td>
<td>2.4</td>
</tr>
<tr>
<td>North West</td>
<td>6,729,764</td>
<td>5.9</td>
<td>3.8</td>
<td>2.7</td>
<td>6.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Merseyside</td>
<td>1,362,026</td>
<td>5.6</td>
<td>3.7</td>
<td>2.7</td>
<td>7.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Knowsley</td>
<td>150,459</td>
<td>6.3</td>
<td>4.2</td>
<td>3.1</td>
<td>7.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Liverpool</td>
<td>439,473</td>
<td>5.6</td>
<td>3.5</td>
<td>2.6</td>
<td>7.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Cherryfield</td>
<td>5,823</td>
<td>5.7</td>
<td>4.0</td>
<td>2.7</td>
<td>8.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Kirkby Central</td>
<td>6,258</td>
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<td>3.8</td>
<td>3.3</td>
<td>8.8</td>
<td>3.5</td>
</tr>
<tr>
<td>Abercromby</td>
<td>11,473</td>
<td>3.6</td>
<td>1.8</td>
<td>1.3</td>
<td>3.8</td>
<td>8.4</td>
</tr>
<tr>
<td>Clubmoor</td>
<td>13,387</td>
<td>6.1</td>
<td>4.0</td>
<td>3.4</td>
<td>8.7</td>
<td>2.7</td>
</tr>
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<td>Everton</td>
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<td>2.9</td>
<td>2.0</td>
<td>5.6</td>
<td>10.2</td>
</tr>
<tr>
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<td>4.1</td>
<td>3.0</td>
<td>7.4</td>
<td>2.4</td>
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<td>2.3</td>
<td>6.9</td>
<td>2.9</td>
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<tr>
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<td>2.6</td>
</tr>
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<td><strong>3.4</strong></td>
<td><strong>2.5</strong></td>
<td><strong>7.1</strong></td>
<td><strong>4.7</strong></td>
</tr>
</tbody>
</table>
4.4.2 Table 4.2 considers the older age groups. It is noted that the proportion of young adults in the 20-24 age range in the Merseytram zone (10.5%) is considerably greater than the average for England and the North West, although this is largely due to Abercromby (23.4%) and Smithdown (16.6%) having fairly large populations within this age range this is due to the University student population. In relation to the older retired population, there are slightly smaller proportions of elderly people in the Merseytram zone in comparison with larger geographical areas. The mean age of the Merseytram zone is approximately three years younger than the average for England.

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>Percent aged 20-24</th>
<th>Percent aged 65-74</th>
<th>Percent aged 75-84</th>
<th>Percent aged 85-89</th>
<th>Mean age of population</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>49,138,831</td>
<td>6.0</td>
<td>8.3</td>
<td>5.6</td>
<td>1.3</td>
<td>38.6</td>
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<td>North West</td>
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<td>150,459</td>
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<td>4.6</td>
<td>0.8</td>
<td>37.0</td>
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<tr>
<td>Liverpool</td>
<td>439,473</td>
<td>8.4</td>
<td>8.6</td>
<td>5.1</td>
<td>1.1</td>
<td>37.4</td>
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<tr>
<td>Cherryfield</td>
<td>5823</td>
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<td>10.0</td>
<td>7.2</td>
<td>0.9</td>
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<td>Kirkby Central</td>
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<tr>
<td>Abercromby</td>
<td>11,473</td>
<td>23.4</td>
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<td>33.2</td>
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<tr>
<td>Clubmoor</td>
<td>13,387</td>
<td>6.0</td>
<td>10.2</td>
<td>5.6</td>
<td>1.0</td>
<td>37.4</td>
</tr>
<tr>
<td>Everton</td>
<td>7,398</td>
<td>14.2</td>
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<td>34.1</td>
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<tr>
<td>Gillmoss</td>
<td>18,665</td>
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<td>7.0</td>
<td>4.3</td>
<td>0.8</td>
<td>35.3</td>
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<td>4.2</td>
<td>1.0</td>
<td>36.2</td>
</tr>
<tr>
<td>Smithdown</td>
<td>10,757</td>
<td>16.6</td>
<td>7.1</td>
<td>3.4</td>
<td>0.8</td>
<td>34.2</td>
</tr>
<tr>
<td>Tuebrook</td>
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<td>7.0</td>
<td>7.5</td>
<td>3.9</td>
<td>0.7</td>
<td>36.1</td>
</tr>
<tr>
<td><strong>Merseytram Average</strong></td>
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<td><strong>8.0</strong></td>
<td><strong>4.5</strong></td>
<td><strong>0.8</strong></td>
<td><strong>35.7</strong></td>
</tr>
</tbody>
</table>

4.5 Ethnicity: Black and Minority Ethnic (BME) Groups

4.5.1 There is a great deal of epidemiological evidence to show that people from black and minority ethnic groups tend to enjoy fewer health and socio-economic benefits than the majority white population. The following analysis considers both the proportions of BME groups within Merseytram zone, as well as the proportion of residents born within another country.

4.5.2 The data (see Appendix 4) indicates that minority ethnic groups comprise a very small proportion of the combined Merseytram populations, with only the ‘White: British’ population (93.3%) being greater than the average for England (91%). However, across Merseyside as a whole, there are extremely small minority ethnic communities that are located within specific wards.

4.5.3 Smithdown (5.1%), Abercromby (6.3%) and Kensington (3.2%), for example, have resident Chinese populations that are significantly greater than the average for the North West Region, Liverpool or Knowsley. Similarly Abercromby (3.4%) and Kensington (2.4%) have resident black
populations which are greater than those existing within local population groups.

4.5.4 However, the two Kirkby wards (Cherryfield and Kirkby Central) have smaller minority ethnic communities in comparison with the Merseytram average statistic, and this is indicative of the greater ethnic communities within Liverpool, especially within the wards of Abercromby, Kensington and Smithdown.

4.6 Socio-Economic Groups by Occupation

4.6.1 The proportion of residents within different socio-economic groupings is often a useful guide as to relative wealth and deprivation. The data (appendix 4) illustrates the percentages of residents across England, North West, Merseyside, Liverpool, Knowsley and the Merseytram zones, as well as the average for these wards, within different occupational socio-economic groupings.

4.6.2 Residents of the Merseytram zone are much less likely to be in higher managerial occupations (1.2%) in comparison with the average for England (3.5%) or the North West Region (2.9%). Similarly the local authority districts of Liverpool and Knowsley have slightly higher levels of their residents in such managerial posts. This pattern can also be seen in relation to lower managerial posts: the Merseytram zone has a much lower proportion of residents working in lower managerial posts in comparison with the Merseyside average (15.5%), as well as the average for both local authorities: Liverpool (13.5%) and Knowsley (12.6%). However, at a ward level, Gillmoss and Tuebrook have levels of lower managerial occupation that are more in line with the average for the North West Region (16.8%).

4.6.3 A large proportion of the Merseytram zone has never worked (8.2%), being nearly three times the average for England (2.7%). There are pockets of high unemployment at ward level that is in excess of the Merseytram zone average: Smithdown and Kirkby Central (10.2% for both wards)
4.7 Economic Activity

4.7.1 There are marked differences between the levels of economic activity in the Merseytram zone and larger geographical areas, as well as within the zone itself (table 4.3). Full-time employment within the zone (26.8%) is much less than the average for England (40.8%), the North West Region (38.8%) and also across Merseyside (34.8%). However, there are two wards in which full-time employment is in excess of 30%: Gillmoss and Tuebrook. Smithdown has an extremely low level of full-time employment: (19.6%).

4.7.2 Part-time employment is also lower within the zone (8.3%) than the average for England, the North West Region and both local authority areas. Abercromby and Everton have levels of part-time employment below 6%, whilst Clubmoor, Gillmoss and Tuebrook have levels that are in excess of 10%.

4.7.3 The rate of unemployment across the Merseytram zone (7.1%) is virtually twice as high as the average for the North West Region. The highest level of unemployment, at ward level, is located in Clubmoor and Kensington.

4.7.4 On average, the Merseytram zone has a permanently sick or disabled population (13.7%) which is far in excess of the North West Regional average (7.7%). The wards having the highest rates of permanent sickness or disability are located in Kirkby: Cherryfield (16.3%) and Kirkby Central (15.8%).
<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage aged 16-74: part-time employed</th>
<th>Percentage aged 16-74: full time employed</th>
<th>Percentage aged 16-74: unemployed</th>
<th>Percentage aged 16-74: permanently sick / disabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>11.8</td>
<td>40.8</td>
<td>3.3</td>
<td>5.3</td>
</tr>
<tr>
<td>North West</td>
<td>11.9</td>
<td>38.8</td>
<td>3.6</td>
<td>7.7</td>
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<tr>
<td>Merseyside</td>
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<td>10.0</td>
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<tr>
<td>Knowsley</td>
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<td>33.9</td>
<td>5.9</td>
<td>12.1</td>
</tr>
<tr>
<td>Liverpool</td>
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<td>31.5</td>
<td>6.0</td>
<td>11.4</td>
</tr>
<tr>
<td>Cherryfield</td>
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<td>27.5</td>
<td>7.6</td>
<td>16.3</td>
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<td>Kirkby Central</td>
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<td>27.1</td>
<td>7.6</td>
<td>15.8</td>
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<td>9.7</td>
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<tr>
<td>Clubmoor</td>
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<td>14.2</td>
</tr>
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<td>22.3</td>
<td>6.0</td>
<td>14.9</td>
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<td>Gillmoss</td>
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<td>11.0</td>
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<td>8.3</td>
<td>15.5</td>
</tr>
<tr>
<td>Smithdown</td>
<td>6.3</td>
<td>19.6</td>
<td>6.8</td>
<td>13.6</td>
</tr>
<tr>
<td>Tuebrook</td>
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<td>32.4</td>
<td>7.7</td>
<td>12.7</td>
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<td><strong>26.8</strong></td>
<td><strong>7.1</strong></td>
<td><strong>13.6</strong></td>
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</table>
4.8 Households with Limiting Long Term Illness

4.8.1 Table 4.4 indicates both greater levels of poverty, as well as limiting long-term illness, within the Merseytram zone in comparison with larger geographical areas. The percentage of households with dependant children and without any adults in employment (13.1%) is well over twice the North West regional and national rate. Within the Merseytram zone, there is a high degree of disparity, with particular wards (ie Kirkby Central, Clubmoor and Cherryfield) having high rates of unemployment. Given that these households contain dependent children emphasises the degree of family poverty.

4.8.2 England’s ageing population is illustrated by the fact that roughly a third of households contain one of more people with a limiting long-term illness. There are higher rates for both the North West and Merseyside respectively. However, within the Merseytram zone, virtually half of all households (47.4%) are of this type. More than half of both Kirkby wards contain households where one or more people has a limiting long-term illness, and this is also true of the Clubmoor ward.

Table 4.4 Households with Limiting Long Term Illness

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of Households</th>
<th>Percentage of Households with no adults in employment (with dependent children)</th>
<th>Percentage of Households with no adults in employment (without dependent children)</th>
<th>Percentage of Households with one or more person having a limiting long-term illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>20,451,427</td>
<td>4.8</td>
<td>30.9</td>
<td>33.6</td>
</tr>
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<td>North West</td>
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<tr>
<td>Clubmoor</td>
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<td>16.8</td>
<td>40.4</td>
<td>53.2</td>
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</tr>
<tr>
<td>Smithdown</td>
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<td>47.8</td>
<td>46.8</td>
</tr>
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<td>Tuebrook</td>
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<td><strong>41.6</strong></td>
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</table>
4.8.3 Residents claiming Incapacity Benefit
Exploring the proportion of residents that are claiming incapacity benefit is a useful guide to the relative level of disability and social exclusion within a population. It is particularly useful when considered in conjunction with data presented by the Index of Multiple Deprivation (see Table 4.8). The following table indicates some marked differences, both in terms of the North West’s experience when compared to the England average, and also at ward level.

4.8.4 The proportion of people claiming incapacity benefit is much higher in the North West (5.8%) in comparison with the average for England (3.7%). Nonetheless, there are roughly 2% more people across Merseyside claiming incapacity benefit in comparison with the North West statistic, and the proportion of people claiming is greater still within Liverpool and Knowsley.

4.8.5 At the ward level, there are highly marked differences. Kensington, for example, has a proportion of people claiming incapacity benefit (15%), which is virtually twice as high as the average rate for Gillmoss (7.9%). Of the wards in the Merseytram zone, Everton, Smithdown and Kirkby Central each have over 12% of their populations claiming incapacity benefit. The average for the Merseytram zone (12.1%) is over twice the rate for the North West region, and is a stark indicator of the level of poverty and social exclusion within this geographical area.
4.9 Transportation Issues

4.9.1 Travel to Work

Table 4.5 illustrates the large differences in the way people in the Merseytram zone travel to work in comparison with the average for larger geographical areas. The proportion of people who walk to work (17.7%) is far greater than the average for England and the North West Region (10% and 10.3% respectively). However, the Knowsley average (9.3%) is much lower than the average for Liverpool (10.6%).

Table 4.5 Percentage of People Travelling to Work: Mode of Transport 1

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage aged 16-74: drive a car/van</th>
<th>Percentage aged 16-74: passenger in a car or van</th>
<th>Percentage aged 16-74: travel on foot</th>
<th>Percentage aged 16-74: bicycle</th>
</tr>
</thead>
<tbody>
<tr>
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<td><strong>17.7</strong></td>
<td><strong>1.7</strong></td>
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4.9.2 A much smaller proportion of people in the Merseytram zone drive a car or van (39.9%) in comparison with the average for England (54.9%) or the North West Region (58.4%). Residents of the Merseytram zone are more likely to be a passenger in a car (8%) than the average for England or the North West, and this statistic reflects the average for both local authorities. Furthermore, both of the Kirkby wards have the highest rates of being a car passenger (12.4% and 9.9% respectively) of wards in the Merseytram zone.

4.9.3 Table 4.5 also indicates that travel to work by bicycle is a generally unpopular means of transport to work, both across England (2.8%) and also within the North West Region as a whole and within the Merseytram zone, it is even less popular.

4.9.4 Table 4.6 shows that few people travel to work by underground light rail or tram in the Merseytram zone (0.4%), and this is true across the North
West Region. No light rail, tram or underground system (with the exception of Merseyrail Electrics which could be classed as underground rather than rail) operates in Merseyside. It should also be noted that the figure for the north west includes Manchester Metrolink and the figure for England, the London Underground. As a result, these figures are not strictly comparable with those for Merseyside. Train travel is also of lesser popularity in the Merseytram zone (2.8%) than across England as a whole (4.2%), although it is more popular than across the North West Region (1.9%).

4.9.5 Bus travel in the Merseytram zone is almost three times as popular in comparison to the average for England, although this is may be a reflection of much lower levels of car ownership, and less affluence. Nonetheless the rate of bus travel within the Merseytram zone (21.3%) is almost twice as great as the average for Merseyside. There is a substantial difference between bus travel across Liverpool (21.2%) and Knowsley (13.2%). Furthermore, there are differences at ward level, with some having high rates of bus travel (such as Clubmoor, 29.8% and Kensington 30.3%), and others having lower levels of bus travel (eg Kirkby Central, 13.1% and Cherryfield, 15.9%).

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<tr>
<th>Area</th>
<th>Percentage aged 16-74: working at home</th>
<th>Percentage aged 16-74: underground / tram</th>
<th>Percentage aged 16-74: train</th>
<th>Percentage aged 16-74: bus / minibus / coach</th>
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4.9.6 Car or Van Ownership

Access to a car, though suggesting greater access to a variety of services, is increasingly regarded as an indication of affluence. Table 4.7 identifies the variance in car ownership between the Merseytram zone and larger areas of geographical comparison.
A high proportion of residents of the Merseytram zone (57.4%) do not own a car or van, which is twice the rate of non-ownership that exists across England. This rate is higher than the rates across the local authority districts of Liverpool and Knowsley (48.3% and 41.8% respectively). There are certain pockets of the Merseytram zone where the lack of ownership of a car or van is exceptionally high (ie Smithdown, 69.2%; Everton, 65.2% and Kensington, 63%).

4.9.7 Similarly a far smaller proportion of Merseytram zone residents have one or more cars in comparison with the larger geographical areas of Merseyside, and both local authorities.

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage of households: no car or van</th>
<th>Percentage of households: one car or van</th>
<th>Percentage of households: two cars or vans</th>
<th>Percentage of households: three cars or vans</th>
</tr>
</thead>
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4.9.8 Urban transportation and Merseytram: Summary Comments
This analysis of transportation patterns along the Merseytram Line 1 alignment identifies that car or van ownership is low, bus travel is high, light and heavy rail usage is low and that walking to work is higher than in larger areas. These patterns are considered to reflect the fact that there are no light rail systems on Merseyside, and that the population is relatively socio-economically disadvantaged. In addition the deregulation of bus services on Merseyside may have contributed to their unreliability in certain areas, and the cost of bus travel has increased substantially in recent years. This suggests that there is potential for encouraging residents to make use of Merseytram Line 1.
An important element, therefore, in encouraging the local communities of the Merseytram zone to take advantage of the proposed Merseytram Line 1 alignment is the issue of pricing. Where ticket pricing reflects favourably in relation to bus travel, there is greater likelihood of local residents using the service, particularly if the service runs frequently.

Similarly the relatively low proportion of car ownership, combined with the average level of travelling as a passenger in a car, suggests that Merseytram will prove popular amongst the communities of the Merseytram zone.

4.10 Multiple Socio-Economic Deprivation

4.10.1 The Department of Social Policy and Social Work (University of Oxford) has produced an Index of Deprivation, which reflects the belief that multiple deprivation is comprised of six separate dimensions of deprivation, which each reflect different aspects of deprivation.

There are six key dimensions of deprivation:

- **Income** (ie measures people in receipt of a low income)

- **Employment** (ie measures people who wish to work but are unable to do so due to unemployment, sickness or disability)

- **Health, Deprivation and Disability** (ie measures people whose quality of life is impaired due to either poor health or disability)

- **Education, Skills and Training** (ie measures education deprivation)

- **Housing** (ie measures people living in unsatisfactory housing or homeless)

- **Geographical Access to Services** (ie measures solely people with low incomes able to access a post office, food shops and a GP)

A description of how each ward in the country is ascribed a score and ranked relative to the other wards is given in Appendix 4. The overall Index of Multiple Deprivation (IMD) is produced by combining information from all six dimensions of deprivation through a system of weighting data from each dimension of deprivation. The IMD 2000 score is the combined sum of the weighted dimension rank, and it allows comparison between different geographical areas for relative multiple deprivation. There are 8414 wards in England. The ward with the rank of 1 is the most deprived, with 8414 is the least deprived.
4.10.2 District Level Deprivation: Liverpool, Knowsley and the North West

The Indices of Deprivation also allow district level comparisons of employment and income, which provides contextual information for exploring a community profile of the Merseytram zone. There are 354 districts in England. The district with a rank of 1 is the most deprived, and the district with a rank of 354 the least deprived.

The deprivation data show strong differences in relative deprivation across the North West. Certain areas can be described as indicating pockets of affluence (eg Congleton, Fylde and Ribble Valley) having relatively low levels of deprivation within a generally deprived region of England. Other districts (eg Lancaster and Chorley) are in the middle range of deprivation.

Liverpool, however, has a scale of deprivation that is marginally worse than Manchester within the North West, being second worst (out of 354 districts) for income and employment. Manchester is the third worst for both employment and income.

Deprivation is not quite as acute in relation to the ranks of employment and income scales. Nonetheless, in terms of average of ward ranks, Knowsley is ranked within the top ten most deprived districts out of 354 across England. The scale of deprivation within Knowsley and Liverpool is very small to that which exists in Manchester.

The Extent and Local Concentration (see appendix 4) figures reveal the high level of deprivation within the most deprived 10% of Liverpool wards. The level of deprivation in Liverpool and Knowsley is higher than within its neighbouring districts (ie Ellesmere Port and Neston, Sefton, St Helens and Wirral).
4.10.3 Ward Level Deprivation in Liverpool

Table 4.8 illustrates the rank accorded to each of the 33 Liverpool wards for the six key dimensions given above, as well as the aggregated IMD rank. The table clearly shows the diverse experience of deprivation across the city. Some wards (ie Childwall, Church, Grassendale and Woolton) have relatively low levels of multiple deprivation. A few other wards have slightly less relative deprivation (ie Aigburth, Allerton and Croxteth). However, the remaining Liverpool wards have extremely high levels of deprivation, with many of the wards (eg Picton, Fazakerley and Gilmoss) featuring within the 500 most deprived of all English wards. The highest levels of deprivation are located within central Liverpool.

There are high levels of deprivation, particularly within the Merseyzone wards. Everton is the most deprived ward in England for three of the key dimensions of deprivation: health, employment and income. When all six domains are aggregated, Everton is the fourth most deprived ward in England. Clubmoor, Kensington and Smithdown are within the 100 most deprived wards in relation to employment and health.

Smithdown ward is the 28th most deprived in England. It lies within the 100 most deprived wards in relation to income, employment, health and education. Abercromby is marginally less deprived that the other four wards. Nonetheless, it is within the 100 most deprived wards in relation to employment, and when all six domains are aggregated, it is the 149th most deprived ward in England.
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<th>Health Rank</th>
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<td>Woolton</td>
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<td>2657</td>
<td>1247</td>
<td>1009</td>
<td>4231</td>
<td>5770</td>
<td>4660</td>
</tr>
</tbody>
</table>
4.10.4 Ward Level Deprivation in Knowsley

There are high levels of deprivation across the 22 wards in Knowsley, and 7 of them are amongst the 50 most multiply deprived wards in England. The two wards that the proposed Merseytram Line 1 alignment will pass through – Cherryfield and Kirkby Central – lie 14th and 18th respectively in the list of most deprived wards. Only Princess and Longview in Knowsley have higher rates of multiple deprivation. However, there are pockets of Knowsley that do not suffer the same acute levels of multiple deprivation: Halewood East, Prescot West, Roby and Swanside have relatively low levels of socio-economic deprivation.

Table 4.9  Knowsley Wards: Multiple Deprivation

<table>
<thead>
<tr>
<th>Ward Name</th>
<th>IMD Rank</th>
<th>Income Rank</th>
<th>Employment Rank</th>
<th>Health Rank</th>
<th>Education Rank</th>
<th>Housing Rank</th>
<th>Access Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cantrill Farm</td>
<td>38</td>
<td>157</td>
<td>55</td>
<td>55</td>
<td>134</td>
<td>840</td>
<td>6042</td>
</tr>
<tr>
<td>Cherryfield</td>
<td>14</td>
<td>26</td>
<td>13</td>
<td>11</td>
<td>274</td>
<td>618</td>
<td>7227</td>
</tr>
<tr>
<td>Halewood E</td>
<td>2853</td>
<td>3898</td>
<td>2640</td>
<td>2229</td>
<td>2471</td>
<td>2908</td>
<td>3283</td>
</tr>
<tr>
<td>Halewood S</td>
<td>184</td>
<td>198</td>
<td>87</td>
<td>199</td>
<td>1088</td>
<td>777</td>
<td>8057</td>
</tr>
<tr>
<td>Halewood W</td>
<td>269</td>
<td>301</td>
<td>184</td>
<td>207</td>
<td>879</td>
<td>1250</td>
<td>7355</td>
</tr>
<tr>
<td>Kirkby Central</td>
<td>18</td>
<td>21</td>
<td>24</td>
<td>21</td>
<td>531</td>
<td>549</td>
<td>7816</td>
</tr>
<tr>
<td>Knowsley Park</td>
<td>140</td>
<td>177</td>
<td>140</td>
<td>80</td>
<td>913</td>
<td>837</td>
<td>5557</td>
</tr>
<tr>
<td>Long View</td>
<td>13</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>550</td>
<td>635</td>
<td>6925</td>
</tr>
<tr>
<td>Northwood</td>
<td>20</td>
<td>23</td>
<td>6</td>
<td>9</td>
<td>712</td>
<td>774</td>
<td>6688</td>
</tr>
<tr>
<td>Page Moss</td>
<td>233</td>
<td>191</td>
<td>177</td>
<td>137</td>
<td>1530</td>
<td>853</td>
<td>7349</td>
</tr>
<tr>
<td>Park</td>
<td>263</td>
<td>480</td>
<td>214</td>
<td>58</td>
<td>991</td>
<td>994</td>
<td>5677</td>
</tr>
<tr>
<td>Prescot E</td>
<td>512</td>
<td>467</td>
<td>296</td>
<td>227</td>
<td>3444</td>
<td>1552</td>
<td>6902</td>
</tr>
<tr>
<td>Prescot W</td>
<td>1363</td>
<td>1425</td>
<td>865</td>
<td>424</td>
<td>3945</td>
<td>3294</td>
<td>7738</td>
</tr>
<tr>
<td>Princess</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>19</td>
<td>523</td>
<td>278</td>
<td>6778</td>
</tr>
<tr>
<td>Roby</td>
<td>2623</td>
<td>3076</td>
<td>1602</td>
<td>1109</td>
<td>3720</td>
<td>7734</td>
<td>6278</td>
</tr>
<tr>
<td>St Gabriels</td>
<td>157</td>
<td>153</td>
<td>41</td>
<td>48</td>
<td>3045</td>
<td>1082</td>
<td>6802</td>
</tr>
<tr>
<td>St Michaels</td>
<td>142</td>
<td>149</td>
<td>64</td>
<td>82</td>
<td>1511</td>
<td>1030</td>
<td>7898</td>
</tr>
<tr>
<td>Swanside</td>
<td>1682</td>
<td>2055</td>
<td>1018</td>
<td>604</td>
<td>3284</td>
<td>5056</td>
<td>6823</td>
</tr>
<tr>
<td>Tower Hill</td>
<td>59</td>
<td>67</td>
<td>146</td>
<td>132</td>
<td>457</td>
<td>439</td>
<td>5138</td>
</tr>
<tr>
<td>Whiston N</td>
<td>771</td>
<td>972</td>
<td>539</td>
<td>235</td>
<td>3345</td>
<td>1353</td>
<td>5815</td>
</tr>
<tr>
<td>Whiston S</td>
<td>746</td>
<td>700</td>
<td>578</td>
<td>438</td>
<td>2975</td>
<td>1498</td>
<td>4530</td>
</tr>
<tr>
<td>Whitefield</td>
<td>205</td>
<td>223</td>
<td>240</td>
<td>121</td>
<td>896</td>
<td>1107</td>
<td>3824</td>
</tr>
</tbody>
</table>
4.11 Health Status

4.11.1 The purpose of this health profiling exercise is to identify the Merseytram zone’s experience of health according to some key health indicators, so as to provide a baseline for our understanding of Line 1’s impact upon these populations. This will help with our assessment of the potential health impacts upon local communities. The selected health dimensions from which key indicators were identified include:

- Mortality
- Morbidity
- Well being
- Health-related behaviour

In addition, the health effects of the construction phase of the scheme on the workforce is considered, some of whom may be local residents.

Where possible, the health dimensions established within this profile seek to provide the health status context by drawing upon comparative health data from the Merseytram zone, and the wider geographical areas of Liverpool and Knowsley, as well as other Merseyside local authorities, and the North West average. In addition to providing information for each of the Merseytram wards, it also provides an average collective statistic for these wards.

Through evaluating comparative data sets held at ward, local authority and regional level, this health profile seeks to explore the Merseytram wards population’s experience of health, and place this within the context of the region’s health experience.

4.11.2 Mortality

The mortality status has been established using Standardised Mortality Ratios (1997 – 1999) provided by Merseyside Information Services (MIS).

- **Standardised Mortality Ratio (SMR)** is used to compare death rates in different populations, taking into account age and sex differences. The average SMR for England and Wales is always 100.

- Where an area has an SMR above 100, then the population of that area has a **higher** mortality rate than the average for England and Wales, after adjusting for differences in the structure of the population.

- Where an area has an SMR below 100, then the population of that area has a **lower** mortality rate than the average for England and Wales, after adjusting for differences in the structure of the population.

- Within each chart, a **horizontal line** is drawn at the SMR = 100 level to indicate the relative health experience of the 5 wards population.

It should be noted that SMRs for larger areas (eg health authority, local authority) provide a more accurate reflection of relative mortality in
relation to other similar sized areas of population. Caution should be applied when comparing SMRs at ward level (comprising small populations), as a small increase in mortality at the local population level can lead to a notable increase in the recorded SMR (and vice versa).

Data Presentation

- Comparative health information at ward level is illustrated using bar charts.
- Each chart indicates the Standardised Mortality Ratio (SMR).
- SMRs have usually been rounded up to the nearest whole number, unless small differences are deemed relevant to aid comparison with other areas.
- The value of the SMR for each indicator is shown above each bar of each of the bar charts where these have been produced by Office for National Statistics (ONS).

4.11.3 All Cause Mortality

Figure 4.1 indicates that the death rate is higher across the North West (116) than the average for England (i.e. 100). However, it also shows that the SMR for the Merseytram zone is higher (168), and that consequently there is a much higher likelihood of early death within the wards through which the Merseytram Line 1 alignment passes.

Within Merseyside, there is considerable diversity in the rate of early death. Sefton has an all-cause standardised mortality rate (110) which is slightly more than the average for England, whereas Liverpool’s SMR (143) is greater.

![Fig 4.1 All Cause Mortality (0-74): All Persons](image-url)
4.11.4 Mortality from All Cancers (Malignant Neoplasms)

Figure 4.2 indicates that the mortality rate from all cancers (160) within the Merseytram zone is higher than the neighbouring local authorities of St Helens, Sefton, Wirral and the North West average (112). The mortality rates for Liverpool and Knowsley are virtually identical, but much less than for the Merseytram zone.

![Figure 4.2 Malignant Neoplasms (0-74): All Persons](image)

<table>
<thead>
<tr>
<th>Geographical Areas</th>
<th>SMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merseytram</td>
<td>160</td>
</tr>
<tr>
<td>North West</td>
<td>112</td>
</tr>
<tr>
<td>Liverpool</td>
<td>137</td>
</tr>
<tr>
<td>Knowsley</td>
<td>136</td>
</tr>
<tr>
<td>St Helens</td>
<td>117</td>
</tr>
<tr>
<td>Sefton</td>
<td>114</td>
</tr>
<tr>
<td>Wirral</td>
<td>114</td>
</tr>
</tbody>
</table>

4.11.5 Mortality from Ischaemic Heart Disease

Figure 4.3 indicates variation in the rate of ischaemic heart disease (or coronary heart disease) across Merseyside. Wirral and Sefton have death rates, which are virtually the same as the average for England. However, across the North West Region (SMR=121) there is a greater likelihood of early death from Ischaemic heart disease. An even greater likelihood can be seen by the SMRs for Knowsley and Liverpool (144 and 156 respectively). However, the SMR statistic for the Merseytram zone illustrates an even greater death rate (173).

![Figure 4.3 Mortality from Ischaemic Heart Disease (0-74): All Persons](image)

<table>
<thead>
<tr>
<th>Geographical Areas</th>
<th>SMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merseytram</td>
<td>173</td>
</tr>
<tr>
<td>North West</td>
<td>121</td>
</tr>
<tr>
<td>Liverpool</td>
<td>156</td>
</tr>
<tr>
<td>Knowsley</td>
<td>144</td>
</tr>
<tr>
<td>St Helens</td>
<td>138</td>
</tr>
<tr>
<td>Sefton</td>
<td>109</td>
</tr>
<tr>
<td>Wirral</td>
<td>104</td>
</tr>
</tbody>
</table>
4.11.6 Mortality from Diseases of the Respiratory System

As with ischaemic heart disease, there are variations in mortality from diseases of the respiratory system across Merseyside. Sefton and Wirral have rates of death, which are similar to the average rate for England (i.e. 100). The rate of death in Liverpool and Knowsley (SMRs of 181 and 187 respectively) is exceptionally high. The Merseytram zone has a mortality rate (217) that is more than twice the national average rate (see Figure 4.4).

4.11.7 Mortality from Diseases of the Circulatory System

There are strong variations in the death rate from diseases of the circulatory system across Merseyside. Both Sefton and Wirral have SMRs that are in largely in accordance with the average for England, as well as being lower than the North West regional average. However, Knowsley, Liverpool and St Helens have rates, which are considerably greater. The average for the Merseytram zone (ie 160) suggests a mortality rate that is one and half times as great as the national average.

4.11.8 Mortality from Road Traffic Accidents

Table 4.10 illustrates the diverse rate of death from road traffic accidents for the different government office regions of England. The East Midlands region has the highest SMR (142), and the North West SMR (99) is just below the average rate for England (100). However, the North West had the second highest number of fatalities from road traffic accidents, after the South East.
Table 4.10  Age-specific SMRs for Motor Vehicle Accidents, All Ages, 1998-2000

<table>
<thead>
<tr>
<th>Area (Government Office Region or Local Authority)</th>
<th>All Persons: Observed Cases</th>
<th>S M R (lower level)</th>
<th>S M R (upper level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>8602</td>
<td>100</td>
<td>97</td>
</tr>
<tr>
<td>North East</td>
<td>366</td>
<td>82</td>
<td>74</td>
</tr>
<tr>
<td>North West</td>
<td>1179</td>
<td>99</td>
<td>93</td>
</tr>
<tr>
<td>Yorkshire &amp; Humber</td>
<td>929</td>
<td>105</td>
<td>99</td>
</tr>
<tr>
<td>East Midlands</td>
<td>1032</td>
<td>142</td>
<td>133</td>
</tr>
<tr>
<td>West Midlands</td>
<td>958</td>
<td>104</td>
<td>97</td>
</tr>
<tr>
<td>East of England</td>
<td>1036</td>
<td>110</td>
<td>103</td>
</tr>
<tr>
<td>London</td>
<td>873</td>
<td>68</td>
<td>64</td>
</tr>
<tr>
<td>South East</td>
<td>1402</td>
<td>100</td>
<td>95</td>
</tr>
<tr>
<td>South West</td>
<td>827</td>
<td>95</td>
<td>88</td>
</tr>
<tr>
<td>Knowsley</td>
<td>25</td>
<td>98</td>
<td>63</td>
</tr>
<tr>
<td>Liverpool</td>
<td>87</td>
<td>107</td>
<td>86</td>
</tr>
<tr>
<td>St Helens</td>
<td>30</td>
<td>98</td>
<td>66</td>
</tr>
<tr>
<td>Sefton</td>
<td>34</td>
<td>68</td>
<td>47</td>
</tr>
<tr>
<td>Wirral</td>
<td>41</td>
<td>73</td>
<td>52</td>
</tr>
</tbody>
</table>

Table 4.10 shows that only Liverpool has an SMR in excess of the average for England. Sefton and Wirral have SMRs that are slightly lower than this.

However, it is important to consider that there are few fatalities from road traffic accidents and consequently when dealing with such few observed cases, the SMR can be subject to large fluctuation on the basis of a few additional (or fewer) deaths.

Land transport accidents (2001)
At the ward level, the small populations can make the extrapolation of relative risk from accidents unreliable. The following table gives a breakdown of land transport accidents for the five local authorities in Merseyside, and there is little difference between them.

Table 4.11  Land Transport Accidents, 2001

<table>
<thead>
<tr>
<th>Area</th>
<th>Land Transport Accidents: Males</th>
<th>Land Transport Accidents: Females</th>
<th>Land Transport Accidents: Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>2108</td>
<td>728</td>
<td>2836</td>
</tr>
<tr>
<td>North West</td>
<td>277</td>
<td>101</td>
<td>378</td>
</tr>
<tr>
<td>Liverpool</td>
<td>13</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Knowsley</td>
<td>11</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>St Helens</td>
<td>12</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Sefton</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Wirral</td>
<td>17</td>
<td>2</td>
<td>19</td>
</tr>
</tbody>
</table>

In relation to the Merseytram zone wards, there was a recorded single land transport accident in Abercromby, Gillmoss and Tuebrook.
4.11.9 Morbidity

Comparing relative levels of illness between the populations of Liverpool and other geographical areas in the North West using hospital admission rates can evaluate relative levels of morbidity.

For 2002/03, Hospital Episodes Statistics (HES) recorded episodes of admitted patient treatment delivered by NHS hospitals in England. Table 4.12 groups hospital admissions according to the responsible Primary Care Trust:

- ‘Finished Episodes’ is a count of the number of HES records submitted on behalf of English NHS hospital providers that relate to episodes of admitted patient care which ended during the 2002/03 HES year.
- ‘Emergency’ is the percentage of admission episodes that occurred as a consequence of an emergency.
- ‘Length of stay’ indicates the mean (average) of the hospital spell duration in days.

**Table 4.12 Hospital Activity Levels for Elective and Emergency Care**

<table>
<thead>
<tr>
<th>Primary Care Trusts (PCTs)</th>
<th>Finished Episodes</th>
<th>Emergency (%)</th>
<th>Length of stay (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All PCTs</td>
<td>12,755,911</td>
<td>35</td>
<td>7.9</td>
</tr>
<tr>
<td>Central Liverpool</td>
<td>71,601</td>
<td>44</td>
<td>8.3</td>
</tr>
<tr>
<td>North Liverpool</td>
<td>37,297</td>
<td>39</td>
<td>7.7</td>
</tr>
<tr>
<td>South Liverpool</td>
<td>26,584</td>
<td>42</td>
<td>8.5</td>
</tr>
<tr>
<td>Average for PCTs within Cheshire &amp; Merseyside St. Health Authority</td>
<td>665,978</td>
<td>36</td>
<td>7.2</td>
</tr>
<tr>
<td>Average for PCTs within Cumbria &amp; Lancashire St. Health Authority</td>
<td>438,404</td>
<td>35</td>
<td>7.8</td>
</tr>
<tr>
<td>Average for Greater Manchester St. Health Authority</td>
<td>727,881</td>
<td>34</td>
<td>7.0</td>
</tr>
</tbody>
</table>
Table 4.12 illustrates hospital admission data for Liverpool PCTs. It also shows admissions for each of the strategic health authorities in the North West region, through combining PCT data within each of them, in order to allow for comparison of emergency admissions and average length of stay.

There is a greater proportion of emergency admissions for Central Liverpool PCT (44%) than the average for all PCTs (35%). At the regional level, it is also greater than the average for the North West strategic health authorities, that have roughly 35% emergency admissions. A higher proportion of emergency admissions suggests a greater preponderance of morbidity in Central Liverpool. Furthermore, patients admitted within Central Liverpool spend (on average) longer periods of time in hospital (ie 8.3 days) than the average for all PCTs (7.9 days), as well as the average for all PCTs in the North West strategic health authorities. This also indicates higher levels of morbidity in Central Liverpool than elsewhere.

4.11.10 Well Being (Self-Reported General Health)

Table 4.13 provides an indication of how the communities of Liverpool and Knowsley have perceived their quality of health over the previous 12 months. The information is taken from the 2001 Census (ONS, 2002).

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>Good Health</th>
<th>Fairly Good Health</th>
<th>Not Good Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>49,138,831</td>
<td>68.8</td>
<td>22.2</td>
<td>9.0</td>
</tr>
<tr>
<td>North West</td>
<td>6,729,764</td>
<td>66.9</td>
<td>22.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Merseyside</td>
<td>1,362,026</td>
<td>65.7</td>
<td>21.8</td>
<td>12.5</td>
</tr>
<tr>
<td>Knowsley</td>
<td>150,459</td>
<td>65.0</td>
<td>21.3</td>
<td>13.7</td>
</tr>
<tr>
<td>Liverpool</td>
<td>439,473</td>
<td>64.5</td>
<td>21.7</td>
<td>13.8</td>
</tr>
<tr>
<td>Cherryfield</td>
<td>5,823</td>
<td>59.1</td>
<td>23.4</td>
<td>17.5</td>
</tr>
<tr>
<td>Kirkby Central</td>
<td>6,258</td>
<td>60.8</td>
<td>22.2</td>
<td>17.0</td>
</tr>
<tr>
<td>Abercromby</td>
<td>11,473</td>
<td>65.6</td>
<td>20.9</td>
<td>13.5</td>
</tr>
<tr>
<td>Clubmoor</td>
<td>13,387</td>
<td>59.9</td>
<td>23.2</td>
<td>16.9</td>
</tr>
<tr>
<td>Everton</td>
<td>7,398</td>
<td>62.7</td>
<td>20.7</td>
<td>16.6</td>
</tr>
<tr>
<td>Gillmoss</td>
<td>18,665</td>
<td>67.6</td>
<td>19.7</td>
<td>12.7</td>
</tr>
<tr>
<td>Kensington</td>
<td>12,740</td>
<td>60.3</td>
<td>23.4</td>
<td>16.3</td>
</tr>
<tr>
<td>Smithdown</td>
<td>10,757</td>
<td>61.3</td>
<td>23.1</td>
<td>15.6</td>
</tr>
<tr>
<td>Tuebrook</td>
<td>14,490</td>
<td>63.5</td>
<td>22.1</td>
<td>14.4</td>
</tr>
<tr>
<td>Merseytram</td>
<td>11,221</td>
<td>62.3</td>
<td>22.1</td>
<td>14.0</td>
</tr>
</tbody>
</table>

Across England, the proportion of people reporting good health (68.8%) is higher than the average for Liverpool and Knowsley residents (64.5% and 65.0% respectively), and the average of the Merseytram zone (62.3%). Similarly, a lower proportion of residents feel they have 'not good health' across England (9.0%) in comparison with Merseyside (12.5%) or the Merseytram zone (14.0%).

There are variations at the ward level. Cherryfield has the lowest proportion of people claiming to have good health (59.1%), and this contrasts with the relevant statistic for Gillmoss, which has the highest
proportion claiming good health (67.6%). This pattern is repeated at the other end of the self-reported health scale: a higher proportion of Cherryfield residents claim to have poor health (17.5%) compared with the lowest proportion in Gillmoss (12.7%). These data tend to reflect the same trend for not good health, limiting long term illness (LLTI), and IB claimants; although this data is for all ages, poor health may also be a barrier to people of working age becoming economically active.

4.11.11 Health-related behaviour

A. Physical Activity
Residents of Liverpool and Sefton are less likely to take part in moderate exercise (slightly out of breath but being able to speak whilst exercising) than the average for England. The Liverpool and Sefton lifestyle survey (September 2003) found that the participation rate of involvement in exercise (27.4%) is lower than the national average (30%). However, Liverpool and Sefton did have higher proportions of people taking exercise between once and four times per week (ie 51%) in comparison with the national average (39%). Table 4.14, provided by Central Liverpool Primary Care Trust, shows the breakdown of participation rates in Liverpool and Sefton.

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>11</td>
</tr>
<tr>
<td>Less than once per month</td>
<td>8</td>
</tr>
<tr>
<td>More than once a month but less than once a week</td>
<td>2</td>
</tr>
<tr>
<td>Once a week</td>
<td>18</td>
</tr>
<tr>
<td>Between 2 and 4 times per week</td>
<td>33</td>
</tr>
<tr>
<td>5 times per week or more</td>
<td>28</td>
</tr>
</tbody>
</table>

B. Obesity
Within the 16-64-age range, the rates of obesity vary across England. Table 4.15 (taken from Health Survey for England (DoH, 1995) ) summarises these differences.

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage of Population: All Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16-44</td>
</tr>
<tr>
<td>England</td>
<td>16</td>
</tr>
<tr>
<td>Northern and Yorks</td>
<td>15</td>
</tr>
<tr>
<td>Trent</td>
<td>14</td>
</tr>
<tr>
<td>Anglia and Oxford</td>
<td>15</td>
</tr>
<tr>
<td>North Thames</td>
<td>15</td>
</tr>
<tr>
<td>South Thames</td>
<td>15</td>
</tr>
<tr>
<td>South and West</td>
<td>18</td>
</tr>
<tr>
<td>West Midlands</td>
<td>21</td>
</tr>
<tr>
<td>North West</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 4.15 indicates that the North West has a high rate of obesity (28) within the 45-64 age range, with only one other English region having a rate as high (ie Northern and Yorkshire). Across the whole range from
16-54, the rate (20) of obesity is higher than most other regions, with the exception of the West Midlands, including the average for England (19%).

Rates of obesity across Liverpool are higher than the average for England, and there are significant differences within Liverpool. Table 4.16 (taken from the Liverpool and Sefton lifestyle survey (Sefton & Liverpool PCTs)) indicates that North Liverpool has a higher rate of obesity in comparison with south and central Liverpool. Anyone with a BMI score over 30 is clinically obese.

**Table 4.16  Body Mass Index (BMI): Percentages of Liverpool people**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Liverpool</td>
<td>2</td>
<td>48</td>
<td>32</td>
<td>18</td>
</tr>
<tr>
<td>South Liverpool</td>
<td>1</td>
<td>43</td>
<td>35</td>
<td>21</td>
</tr>
<tr>
<td>North Liverpool</td>
<td>5</td>
<td>40</td>
<td>31</td>
<td>24</td>
</tr>
</tbody>
</table>

**C. Cigarette Smoking**

Table 4.16 (taken from the General Household Survey, 2001 (ONS, 2001) ) indicates that there is a greater prevalence of cigarette smoking amongst females in the North West (29%) than the average for England (25%). Male smoking, however, is roughly the same as the average for England (28%).

**Table 4.17  Prevalence of cigarette smoking, ages 16 and above**

<table>
<thead>
<tr>
<th>Areas</th>
<th>Males: Percentage</th>
<th>Females: Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>Northern and Yorks</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>Trent</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>Eastern</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>London</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>South East</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>South West</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>West Midlands</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>North West</td>
<td>28</td>
<td>29</td>
</tr>
</tbody>
</table>

The Liverpool and Sefton lifestyle survey provides a breakdown of smoking patterns for current smokers across Central Liverpool PCT (see Table 4.18). It indicates high rates within the 35-44 and 45-54 age ranges.
Table 4.18  Central Liverpool PCT: Percentages of Current Smokers

<table>
<thead>
<tr>
<th>Age range</th>
<th>Percentage of respondents in age group in PCT</th>
<th>Percentage of male respondents</th>
<th>Percentage of female respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>20</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>25-34</td>
<td>33</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>35-44</td>
<td>35</td>
<td>35.5</td>
<td>33.5</td>
</tr>
<tr>
<td>45-54</td>
<td>33</td>
<td>33.5</td>
<td>32</td>
</tr>
<tr>
<td>55-64</td>
<td>26</td>
<td>26.5</td>
<td>26</td>
</tr>
<tr>
<td>65-74</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>75+</td>
<td>16</td>
<td>25</td>
<td>12</td>
</tr>
</tbody>
</table>

4.11.13 Occupational health

Liverpool and Knowsley have 2.5% and 6.3% of employees in the construction sector, respectively, and 5.5% and 6.9% in transport and communications industries (AES, 1998). The ES predicts that the equivalent of 937 person years employment (94 gross Full Time Equivalents) will be created during the construction phase of the scheme, with 50% retained by Merseyside residents under the Merseyside Construction Initiative.

The national injury incidence rates for the construction industry between 1998 and 2003 are reported in Table 4.19 below:

Table 4.19  Injury rates reported to the enforcing authorities for the construction industry, 1998/99-2002/03

<table>
<thead>
<tr>
<th>Injury incidence rates (per 100,000)</th>
<th>98/99</th>
<th>99/00</th>
<th>00/01</th>
<th>01/02</th>
<th>02/03</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E¹</td>
<td>SE²</td>
<td>E¹</td>
<td>SE²</td>
<td>E¹</td>
</tr>
<tr>
<td>Fatal</td>
<td>4.4</td>
<td>2.8</td>
<td>5.5</td>
<td>3.2</td>
<td>6.5</td>
</tr>
<tr>
<td>Major (non-fatal)</td>
<td>402.7</td>
<td>56.5</td>
<td>395.9</td>
<td>57.7</td>
<td>380.9</td>
</tr>
<tr>
<td>Over-3-day</td>
<td>863.4</td>
<td>58.7</td>
<td>917.0</td>
<td>54.9</td>
<td>829.2</td>
</tr>
</tbody>
</table>

E¹ = employees  
SE² = self-employed

Falls from height accounted for the majority of deaths and major injuries, followed by slips, trips and falls. The construction industry in the North West shows slightly lower injury rate levels as indicated in table 4.18 below; however it needs to be noted that it is estimated (HSE, 2002a) that the industry in England under reports injuries by approximately 47%.
Table 4.20 Injuries rates reported to the enforcing authorities for the construction industry in the North West, 1999/00-2002/03

<table>
<thead>
<tr>
<th>NORTH WEST</th>
<th>Fatal and Major Injuries</th>
<th>Over 3 day injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>99/00</td>
<td>00/01</td>
</tr>
<tr>
<td>Construction</td>
<td>No.</td>
<td>Rate</td>
</tr>
<tr>
<td></td>
<td>526</td>
<td>451</td>
</tr>
<tr>
<td></td>
<td>419.1</td>
<td>348.0</td>
</tr>
</tbody>
</table>

In addition, the 2001/02 Self-reported Work-related Ill health (SWI) survey (HSE, 2002b) indicates the construction industry's SWI prevalence rate is 5.6% higher than the all-industry average. A number of clinical conditions however have been shown to be significantly above average in the industry: musculo-skeletal disorders, spine/back disorders, asbestosis, mesothelioma and dermatitis.

4.12 Health Services

4.12.1 Performance for local NHS organisations is evaluated against various targets, including 'access'. This refers to how quickly a patient sees a General Practitioner (GP), primary care professional (PCP) or hospital consultant. However physical access to health services - eg getting to and from consultations - also effects a patient's ability to seek treatment and to keep appointments. Transport is key to ensuring that patients and carers receive appropriate and timely care, and has been identified as such in enabling patients 'Choice' in their care.

In 2002/03 Central Liverpool PCT was not able to meet targets for access to a GP or PCP. Similarly less than 90% of PCT patients accessing emergency care were seen within 4 hours. For both cervical and breast screening, the targets set for the percentage of women being screened were not met.

Whilst there is a relationship between transport and access to health services, it is not possible to say to what extent the performance against the above targets may have been effected by transport issues.

The proposed Merseytram Line 1 scheme will facilitate direct access to Royal Liverpool University Hospital and Liverpool University Dental School, and also encompasses 20 GP practices. It is estimated that approximately 90% of patients are cared for in primary care.
SECTION 5: DOCUMENTARY ANALYSIS

5.1 Introduction

5.1.1 This documentary analysis aims to review policy information contained within official documentation which is of relevance to the proposed Merseytram Line 1 scheme, focusing at national and local level, but also referring to international policies where appropriate. It examines policy evidence concerning transport and the relationship with health determinants and health outcomes.

5.1.2 As described in section 3, the purpose of the documentary analysis in a HIA is to assess the context of the policy proposals:

- What is the rationale for the policy? Does it address identified needs? Does it affect key health determinants?
- Is there an evidence-base for the proposed interventions?
- What is the relationship with other policies? How do the proposals affect these other policies, particularly health or key health determinant policies, and vice versa?
- What are the risks to the policy proposals not being implemented as described? How were the proposals developed? Who was involved? Is funding assured?

5.1.3 The documentary search strategy employed identified scientific evidence, policies and other official documents that related to key health determinants/'determinants of determinants' and Merseytram Line 1 outcomes: road traffic accidents (RTAs), physical activity, air quality, noise, social support, economic activity/economic growth, road traffic/transport. The policies analysed included:

<table>
<thead>
<tr>
<th>International policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC's European Transport Policy (EC, 2001) and associated programmes on sustainable mobility, road safety and citizen's networks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UK policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>'A New Deal for Transport: Better for Everyone’ (DETR, 1998a)</td>
</tr>
<tr>
<td>‘Transport 2010, The 10 Year Plan’ (DETR, 2000a)</td>
</tr>
<tr>
<td>‘The Road Traffic Reduction (National Targets) Act’ (DETR, 1998b) and the first report under this Act: ‘Tackling Congestion and Pollution’ (DETR, 2000b)</td>
</tr>
<tr>
<td>‘Tomorrow’s Roads: Safer for Everyone’ (DETR, 2000c)</td>
</tr>
<tr>
<td>‘Transport and the Economy’ (TSO, 1999a)</td>
</tr>
<tr>
<td>'Air Quality Regulations' (DETR, 2000d)</td>
</tr>
<tr>
<td>‘A Better Quality of Life: A Strategy for Sustainable Development for the United Kingdom’ (TSO, 1999b)</td>
</tr>
<tr>
<td>Overview of noise policies</td>
</tr>
<tr>
<td>Overview of socio-economic policies</td>
</tr>
<tr>
<td>Overview of health policies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Local policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merseyside Transport Plan (Merseytravel et al, 2000)</td>
</tr>
<tr>
<td>Liverpool Unitary Development Plan (Liverpool City Council, 2002)</td>
</tr>
<tr>
<td>Knowsley Unitary Development Plan (Knowsley MBC, 2003)</td>
</tr>
</tbody>
</table>
5.2 International Transport Policy Developments

5.2.1 World Health Organisation's Strategy for Road Traffic Injury Prevention

The World Health Organisation (WHO) has paid a great deal of attention to the impact of transport systems on human health. The WHO's strategy on Road Traffic Injury Prevention (Appendix 5) highlights the growing prominence of road traffic accidents in disability-adjusted life years (DALYs) lost; by 2020 it is forecast to be the 3rd leading cause of DALYs globally. In view of this evidence, the strategy urges measures at national and local levels to reduce the burden of road traffic injuries.

Clearly the implications for the proposed Merseytram Line 1 scheme are to ensure that risks from accidents are minimised, although the low RTA injury rate within the Merseytram zone is recognised. Merseytram Line 1 will also contribute to the objectives of the Strategy, by providing an alternative to the private car.

5.2.2 European Transport Policy

The White Paper on European Transport Policy (EC, 2001) describes achievements over the past decade at the Union and Member States levels, future challenges and actions to address this.

Fundamentally, the White Paper recognises the inherent contradiction between a European society that demands greater mobility, whilst being increasingly intolerant of chronic delays and poor quality public transport services. It indicates that the opening up of the transport market has been beneficial for some travellers, eg air travel, but a common transport policy had been lacking. As a result road transport, primarily by cars, has grown much faster than other transport modes with the associated congestion and detrimental effects on the environment and public health. The White Paper argues that the level of congestion has begun to threaten economic competitiveness and that this will amount to 1% of Community GDP by 2010 if improvement measures are not undertaken.

There are 60 specific measures to be taken at Community level under the transport policy, which includes an action programme extending until 2010. Whilst the measures do not specifically refer to increasing light rail transit systems, there is clear synergy between the White Paper's proposals and the Merseytram Line 1 scheme:

- 'developing high quality urban transport' i.e. rationalising car use,
- 'adopting a policy on effective charging for transport', i.e. transport mode costs reflecting there true costs
- 'developing medium and long term environmental objectives for a sustainable transport system', i.e. protecting the physical environment and shifting transport to sustainable modes

As with the WHO strategy, there is also an emphasis on improving road safety.
5.3 **Transport Policy Developments in the UK**

5.3.1 The following summary seeks to highlight recent key developments in UK transport policy. The key national transport policies and supporting documents relevant to Merseytram are:

<table>
<thead>
<tr>
<th>Document</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘A New Deal for Transport: Better for Everyone’ (DETR, 1998a)</td>
<td></td>
</tr>
<tr>
<td>‘Transport 2010, The 10 Year Plan’ (DETR, 2000a)</td>
<td></td>
</tr>
<tr>
<td>‘The Road Traffic Reduction (National Targets) Act’ (DETR, 1998b) and the first report under this Act: ‘Tackling Congestion and Pollution’ (DETR, 2000b)</td>
<td></td>
</tr>
<tr>
<td>‘Tomorrow’s Roads: Safer for Everyone’ (DETR, 2000c)</td>
<td></td>
</tr>
<tr>
<td>‘Transport and the Economy’ (TSO, 1999)</td>
<td></td>
</tr>
</tbody>
</table>

Much of the UK policy outlook generally bears a strong resemblance to the EU policy framework.

5.3.2 **‘A New Deal for Transport: Better for Everyone’**

A key emphasis of this White Paper is on developing sustainable, integrated transport systems and modes, and reducing the damaging effects of road transport in particular on the environment. Tools for delivering *New Deal for Transport* include:

- Local Transport Plans (LTPs),
- New powers to tackle congestion, including road user charges, levies on parking
- *Commission for Integrated Transport* - new, independent organisation to advise on integration at the national level
- *Quality Partnerships* - between bus operators and local authorities to develop high quality services/vehicles
- *Quality Contracts* - exclusive contracts for bus routes to ensure integrated networks
- *Cleaner Vehicles Task Force* - developing 'greener', more fuel efficient vehicles
- Fiscal incentives to use more fuel efficient vehicles

The White Paper highlights the health effects of air pollutant emissions from road vehicles and contrasts this with the benefits of non-motorised transport modes such as walking and cycling. It reinforces EU directives to further control vehicle emissions and indicates that together with local action further emission reductions are also possible.
5.3.3 'Transport 2010, The 10 Year Plan'

Specific targets have been set in 'Transport 2010' to achieve or contribute to the above transport policy as follows:

- to double light rail use in England .... by 2010 from 2000 levels
- 'to reduce road congestion below current levels by 2010... by promoting integrated transport solutions and investing in public transport and the road network...'
- to increase rail use in Great Britain .... from 2000 levels by 50%...
- to increase bus use in England ... from 2000 levels by 10% 2010..
- to cut journey times on London Underground services...
- to improve air quality by meeting National Air Quality Strategy targets...
- to reduce greenhouse gas emissions by 12.5% from 1990 levels, and move towards a 20% reduction in carbon dioxide emissions by 2010
- to reduce the number of people killed or seriously injured in Great Britain in road accidents by 40% by 2010 and the number of children killed or seriously injured by 50% compared with the average for 1994-98'
- to increase the rail freight share of the freight market by 2010, eg from 7% to 10% share
- to triple the number of cycling trips by 2010 compared to 2000 base
- 'to achieve a on-third increase in the proportion of households in rural areas within 10 minutes walk of an hourly or better bus service by 2010'
- to improve bus reliability with no more than 0.5% services cancelled by 2001
- to reduce average age of buses in fleet from 12 to 8 years by 2001
- to reduce overcrowding on trains to meet the SRA standards by 2010
- to maintain the strategic road network in optimum condition
- to halt the deterioration in the condition of local roads by 2004
- to reduce the congestion on local roads

It is unlikely to support increased rail use between Kirkby and Liverpool City centre and bus use along the Line 1 route, but it may indirectly enhance bus and rail travel elsewhere due to the improvements in integration. Similarly Merseytram may contribute to other targets, eg reduction in greenhouse gas emissions, congestion on roads with a modal switch from the car to Merseytram.

5.3.4 'Tackling Congestion and Pollution'

This was the Government's first report on the Road Traffic Reduction Act. It acknowledged the impacts of traffic on the environment, economy and society, including:
- the effects on air quality
- the effects on health
- the emissions of gases which contribute to climate change
- traffic congestion
- the effects on land and biodiversity
- danger to other road users
- social impacts

It explains the Government's right not to set a national road traffic reduction target if it is satisfied that other measures are more appropriate to reduce these effects. As such the preference has been to focus on targets that relate to 'the outcomes we want to achieve, rather than crude national traffic volumes' (DETR, 2000b).

Various measures including light rail systems such as Merseytram Line 1 are how the Government is hoping to achieve reductions in traffic congestion. However early indications are that reductions in congestion and other Transport 2010 targets are not making the progress predicted, therefore, Merseytram is of particular importance.

### 5.3.5 ‘Tomorrow’s Roads: Safer for Everyone’

This important policy document (DETR, 2000) outlined Britain’s strategy for road safety. It comprises the UK government's road safety strategy and casualty reduction targets for 2010, which will be reviewed every three years to take account of new ideas and new technologies. The targets are summarised in Box 5.1.:

<table>
<thead>
<tr>
<th>Target Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>40% reduction in the number of people killed or seriously injured in road accidents.</td>
</tr>
<tr>
<td>50% reduction in the numbers of children killed or seriously injured.</td>
</tr>
<tr>
<td>10% reduction in the slight casualty rate, expressed as the number of people slightly injured per 100 million vehicle*kilometres.</td>
</tr>
</tbody>
</table>

The UK road safety strategy covers ten priority themes and groups, with specific measures, together with an implementation timetable. These are described in Appendix 5. The aim is to:

- Help make drivers more aware of their responsibilities towards all vulnerable road users through better training and testing.
- Develop cycle training courses for adults.
- Develop schemes to promote the use of cycle helmets.
- Support training schemes for horseriders.
- Improve victim support systems.

Evidence (Hedelin et al, 2001) suggests there is a four fold increased risk of accidental injury to pedestrians and cyclists from light rail systems compared with buses.

### 5.3.6 ‘Transport and the Economy’

The SACTRA's report (appendix 5) considered:
- the relationship between transport and the economy
- whether economic growth was dependent on the growth in road traffic levels
- the appropriateness of existing economic appraisal models in assessing the economic impacts of transport interventions

Evidence indicates that economic growth is 'decoupling' from traffic growth: traffic is growing at a faster rate than GDP. However although income growth does affect traffic growth evidence also suggests that it is the price speed and quality of transport that influences the amount of road traffic. It concluded that in mature economies with well-developed transport systems, transport investments with lower transport costs only produce modest rates of return via economic growth and increased productivity.

Existing economic appraisal methods used to consider the cost and benefits of transport investments were shown to be imperfect. They have since been updated to take a more holistic approach and account for a fuller range of costs eg environmental effects, and benefits, eg jobs. However it is understood that this does not include, eg health costs.

The implications of this are that transport investments may not produce much higher rates of economic growth, and may have some costs that are not considered within the economic appraisal.

### 5.3.7 Strategic Rail Authority

The Strategic Rail Authority (SRA) was established to provide a clear, coherent and strategic programme for the development of UK railways under the Transport Act 2000. The authority is a statutory body with board members appointed by Ministers, and has a strong voice for the consumer with consumer representation on its Board, which clearly chimes with EU moves for stronger passenger involvement. Details are provided in Appendix 5. Merseytravel, from the 20 July 2003, is in effect the SRA for the Merseyrail Electrics Network.
5.3.8 Environmental Policies relevant to Merseytram

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland - Working Together for Clean Air, issued by DETR in January 2000, sets health-based objectives for eight ambient air pollutants. These are set out below in Table 5.1.

**Table 5.1 Air Pollutant Objectives**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Concentration</th>
<th>Objective</th>
<th>Measured as</th>
<th>Date to be achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>benzene</td>
<td>16.25 ug/m³ (5ppb)</td>
<td>Running annual mean</td>
<td></td>
<td>31/12/03</td>
</tr>
<tr>
<td>1,3-butadiene</td>
<td>2.25 ug/m³ (1ppb)</td>
<td>Running annual mean</td>
<td></td>
<td>31/12/03</td>
</tr>
<tr>
<td>carbon monoxide</td>
<td>11.6 ug/m³ (10ppb)</td>
<td>Running 8 hour mean</td>
<td></td>
<td>31/12/03</td>
</tr>
<tr>
<td>lead</td>
<td>0.5 ug/m³</td>
<td>Annual mean</td>
<td></td>
<td>31/12/04</td>
</tr>
<tr>
<td></td>
<td>0.25 ug/m³</td>
<td>Annual mean</td>
<td></td>
<td>31/12/08</td>
</tr>
<tr>
<td>nitrogen dioxide</td>
<td>200 ug/m³ (105ppb)</td>
<td>1 hour mean</td>
<td>not to be exceeded more than 18 x a year</td>
<td>31/12/05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hour mean</td>
<td>40 ug/m³ (21ppb)</td>
<td>31/12/04</td>
</tr>
<tr>
<td>particles (PM₁₀)</td>
<td>50 ug/m³</td>
<td>Annual mean</td>
<td>not to be exceeded more than 35 x a year</td>
<td>31/12/05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hour mean</td>
<td>40 ug/m³</td>
<td>31/12/04</td>
</tr>
<tr>
<td>sulphur dioxide</td>
<td>350 ug/m³</td>
<td>1 hour mean</td>
<td>not to be exceeded more than 24 x a year</td>
<td>31/12/04</td>
</tr>
<tr>
<td></td>
<td>125 ug/m³</td>
<td>24 hour mean</td>
<td>not to be exceeded more than 3 x a year</td>
<td>31/12/04</td>
</tr>
<tr>
<td></td>
<td>266 ug/m³</td>
<td>15 minute mean</td>
<td>not to be exceeded more than 35 x a year</td>
<td>31/12/05</td>
</tr>
<tr>
<td>ozone</td>
<td>100 ug/m³</td>
<td>8 hour mean</td>
<td>not to be exceeded more than 10 x a year</td>
<td>31/12/05</td>
</tr>
</tbody>
</table>

The health effects for some of these pollutants are described in Table 5.3. These set long-term objectives for particles (PM₁₀) and introduce, for the first time, an objective for polycyclic aromatic hydrocarbons. It is proposed, for the purpose of local air quality management, to include in UK wide regulations the objectives for benzene and carbon monoxide, and the objectives for particles in regulations in Scotland and Wales. Local authorities are required to review and assess these air pollutants in their areas and take action where the objectives are unlikely to be met. The existing objectives in the 2000 Strategy will remain in regulation.

The objectives are binding. Local authorities will have a statutory duty to take steps to meet them through Local Air Quality Strategies (LAQS); LTPs and land use strategies will also contribute to these. They have
been revised to take into account up to date evidence and developments, for example in Europe. For some of the pollutants the standards are seen as a staging post rather than the final value, eg particles. Because of the impact on health and the environment, air pollution is one of the headline indicators for sustainable development. In addition, the unequivocal relationship between road traffic in particular and air pollution has meant A New Deal for Transport: Better for Everyone and Transport 2010 have clear targets to reducing traffic-related air pollution.

Table 5.2 Effects of pollutants and air quality objectives

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Source</th>
<th>Health effects</th>
<th>Environmental effects</th>
<th>Air quality objectives:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airborne particulates</td>
<td>Diesel exhaust, coal burning</td>
<td>Carry acidic gases and volatile hydrocarbons into lungs. Raise blood pressure. May be carcinogenic. Possible link with diabetes.</td>
<td>Soiling of buildings, reduced visibility, odour</td>
<td>1h mean</td>
</tr>
<tr>
<td>Sulphur dioxide</td>
<td>Fossil fuels, power stations (73%), diesel exhaust</td>
<td>Bronchitis, bronchospasm (especially in asthmatics)</td>
<td>Main constituent of acid rain. Damages plants and aquatic life</td>
<td>8h mean</td>
</tr>
<tr>
<td>Nitrogen oxides</td>
<td>Motor vehicles (45%), power stations (35%)</td>
<td>Respiratory irritation</td>
<td>One third of acidity of rainfall</td>
<td>24h mean</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>Incomplete combustion fossil fuel, tobacco smoke</td>
<td>Reduces oxygen carrying capacity of blood. Causes headaches, impairs concentration, exacerbates angina, precipitates arrhythmia, retards foetal growth</td>
<td>Oxidises to carbon dioxide, contributing to greenhouse effect</td>
<td>1 year mean</td>
</tr>
</tbody>
</table>
Where Merseytram can result in a modal shift from private cars, there is the potential for improvements in relation to these objectives. This is assessed in detail in the ES. Other relevant environmental policies are summarised below.

‘A Better Quality of Life: A Strategy for Sustainable Development for the United Kingdom’ (TSO, 1999b) has four main aims. These are:

- social progress which recognises the needs of everyone;
- effective protection of the environment;
- prudent use of natural resources; and
- maintenance of high and stable levels of economic growth and employment.

For the UK, priorities for the future are:

- more investment in people and equipment for a competitive economy;
- reducing the level of social exclusion;
- promoting a transport system which provides choice, and also minimises environmental harm and reduces congestion;
- improving the larger towns and cities to make them better places to live and work;
- directing development and promoting agricultural practices to protect and enhance the countryside and wildlife;
- improving energy efficiency and tackling waste;
- working with others to achieve sustainable development internationally.

The strategy has ten guiding principles:

- putting people at the centre;
- taking a long term perspective;
- taking account of costs and benefits;
- creating an open and supportive economic system;
- combating poverty and social exclusion;
- respecting environmental limits;
- the precautionary principle;
- using scientific knowledge;
- transparency, information, participation and access to justice;
- making the polluter pay.

Fifteen headline indicators, which are to be monitored annually, identify the key issues relating to quality of life. They are:

- Economic output - GDP at constant prices
- Investment - social investment as a percentage of GDP at current prices
- Employment - % of people of working age in work
- Poverty and social exclusion - eg working age people in workless households
- Education - % of 19 year olds with level 2 qualifications
- Health - healthy life expectancy
- Housing - % of non-decent housing
- Crime - recorded offences per 100,000 population
- Climate change - 'basket' greenhouse gases
- Air quality - days of moderate or higher air pollution
- Road traffic - vehicle miles
- River water quality - % of total river length
- Wildlife - population of wild birds
- Land use - % of new homes on previously developed land
- Waste - arisings and management

The Government’s policies on noise and nuisance fall into the following categories:

- neighbourhood noise (other than in the workplace) and other statutory nuisance (e.g., dust and smells/odours, bonfire nuisance);
- ambient noise (including a proposed National Ambient Noise Strategy - NANS);
- controlling noise emissions from aviation, vehicles and railways (DfT);
- noise emission standards for outdoor machinery and recreational craft and for fireworks (DTI).

Currently, DEFRA are negotiating proposals for European legislation on environmental noise and will be responsible for implementing the legislation once it comes into force. They are also responsible for managing noise research including noise mapping, assessing current levels and attitudes to environmental noise, a series of joint projects with the Department of Health on Noise and Health, projects connected with the proposed EU Directive on Environmental Noise and the proposed Ambient Noise Strategy and projects in response to noise and other nuisance issues.

Where Merseytram gives rise to a modal shift there is the potential for a reduction in road traffic noise in some areas. In other locations, traffic noise levels may increase due to the displacement of traffic from streets on which the proposed Line 1 alignment runs. This is considered in detail in the ES for the scheme.

5.3.9 Socio-economic Policies relevant to Merseytram

The Government's Economic Strategy aims to achieve high and stable levels of growth and prosperity by creating economic and employment opportunities for all. It is underpinned by the principle of enabling everyone to participate in the benefits of economic success. The key elements of the strategy are:

- Delivering macroeconomic stability
- Meeting the productivity challenge
- Increasing employment opportunities for all
- Ensuring fairness for families and communities
- High quality public services
- Protecting the environment

At a local level, Merseytram contributes to the latter five elements of this.
5.4 Health Policies relevant to Merseytram

5.4.1 The Government’s priorities for improving the nation’s health were outlined in a series of statements, documents and White Papers. The public health White Paper Saving Lives: Our Healthier Nation (OHN) (1999) set out the Government’s intention to achieve better health for everyone, and especially the worst off, by setting targets in four priority areas (Table 5.3).

<table>
<thead>
<tr>
<th>Priority Area</th>
<th>Target (2010)</th>
<th>Associated document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>Reduce death rate by 20% (&lt;75s)</td>
<td>The NHS Cancer Plan</td>
</tr>
<tr>
<td>Coronary Heart Disease &amp; Stroke</td>
<td>Reduce death rate by 40% (&lt;75s)</td>
<td>CHD National Service Framework</td>
</tr>
<tr>
<td>Accidents</td>
<td>Reduce death rate by 20%</td>
<td>Tomorrow’s Roads</td>
</tr>
<tr>
<td></td>
<td>Reduce serious injury by 10%</td>
<td></td>
</tr>
<tr>
<td>Mental Illness</td>
<td>Reduce death rate (suicide) by 20%</td>
<td>Mental Health National Service Framework</td>
</tr>
</tbody>
</table>

These four areas were selected because of their impact on the health of nation, in terms of both mortality and morbidity. Although the stated targets are in some ways arbitrary, achieving them could prevent an estimated 300,000 untimely and unnecessary deaths. The Government's increase in investment has focused on improving the quality of, and access to, services. However, it has been recognised that there are also social, economic and environmental factors that contribute to poor health, and that agencies outside the NHS have a role in improving health. The Government’s general approach was outlined in Saving Lives:

“...Health inequality can be reduced only by giving more people better education; creating employment so that people can achieve greater prosperity; building social capital by increasing social cohesion and reducing social stress by regenerating neighbourhoods and communities; and tackling those aspects of the workplace which are damaging to health.”

Merseytram has implications concerning the physical accessibility of health services, as well as effects on socio-economic and environmental health determinants.

5.4.2 Cancer

One in three people will develop cancer in their lifetime, and one in four currently dies from the disease. Each year there are 200,000 new cases and 120,000 cancer deaths in the UK. The Government’s approach to cancer focuses on raising awareness, promoting healthier behaviour and reducing exposure to risk, principally through decreasing smoking and encouraging the adoption of a healthier diet. “Saving Lives” claims a 10% reduction in cancer death rates could be achieved via these means by 2010.
Cancer treatment is predominantly in specialist cancer centres and Merseytram does not directly affect access to these.

5.4.3 Coronary Heart Disease and Stroke

Cardiovascular disease is currently the cause of 40% of deaths in the UK, claiming the lives of 200,000 people each year, and resulting in disability for thousands more. The largest contributors to this toll are coronary heart disease (CHD) and stroke. The Government’s approach to reducing these diseases focuses on individual behaviour, encouraging in particular: major changes in diet, with increased consumption of fruit, vegetables, and oily fish; reductions in tobacco smoking; avoiding excessive alcohol consumption; and physical activity and weight control.

The National Service Framework (NSF) for Coronary Heart Disease, published in 2000, set national standards for health promotion, disease prevention, diagnosis, treatment, rehabilitation and patient care with the aim of reducing variations in health care and improving service quality. The framework set 12 standards for the NHS, three of which, concerned with reducing heart disease in the population and preventing CHD in high risk patients, have some relevance for transport-related initiatives:

- The NHS and partner agencies should develop, implement and monitor policies that reduce the prevalence of coronary risk factors in the population, and reduce inequalities in risks of developing heart disease.

- General practitioners and primary care teams should identify all people with established cardiovascular disease and offer them comprehensive advice and appropriate treatment to reduce their risks.

- General practitioners and primary health care teams should identify all people at significant risk of cardiovascular disease but who have not developed symptoms and offer them appropriate advice and treatment to reduce their risks.

With these standards in mind, the NSF identifies lack of physical exercise as one of the principal remediable risk factors for developing CHD. It follows US Department of Health recommendations that moderate exercise (e.g. brisk walking) should be undertaken for 30 minutes on at least five days each week. Successful population interventions to promote such physical activity tend to be those that encourage walking as an informal exercise, and that fit into the daily routine, such as:

- promoting moderate intensity physical activity that can be carried out as part of daily life
- promoting cycling and walking as modes of transport
- implementing “green” transport plans in NHS facilities and other workplaces
- creating safe routes to school
- improving community access to green spaces and community recreation facilities
- training primary care staff in counselling skills to promote physical activity
Merseytram through its promotion of integrated transport including cycling and walking is supporting these measures in the CHD NSF.

5.4.4 Accidents
Accidents of all kinds claim 10,000 lives each year in the UK, and they are the most common cause of death in children and young adults. The Governments’ principal means of reducing accidents is to make the environment safer. Although accidents can occur anywhere, the majority occurs at home, work, and school as well as on the roads. As described in earlier sections, there are several objectives of the road safety strategy:

- careful planning of traffic flows
- traffic calming measures
- giving greater priority to pedestrians and cyclists
- designing safer routes to school
- adopting speed management policies
- encouraging the design of vehicles which offer better protection to the occupants and others involved in collisions

Merseytram contributes to this strategy through the careful planning of traffic flows, traffic calming measures, giving greater priority to pedestrians and cyclists and encouraging the design of vehicles which offer protection to the occupants and others involved in collisions.

5.4.6 Mental Health
Mental health influences peoples’ ability to perceive, think, and communicate, and hence how they function within society. Common mental illnesses, such as anxiety and depression, affect over 15% of the adult population, and are a leading cause of illness, distress and disability. Psychotic illness, which affects 0.4% of the population, can be severely and chronically disabling for sufferers and extremely stressful for their families. Mental illness is not, however, a common cause of death in the UK: 3,000 people commit suicide each year, not all of whom are mentally ill.

The National Service Framework on Mental Health identifies mental health promotion as one of its seven standards, urging health and social services to promote mental health and combat discrimination within local communities. Social stress, reflected, for example, in the extent to which an individual has little control over their job, increases the risk of illnesses such as coronary heart disease and depression. Similarly the degree of social cohesion, the strength of social networks in a community and the nature of people’s work may all affect their risk of developing depressive illness. The Government’s response is a commitment to build social capital by increasing social cohesion and reducing social stress through the regeneration of neighbourhoods and communities. It also recognises that exercise, relaxation and stress management have a beneficial effect on mental health, as does maintaining social contacts.
Merseytram's objectives to develop 'sustainable inclusive regeneration', to 'promote social inclusion' and reduce noise indicate coherence with the Mental Health NSF.

5.4.7 Respiratory Health
Respiratory disease represents a significant proportion of ill health and mortality nationally. Whilst there is no NSF for respiratory disease, it is one of the indicators monitored in the 'Better Quality of Life' strategy. However because of the direct links between respiratory health and road traffic it is emphasised here as a potential health gain area for road traffic interventions that aim to attract car users to other less polluting - and health damaging - modes of travel.

Merseytram's objective to contribute to reducing air pollution is in line with this. However, the overall impacts of the scheme on air quality are expected to be negligible.

5.4.8 Health Inequalities
Following on from the Independent Inquiry into Health Inequalities report (Acheson et al, 1998) and the NHS Plan's targets to reduce health inequalities, the Government have consulted on a delivery plan, Tackling Health Inequalities (DoH, 2001). This very clearly spelt out the role of all Government departments in tackling the wider determinants of health inequalities, eg through the Neighbourhood Renewal strategy. Within the monitoring framework, the dataset of health inequality indicators includes:

- Lifestyle factors - eg, physical activity, psychosocial (relationships)
- Wider determinants - eg, transport (Killed or Seriously Injured (SI) from RTAs, access difficulties), employment (relative rates between geographical areas, different population groups)
- Health outcomes - eg, mortality, morbidity/SI from cancer, CHD, mental health, accidents; mortality and morbidity of vulnerable groups (older people and children)

Merseytram has a clear remit to contribute to regeneration and to reduce barriers to employment and services for people living in areas of high deprivation by facilitating access; if successful, this will contribute to reducing health inequalities.

5.4.9 Occupational Health
The Government and it's agencies have developed Securing Health Together: An Occupational Health Strategy for England, Scotland and Wales (HSE, 2001), which aims to:

- Reduce ill health both in workers and the public caused, or made worse by work
- Help people who have been made ill, whether caused by work or not, to return to work
- Improve work opportunities for people currently not in employment due to ill health or disability
- Use the work environment to help people maintain or improve health
By 2010 the strategy aims to have achieved the following targets:

- Reduce work-related ill health by 20%
- Reduce ill health to members of the public caused by work activity by 20%
- Reduce the number of days work lost due to ill health by 30%

Five programmes of work have been established - compliance, continuous improvement, knowledge, skills, and support - through which the strategy's targets will be achieved.

The Strategy represents a commitment to improve health, with the recognition of the importance of a healthy workforce to achieve economic success.

This has clear implications for Merseytram during the construction phase of the scheme with a greater focus on occupational health being advocated beyond existing health and safety requirements.
5.5 Policy Developments on Merseyside: Transport and Health

5.5.1 Both of the local authorities on Merseyside that the Merseytram Line 1 development will pass through (Knowsley MBC and Liverpool City Council) have produced various policy documents relating to local transportation issues. The following summary seeks to highlight the key points arising from the main documents for both local authorities. Policy and project issues are routinely discussed on Merseyside through the Transport, Health and Environment Forum, with representatives from each sector.

5.5.2 Merseyside Local Transport Plan: Opportunities for All

This document (Merseytravel et al, 2000) highlights ways in which the Merseyside local authorities have tried to take forward the national agenda highlighted in the White Paper ‘A New Deal for Transport: Better for Everyone’.

It provides full details of a programme of co-ordinating transport investment, so as to achieve the regeneration vision for Merseyside, but also to ensure inclusive, sustainable regeneration, and to provide opportunities for all who live and work in Merseyside. The following seeks to provide a summary of the main points:

**Strategy Development**
The overall strategy proposes a package of measures to aid regeneration and control the anticipated growth in traffic:

- Provide a single integrated high quality public transport network;
- Provide a network of strategic signing to support efficient freight movement; and
- Provide a programme of initiatives to promote efficient forms of transport.

**The 10 Year Strategy**
- A fully integrated transport system, including a network-wide series of improvements to the Merseyrail network, including new trains, station improvements and better punctuality standards;
- A 3 line Light Rail Transport network (Merseytram) to complement the existing heavy rail network;
- An extensive network of high quality bus services to SMART standards, including high quality infrastructure, trained staff with high punctuality standards;
- An airport access strategy maximising the use of public transport;
- Improvements for cyclists across Merseyside, including a comprehensive network of dedicated cycle routes;
- An integrated land use and transport strategy for sustainable freight distribution; and
- Comprehensive improvement to Liverpool city centre (including Lime Street Gateway), and improved links to the Waterfront.

**The 5 Year Plan**
- Within the 10 year strategy, a package of measures has been identified that forms the 5 year local transport plan. Its main elements are:
  - Development of the bus network, with 15 new bus corridors;
  - Development of the rail network, with 25 station upgrades and underground station improvements;
• The development of 15 new interchanges;
• The development of a walking strategy;
• The development of a cycling strategy;
• Improvements to road safety and urban safety management; and
• Road maintenance proposals.

• The most recent annual progress report of the Merseyside Transport Plan (Merseytravel et al, 2003) highlights some significant improvement
  This includes:

• good progress on approved major schemes including Merseytram Line 1, Blackbrook Diversion and Hall Lane (to improve environmental and road safety conditions on the strategic freight route network);
• planning approval for Blackbrook Diversion and South Liverpool Parkway;
• the launch of SMART quality bus corridors;
• delivery of local safety and traffic calming schemes;
• success in improving road safety, particularly in deprived areas and for children; and
• continued low levels of congestion.

In relation to inclusive sustainable regeneration, the Progress Report highlights examples of how access improvements have been targeted to specific groups, through the following

• expansion of the ‘job link’ services to key employment sites;
• ‘TO GO’ initiative to facilitate independent travel for people experiencing physical or psychological barriers; and
• ongoing comprehensive concessionary travel scheme.

5.5.3 Bus and Passenger Services

The Plan recognises that over a third of all journeys to the City Centre are made by bus. In upgrading the city centre bus facilities, it seeks to improve the quality of travel for bus passengers, whilst also attracting more passengers, so as to help reduce private car use and urban congestion.

The policy outline seeks to:

• improve traffic movement in the city centre by dispersing the heavy concentrations of buses on particular routes;
• improve bus efficiency;
• improve bus passenger facilities; and
• create a safer environment for bus passengers, pedestrians and other road users.

The Liverpool City Centre Movement Strategy (CCMS) forms an integral part of the Local Transport Plan and aims to provide an overarching framework for the development and implementation of transport proposals in Liverpool city centre. Regeneration is the key theme of much of the work, which is currently taking place in Merseyside, and as the focal point for much of the economic activity in the region, the city centre has an important role to play.
The CCMS takes a balanced approach, which considers the needs of car users, pedestrians, cyclists and public transport users, as part of a strategy to meet the requirement to support Sustainable Inclusive Regeneration. The strategy aims to reduce the volume of traffic that passes through the city centre while also maintaining good access by car city centre car parks. At the same time, public transport is afforded priority on certain key routes, to improve reliability and journey times. Traffic access is maintained for business and commerce, and for shoppers, visitors and leisure uses, but the Strategic Road Network is reconfigured to guide traffic to existing off-street car parks. At the same time the re-allocated road space in the central area can be used to introduce pedestrian priority areas and improvements to public transport and access to key development areas an the Waterfront. Complementary public realm schemes will further improve the environment and appearance of the city aiding the wider regeneration initiatives being promoted by Liverpool Vision and Liverpool City Council.

The Merseytram Line 1 scheme has been developed as part of the CCMS. Although the Merseytram Line 1 scheme is not required for the CCMS to be implemented, the schemes have been designed together to provide Liverpool city centre with a sustainable and integrated transport network.

5.5.4 Rail and Passenger Facilities
Merseytravel places high priority on the following:

- major upgrading of the West Coast Main Line;
- high speed rail link from Merseyside to the Channel Tunnel; and
- improvements to Trans Pennine routes through electrification.

The Merseyrail system has benefited from considerable capital investment in recent years, as evidenced by the completion of the Liverpool ‘Loop and Link’ in the City Centre, in addition to a comprehensive programme of Merseyrail station improvements and new stations. The recent re-franchising of the Merseyrail Electrics Network for a 25 year term will ensure the provision of investment in the long term.

5.5.7 Liverpool Unitary Development Plan (LUDP)
The LUDP (LCC, 2002) contains some important plans for creating transport development schemes. It states, for example, that new roads will only be supported where it can achieve any of the aims of securing environmental improvements by removing extraneous traffic from congested areas, especially residential areas, and helping urban regeneration by attracting new investment.

Furthermore, where planning permission is sought for new development likely to cause a significant change in the volume of traffic, the LUDP states that the applicant must submit a full Traffic Impact Assessment (TIA).

Proposals that exceed any of the following parameters generally require a TIA as part of the planning application:

- Residential developments in excess of 200;
- Business development in excess of 5,000 square metres;
- Warehousing development in excess of 10,000 square metres;
- Retailing development in excess of 1,000 square metres;
- 100 trips in/out combined in the peak hour; and
- 100 on-site parking spaces.

The main thrust of the transport strategy of the Plan follows on from the conclusions of the Merseyside Integrated Transport Study (MERITS), in that it promotes the role of passenger transport, cycling and walking in meeting the City’s transport needs. Given the relatively low levels of car ownership (see Merseytram Community Health Profile), particularly within the Merseytram zone, this strategy is underpinned by social and economic considerations. Promoting transport modes other than the private car are seen as benefiting both the local and global environment through reduced congestion and vehicle exhaust emissions.

Improved bus facilities are proposed at key locations and similarly improved rail facilities, in particular new stations, are proposed. Together with improvements to existing stations, these are seen as having the potential to increase the use of the rail network in Liverpool.

**Liverpool Unitary Development Plan – Draft Supplementary Planning Guidance on Merseytram, September 2003.**

LCC have recently consulted with the public on draft Supplementary Planning Guidance (SPG) which has been prepared to provide further planning policy support for Merseytram in advance of the consideration of the proposed TW Order application and planning direction for the project.

The draft SPG considers the land use implications of Merseytram and provides further detailed guidance under the auspices of Policy T3 of the adopted UDP. The draft SPG reiterates policy provision for Merseytram in the adopted UDP under Policy T3 and the reasoned justification. Supplementary policy is provided for Merseytram under Supplementary Policy T3A. This policy sets out the support for Merseytram Line 1 and states that the route will be safeguarded through the development control process.
5.5.8 Knowsley Unitary Development Plan

This document emphasises a commitment to meeting the transport needs of the whole community, supporting and maintaining a competitive local economy and safe, healthy and attractive environment. A key part of this strategy is the development of integrated policy on public transport.

The key policy in the transport section of the UDP is Policy T1 (integrated Policy for Public Transport). The policy sets the context for the proposed scheme by describing the criteria used to assess the need for new transport development.


Draft Supplementary Planning Guidance (SPG) has been prepared to provide further planning policy support for Merseytram in advance of the consideration of the proposed TW Order application and planning direction for the project.

The draft SPG considers the land use implications of Merseytram and provides further detailed guidance under the auspices of Policy T1 of the adopted UDP. The draft SPG reiterates policy provision for Merseytram in the adopted UDP under Policy T1 and the reasoned justification. Supplementary policy is provided for Merseytram under Supplementary Policy T1A and discusses the new draft policies T1 and T2 in the First Deposit Draft Replacement UDP. Policy T1A sets out the support for Merseytram Line 1 and states that the route will be safeguarded through the development control process.

5.6 Merseytram associated documents

5.6.1 Code of Construction Practice

The Code of Construction Practice (2003) sets out a series of mitigation measures to minimise the impacts of construction. It describes the level of mitigation to which Merseytravel is committed and is the result of negotiations with both LCC and KMBC. It sets out measures that will be taken to ensure site safety and environmental best practice, and will encapsulate statutory codes of practice, standards and relevant Acts. The code will cover general aspects of construction works potentially affecting local communities and the environment, as well as individual construction compounds and activities along the route.

The code will be included in the contractual arrangements between Merseytravel and the selected Concessionaire, and their sub-contractors and adherence to its remit will be compulsory.

5.6.2 Design Guide

A Design Guide has been prepared to ensure the highest standards for the scheme. This lays down the design principles. It is made of two parts, the first setting out the general design principles for the 3 line network, and the second applying this guidance to Line 1 specifically. It sets out the minimum standards of
design for the scheme infrastructure (eg stops, surfacing and materials) that are acceptable to Merseytravel and both of the local authorities. Where possible, and subject to cost, the standards to which Merseytram will be designed will surpass the base specification and the standard of design, mitigation and remediation measures reflected in the Design Guide.

Within the Design Guide compliance with the Disability Discrimination Act was of great importance.

5.7.1 Fares Policy
Merseytram have developed a fares policy which anticipates no premium fares on the Line 1 development. Therefore, the cost of travelling on the tram services will be at the same level for buses travelling the same distances. This fits with Merseytram’s wider social agenda around supporting people on lower incomes.
5.8 The Relationship between Transport and Health: An analysis of the literature

5.8.1 Background to exploring transport and health

There has been considerable interest, in recent years, regarding the relationship between modes of transport and the impact upon human health. Some of this has been reflected in specific policy directives aimed at improving air quality, particularly within international policy forums, such as the WHO and the European Union (EU). Air Quality Guidelines (WHO, 1997), for example, drew attention to air pollution’s role in constituting a major environmental health problem, which affects both developed and developing countries. Similarly, in 1996 the Environment Council of the EU adopted Framework Directive 96/62/EC (EC, 1996) on ambient air quality assessment and management. This Directive covered the revision of previously existing legislation, and the introduction of new air quality standards for previously unregulated air pollutants, as well as setting the timetable for the development of so-called ‘daughter directives’ on a range of pollutants.

However, the environmental impacts, such as air pollution, constitute merely one example of the relationship between transport and health. There has been considerable debate at the national level on this issue. The Health Development Agency (HDA, 1998) argued that some negative factors, including traffic casualties, noise and air pollution, are relatively easy to quantify. Other impacts (such as stress and worry, loss of opportunities for physical activity, reduced access to affordable and healthy diets and reductions in non-traffic street activities), however, are less easy to quantify, though no less important. The HDA summarises the evidence on accidents, air pollution, noise and physical activity.

5.8.2 Accidents

In 2002, 3,431 people were killed in road accidents, of which 775 were pedestrians and 1,146 car drivers. Although traffic volume has increased substantially, deaths from road traffic accidents have approximately halved since 1960. Casualties to vulnerable groups, such as children, pedestrians and cyclists have reduced in recent years, although this is more likely due to road danger (ie fewer people walk or cycle, with parents more restrictive of their children’s activities) than to a lowering in risk reduction posed by road traffic.

5.8.3 Air pollution

The Committee on the Medical Effects of Air Pollution (COMEAP) has estimated that up to 24,100 deaths each year in Great Britain may be brought forward by air pollution, mainly among older people and the sick. Furthermore, 23,900 hospital admissions, as well as further additional admissions, can also be brought forward by air pollution, and chronic effects are not even recorded in these figures. Long-term exposure to air pollution also damages health, although this is not yet quantifiable.
5.8.4 Noise
Complaints about the noise from road traffic have increased by 64% from 36 per million people (1982) to 59 per million people (1993/4). The strongest evidence for the effects of environmental noise on health relates to annoyance, sleep disturbance (ie onset, latency, awakening during the night and prematurely; subjective quality and mood the next day), ischaemic heart disease and performance by school children. Inconclusive data has also pointed to effects such as low birth weight and psychiatric disorders.

5.8.5 Physical activity
There are a range of health outcomes influenced by poor physical activity, and these include coronary heart disease, diabetes, stroke, obesity / overweight and mental well-being. The risk of coronary heart disease is twice as great for an inactive person as an active one, yet it is estimated that six out of ten men (and seven out of ten women) in the UK are not regularly active. Integrating physical activity into everyday life, through cycling and walking, can substantially improve aerobic fitness.

5.8.6 Social networks, economic activity
Evidence from elsewhere (eg WHO, 2000; Acheson et al, 1998; Appleyard, 1981) also shows the important relationship between road traffic and the effect on social networks, and health and well being outcomes. In addition the associations between transport and employment and employment and health are well-defined (Acheson et al, 1998; BMA, 1998).

5.8.7 Transport mode and health: evidence from the literature review
The literature on the impact of transport mode and design upon human health considers a wide range of issues, and draws comparatively little direct attention to morbidity and mortality within the population. This literature review seeks to outline the key messages using a thematic approach, and draw out the main inferences that can be made for developing transport modes that can enhance population health. The themes that are explored here, therefore, do relate to population health, but more indirectly than directly. Further details are provided in Appendix 5. They can be summarised as:

- the environmental impacts of traffic mode;
- accessibility;
- reducing car travel; promoting an integrated transport design;
- public transport and the promotion of physical activity;
- the development of healthy public transport policy;
- relative accident risks of buses and trams.

5.8.8 Environmental impacts of traffic mode
Public transport is recognised as being more energy efficient and less polluting per passenger kilometre than cars.
A review of bus-based public transport systems in Canada, the Netherlands, the UK and the USA (Potter & Enoch, 19997) was examined to identify their relative benefits and implications for Merseytram. Each had slightly different operational contexts and emphases - the UK system was the only one developed as a privatised, deregulated system, but has increased patronage by 30%, the USA had exclusive busways, Canada had a hierarchy of services and the Netherlands have enforced restrictions to parts of the city to private motor vehicles.

It was concluded that measures to promote bus use need to be integrated with a mix of land use, car restraint and economic policies together with approaches to influence attitudes to travel and travel behaviour. Political will was seen as vital as well as champions to see improvements through.

There are implications for Merseytram here, firstly in relation to complementary bus service developments, and secondly to the transferability of conditions to successfully facilitate a switch to a public transport system from car use.

5.8.9 Transportation and accessibility
Merseytram has a key objective to increase social inclusion. An effective transport system will open up economic and social opportunities by increasing accessibility without compromising the environment (and public health).

An example from Australia draws some parallels with Merseytram, particularly regarding the development of integrated transport systems with various transport modes - bus, rail, ferry - in the context of sustainable regional development. Within South East Queensland the policy goal was to have 90% of the total population covered within 400m of a bus, rail or ferry stop. In reality however this has been hard to achieve with only 55% of the population having access to public transport within 400m. It concluded that public transport goals need to reflect the spatial, demographic and socio-economic characteristics of the particular locality. As such the focus turned to enhancing accessibility for vulnerable groups - older people, people on low income.

Merseytram's Line 1 route has been devised in order to meet the needs of the local population. Access to the stops is 800m (Steer Davies Gleave, 2004) for 90% of the Merseytram zone population. Although the route has bus services, journey times are comparatively slow and their frequency does not meet local needs.

5.8.10 Transportation and reducing car travel
There has been much research on how to encourage car users to switch to other methods of transport. Factors that facilitate this switch include:

- Reducing parking at work (Stokes, 1996)
- Awareness of the effects of car use (Steg & Vlek, 1996)
- Reducing journey times (Curtis & Carey, 1997)
- Reducing travel costs, discounted fares
- Convenient/accessible stops
- Reliability and frequency of other travel modes (Lex, 1999)

Those less inclined to change travel mode include part-time workers, younger people (20-24 years), and older people (50+) as well as people fearful of crime or personal safety. Constraints in circumstances
Merseytram's proposals include the provision of conductors and other security measures eg CCTV. Other issues such as journey times, frequency and reliability are also addressed. Finally, the fares policy will ensure travel costs are comparable to bus travel.

5.8.11 Promoting an integrated transport design

The Light Rail Transit Association (LRTA) and others, including Merseytravel, have argued that UK tram systems should be more strongly integrated with bus networks similar to continental models. The benefits of this are enhanced patronage. Park and Ride schemes were also seen as important features of an integrated transport strategy to increase usage, as were fare reductions, parking charges and road pricing. The Merseyside Local Transport Plan also includes an Interchange Strategy.

A review (May & Roberts, 1995) examined a range of studies in the UK and concluded effective integrated transport strategies are sustainable and can achieve economic growth without increases in congestion and pollution.

One of Merseytram's objectives is to provide a system that is integrated with other transport modes.

5.8.12 Public transport and the promotion of physical activity

Kingham et al (2001) explored the relationship between public transport and cycling. Their findings suggest that people would regularly cycle to work if they lived closer to work and owned a bicycle. Financial incentives and safety measures, eg cycle paths would also potentially influence uptake.

Merseytram seeks to support cycling and walking. The evidence suggests that it would be useful to explore whether local workers would take up cycling if there were financial incentives, including providing bicycles, and safer cycling routes.

Developing healthy public transport policy

The marked decline in public transport services in the UK contrasts with the developments in Europe. Between 1966 and 1993 bus patronage declined by 32% in the UK, but increased by 16% in the Netherlands, 34% in Germany and 52% in Belgium. Similarly in the UK rail travel increased by 3% in the same period compared with 52% in France, 58% in Germany, 100% in the Netherlands and 109% in Belgium.

Edwards and Mackett (1996) suggest that the attitudes to urban public transport have been very different. They argue, however, that developments of UK light rail systems are not necessarily the answer to this as they are an expensive option, that are not always used to capacity and whose effectiveness in reducing congestion and stimulating development is unsubstantiated. They conclude that globally the trend is towards buses and busways and that the UK is out of step with these developments.

However, Hass Klau et al (2000) had a different perspective. A study carried out by Environment & Transport Planning (ETP) and the University of Wuppertal on behalf of a consortium of clients including the DETR, The Confederation of Passenger Transport, PTEs and operators concluded that light rail can be a “confident futuristic
symbol of the city” and “it has many friends… and few enemies”. For bus priorities the study concluded that
“...service improvements – while overwhelmingly positive in terms of value for money – are simply too small to make a great impact”, and that busways and guided buses “are probably limited to a fringe role…. and for use in some outer areas….. They are unlikely to be implemented in town centres in any country…. We do not consider that busways will be the central element of the public transport strategy of any European town….”

In terms of capital cost the study concluded

“Given similar conditions, the infrastructure costs for light rail, busways and guided buses are closer together than has often been assumed. Light rail and busways are very similar in terms of cost. Guided busways are generally slightly cheaper: we do have some examples where guided busways are very much cheaper, but it would be over-optimistic to assume this will always apply. There are clear differences between vehicle costs, light rail being by far the most expensive, but also having the longest life expectancy. However the newly manufactured guided buses, the TVR [GLT] Translohr show similar costs to a light rail vehicle.”.

Fitzroy and Smith (1998) present an alternative argument from experience in Freiburg, Germany. Here public transport patronage doubled between 1983 and 1995 with tram trips exceeding buses. The key to the success was seen to be the ‘environmental protection’ ticket, which was transferable across the network, and to family and friends. There was also a favourable pricing differential compared to other tickets.

Hill's analysis (1995) of Toulouse and South Yorkshire's tram systems showed a number of key differences that were suggested to account for their relative successes. Firstly Toulouse's system is fully segregated and mainly underground, whereas South Yorkshire's Supertarm is not. Secondly, Toulouse's Metro has encouraged cheap fares to divert 20% of road traffic to tram use, whereas the Supertram has had to compete with the privatised bus and rail networks.

Park and Ride schemes are seen to have both benefits and disbenefits (Parkhurst, 1995; Topp, 1995). Disbenefits may include:

- switches from transport modes other than the car, eg buses, trains
- additional trips due park and ride facilities
- To counter this it was suggested that other measures such as car restrictions in City and town centres need to be in place.

Merseytram's fares will be competitive with buses, and 'Trio' and concessionary tickets will apply. In addition, other strategies such as the CCMS may help reduce the potential negative consequences of Park & Ride facilities.

5.8.14 Accident risks: buses and trams

Different types of transport mode represent different levels of risk to pedestrians and cyclists. A Swedish study (Hedelin et al, 2001) analysing relative transport risk for buses compared with trams found that the risk of suffering a non-fatal injury was four-times higher per vehicle-kilometre for tram traffic compared with bus traffic.
Furthermore the risk of death was 9 to 15 times higher for tram traffic. Most of the injured were pedestrians: roughly 39 were injured by trams and 14 by buses. Trams injured twice as many cyclists compared to buses. Three quarters of injuries were sustained at bus or tram stops, or at pedestrian crossings. Further analysis reveals that a third of tram injuries, and a quarter of bus injuries, occurred in the dark. There was a very high ratio of 1:14 between the fatally and non-fatally injured, yet for buses the ratio was 1:33. An important factor identified by the authors was the injurious nature of trams, due to the ‘non-forgiving’ structure at the front with a hard coupler sticking out and the wide mouth at the front that can entrap people. Furthermore, if a pedestrian falls under the iron wheels of a tram, more harm is caused in comparison with falling under the rubber tyres of a bus, which can sometimes roll over a leg without causing serious harm. The authors recognise that trams are now being equipped with protecting side shields to prevent people from sliding in under the tram. However, they emphasise that the front area also requires modification to a less dangerous design, given that many of the injured people were struck by this part of the tram.

This emphasis on proper safety facilities is something that can be introduced with new systems such as Merseytram, but which may not apply to older, existing systems. In addition, whilst these risks may be relevant to older, existing systems, current regulations require that new tram vehicles are designed to address all of these risks. These insights have highlighted the importance of stops, and surrounding areas, being well lit to reduce the risk of injury. It is also reinforces the emphasis of safety features of the tram within the Design Guide.
SECTION 6: EVIDENCE FROM STAKEHOLDERS AND KEY INFORMANTS

6.1 Introduction
6.1.1 This section presents evidence of health impacts identified from the data collected from 'stakeholders' and 'key informants'. 'Stakeholders' are defined as individuals or groups of people who have a stake or interest in the policy under investigation. For the Merseytram Line 1 scheme proposals, stakeholders included people who live and work along the Merseytram alignment in the following wards: Cherryfield Kirkby Central Abercromby Clubmoor Everton Gillmoss Kensington Smithdown Tuebrook. In addition data from individuals and organisations involved in the development of the project proposals was also collected. 'Key informants' are experts or specialists in a specific policy field. For the purpose of this HIA, key informants in transport and transport and health were invited to be involved.

6.1.2 The section also draws on data from the Merseytram Line 1 public consultation exercise.

6.2 Presentation of evidence
6.2.1 Findings are presented under the themes that emerged from the interviews and focus groups. Contributions have been anonymised. The aim of the interviews and focus groups was to gain a range of opinions, experiences and beliefs, and to generate from this an understanding of the potential effects of the intervention - in this case the Merseytram scheme - on the stakeholders. It was not the purpose of the qualitative approaches used to attribute numerical values to different views.

6.2.2 Twenty-two focus groups and interviews were facilitated between October and December 2003. Focus groups were held with each of the stakeholder and key informant categories identified in section 3. The development of the question schedules is described in section 3. The development of the question schedules is described in section 3.

6.3 Perspectives of Liverpool and Knowsley

6.3.1 Socio-economic environment

Families / communities
The sample presented a variety of views in this regard. Some felt that strong communities existed in the area, and that these were very committed to the area. Social networks were also seen as fairly well developed, despite the fact that younger people were perceived as more excluded from the community as a whole. This spirit was seen in the engagement local people had with statutory authorities, particularly within a regeneration context.

“people are very committed to the area... there isn’t a lot of movement in and out, people feel that if members of their families decide to move out of the area, they’re almost betraying them”
Local people themselves generally felt that families and communities were 'close knit' and very supportive of each other. Children tend to stay close by when they grow up, or if they move away come back to 'be near their mothers'. Older people in Kirkby found particular support from the closeness of the community, as well as the various community activities for them. However some of the younger respondents commented that Liverpudlians were not as friendly to students or outsiders.

Others, however, felt that only certain communities, for example older, more established communities, actually exhibited a strong sense of community spirit. One respondent felt that higher living costs within the city centre could be causing cleavages within communities as certain families are priced out of some areas, so weakening community spirit. It was also commented on that there were some 'naughty families' who are anti-social and cause problems.

It was commented on that there were less 'traditional family units', with a lot of young families with young mothers, and single parent families. In Liverpool, there was a large, transient student population and comments that the population is more migratory as housing areas have been cleared and communities have been displaced.

Work / education
Worklessness was seen as having a very damaging impact, particularly in relation to the intergenerational unemployment of some families. This had created a ‘dependency culture’ within certain communities, and this did not support the creation of a strong educational base in the region, where school performance is generally poor.

"in some areas we've got three generations of unemployment ... there just isn't the culture of working"

Nonetheless, respondents highlighted the Job Link element of the Pathways areas, so as to help unemployed people access work. Similarly work is in progress to tackle youth unemployment and address the skills shortage, particularly in relation to manual trades, such as plumbing and electrical work. The local economy is seen to suffer generally as a consequence of high unemployment. However, to tackle the culture of worklessness, regeneration money was not deemed by all to be the universal panacea:

"we've got a stash of millions coming in Northwood (Kirkby) in the next two years ... whether it will make a difference I don’t know, because it's a cultural thing"

It was acknowledged that there is a range of education and training opportunities available in Kirkby and Liverpool, for example through Sure Start, Community Colleges as well as at local schools.

Local economy
Deep seated levels of deprivation across the Merseytram zone were recognised by all key stakeholders, although it was observed that not all respondents felt
comfortable in describing where they lived in this manner. The pockets of affluence were few and far between, and the presence of food deserts was perceived as symptomatic of a deeper social malaise, such that a local supermarket (in Kirkby) had closed because of high levels of shoplifting.

\[\text{“all they’re left with is corner shops which sell tinned fruit and very old fruit and veg …. To get decent food is hard for (the) old and disabled … it’s a vicious circle of deprivation”}\]

The inward investment into Kirkby over recent years was commented on, eg QVC. With the increase in job opportunities and housing developments, many mentioned noticeable improvements in Kirkby. A number of people also commented on the influx of shoppers to Kirkby on market days. Similarly in Liverpool, the New Paradise Street development was mentioned by a number of people as well as the opportunities that the European City of Culture will bring.

However, it was still felt that for some groups in particular unemployment was too high and that too many jobs were serviced based. There were also concerns about what happens when all the regeneration money dries up? Finally respondents mentioned raised the growing disparity between rich and poor locally - something that was not discernible until recently - reflected in housing market prices.

\textit{Safety (including RTAs)}

Road safety was not deemed a highly significant issue, as the road traffic accident rate is very low in comparison with other areas. However, risk-taking behaviour, eg by young men on motorbikes (increase of head injuries), drivers going through red lights and speeding over road humps, increase the likelihood of accidents. Others pointed out that there were known accident hot spots, but that measures were in place to address these issues (ie publicity campaigns). Within the city centre, there were deemed to be few traffic black spots. Comments were also passed on traffic volume and the difficulty of crossing the road.

\textit{Crime}

Crime has a devastating impact upon community residents in Kirkby, with gangs of young males engaging in anti-social behaviour and spreading fear and intimidating local residents. Some commented that gangs tended to congregate around bus shelters. The perception is that this behaviour is out of control. Drug-related crime - including dealing on buses - was also mentioned, as was car theft and the related dangerous driving. Some areas were seen as less safe than others but the reputation of areas was said to change constantly.
6.3.2 Physical environment

Traffic
On a positive note, traffic in the city centre is not perceived to be as bad as in other regional centres, although if there is an upturn in the city’s economic performance generally, this may encourage more people into the city and so the present situation may change. However, as a pedestrian, the city centre is seen as presenting a host of difficulties, such as accessing St George’s Hall from Liverpool Lime Street. This can mean people feeling unsafe, particularly as signage is not seen as very well defined.

In relation to travel behaviour, the main positive aspect identified by one respondent is the good rail network, with the underground loop system through the city centre. This is not always appreciated as much as it ought to be; Central Station, Moorfields and Lime Street can be accessed fairly quickly from most places.

Various respondents mentioned the City Centre Movement Strategy (CCMS) as a means of addressing some of these issues, and encouraging a modal shift whereby people leave their cars at home. Inappropriate parking was seen as a particular problem in the City centre; this was said to impede the smooth flow of traffic and cause buses to run behind schedule. However, beyond the confines of the city centre, a sense of parochialism is seen as inhibiting people’s willingness to travel beyond their own locality, although this is not helped by bus services not operating as efficiently as local people would wish or at convenient times.

It was mentioned that Kirkby train station was very well used, with cars left in the surrounding streets in order for people to use the train. Taxis were also a preferred mode of transport for the Kirkby resident’s and were said to be cheaper (when shared) and more convenient than travelling by bus.

Accessibility
Accessibility is a particular issue in the city centre, where the traffic can be so intimidating that it deters people from travelling around. Consequently the CCMS aims to force traffic out of central Liverpool, and so encourage pedestrianisation. However, in relation to the needs of disabled travellers, more buses were seen to be cognisant of their needs, although some stations were still a problem.

One stakeholder commented that the Knowsley borough was poorly served by bus companies, such that there were few bus services between St Helens, Liverpool, Halewood, Kirkby and Huyton. Associated with this, people find it difficult to get to health care services, and this added to a heightened sense of parochialism within the borough.

‘When I sprained my ankle and had to go to University hospital... the bus dropped me off ... but the actual entrance is another 100 yards so I had to hobble from the bus stop to A&E... make more sense for the bus stop to be at the entrance.’
However it was also said that if you had access to a car, Kirkby was very accessible to and from various places - Liverpool, St Helens, Southport - relatively quickly and easily. Some respondents thought Liverpool was well connected by public transport links to other parts of the North West.

**Air quality**

A stakeholder commented that local residents in Kirkby were concerned with air quality, but more in relation to factory odours rather than vehicle emissions. This is more of a nuisance factor, as research had indicated that the factory odours were not injurious to health. This was borne out by many residents who were very sceptical about factory emissions not being harmful to them.

**Cleanliness**

Cleanliness was perceived as poor in some areas, although there was a feeling that this had improved. Some respondents felt this related to the sense of community spirit in the area. Litter in the city is highlighted as a significant issue, especially after the weekend. Some respondents felt that this is a cultural issue, and one that is relevant to all major urban areas in the UK. One stakeholder felt that the residue from factory smoke in Kirkby could coat houses and cars, depending on the direction of the wind.

### 6.3.3 Services

**Public transport**

The positive aspect of current public transport relates to the government funds that are made available to improve transport planning, although on the negative side, deregulation means that bus services can be sporadic and unplanned. The bus stations at Queen Square and Paradise Street are seen to work quite well. However, transport planning is weak, such as the absence of layover space for buses to wait before commencing their journey, so creating congestion. Importantly, residents in Kirkby commented that the bus timetables were very restrictive and did not run on some days after 6.30 p.m.

The lack of an infrastructure at the Pier Head is seen to inhibit the movement of people into the dock area. Restaurants, bars and other social facilities were seen as a way of encouraging people to go the Pier Head, so relieving congestion elsewhere.

**Health services**

A key stakeholder in Kirkby remarked that primary care facilities are not seen as very good, particularly given the very poor quality buildings. However, on a positive note, the Health Suite provided a wide range of health services locally and funding has been made available to revamp a lot of primary care buildings, although these will not be completed for the next few years. Within the city centre, one respondent commented on a perceived lack of GPs. This links to comments made by a respondent concerning the lack of dialogue between land use planners and health care planners, so that health care facilities are not always located in areas where people can easily access them, particularly if they are relying on public transport.

A further respondent also highlighted this issue, but felt that greater links were being created between statutory and non-statutory agencies to address this problem. There are moves in Kirkby to link social services and health with
community transport, so that a more co-ordinated, integrated system could be created.

*Police*

Many of the residents commented on policing within Kirkby. Key points made included:

- the lack of visible presence
- the lack of response or no response to reported crime
- 'part-time' police station

This was a real source of concern for residents.
6.4 Potential positive impacts of Merseytram Line 1 scheme

The responses of community stakeholders to the Merseytram scheme proposals were based on the assumptions that the scheme would be implemented in its entirety. Any amendments to the scheme proposals would undoubtedly reflect different opinions on the impacts.

6.4.1 Socio-economic environment

Families / communities
The main advantage is the link to Kirkby, which is seen as having economic benefits for the people of Kirkby. For families, there are the added benefits of reducing levels of isolation, particularly as the route of the tram will touch upon those pathfinder areas, which have high levels of deprivation. In relation to social networks, Merseytram was seen as providing opportunities for improving these as people from Kirkby will have access to public transport and will be able to go out and visit friends and family more.

Local economy
All stakeholders commented on the perceived benefits of people accessing employment opportunities in Liverpool, although some noted that this could also be a two-way process, and opportunities in Kirkby might also serve to attract people from Liverpool, and so help to regenerate Kirkby.

Work / education
There are also important employment and training opportunities to be gained, particularly for people living in Kirkby being able to get into Liverpool and access such opportunities. The key benefit is that residents living along the Merseytram path will be able to access jobs and educational opportunities that might not be as easily available. One stakeholder felt that there were other benefits, less easy to quantify but no less valid, in the positive image for local residents:

“it will enhance the feel of Merseyside as a go-ahead .. conurbation”

Given that the Merseytram will pass through six of the 38 Pathways areas (part of EC Objective 1 funding area), it will hopefully connect people living in areas of high deprivation with economic and educational opportunities within investment areas, and this has major positive benefits.

Safety (including RTAs)
It was thought that road traffic accidents should also be reduced as a consequence of Merseytram. However, virtually all respondents commented on the wider issue of crime, and the importance of having staff on the trams that will be able to deter anti-social behaviour. Similarly, the importance of the tram service operating the security measures indicated in the proposals, eg the CCTV system and conductors in making passengers feel safer was emphasised. In addition respondents affirmed their support for stations/stops to be well lit; this was felt would increase the sense of public safety. Although respondents were clear that these measures were in the scheme proposals they were anxious that this commitment was sustained, otherwise there would be a danger that public confidence would be lost.
6.4.2 Physical environment

Traffic / travel behaviours
On the positive side, the development should contribute to a modal shift from road traffic so that people are less likely to drive a car along the Line 1 route, and subsequently there should be less traffic in the city centre.

Travel behaviours should also be made healthier, as the image of the tram as a high-tech, state of the art mode of transport compares very favourably with that of the outdated, often irregular and dilapidated bus service.

Another stakeholder commented that the tram stops should be very well lit, and were reassured that CCTV facilities were also proposed. This was seen as reassuring the travelling public, and so encouraging people to be more confident in travelling on the tram, and be less afraid of anti-social behaviour.

However, one stakeholder questioned how much traffic would be reduced as a consequence of the Line 1 development. At the Kirkby end of the Merseytram development, there were doubts expressed as to how much traffic would be taken from the East Lancashire Road (i.e. the major thoroughfare linking Kirkby with Liverpool) in favour of the tram service.

Accessibility
Stakeholders remarked that accessibility should also be improved, particularly for those coming into the city centre in a cleaner vehicle, and be travelling around the city centre in a cleaner vehicle. Air quality will also improve with less car usage. Similarly, where the operation of Merseytram can reduce road traffic, there may also be a reduction in road traffic noise. Some Kirkby residents indicated that as long as there are conductors on board the trams, local people would use them. Many elderly residents live much closer to where the tram will be in comparison to Kirkby train station, so it will be much more convenient for them. The regularity of the service will also encourage users, as they will not have much time to wait.

Air quality
A respondent considered the improvements in air quality when the tram was in operation might be less than anticipated for such a large development. Residents had mixed views: some thought there would only be a difference if less people used their cars, not if more people moved from buses to the tram.

Noise
Many people had experience of the Manchester Metrolink and felt that noise-wise the tram would be a marked improvement when it was in operation compared to current road traffic noise. One respondent commented that the level of noise however would also depend on the type of rolling stock ultimately commissioned.

Integration
The tram system is seen as integrating Kirkby more with Liverpool, and this is seen as beneficial.
Cleanliness
Cleanliness is linked with the image issue, as a clean, efficient tram will have significant impact on improving the image of the area, but also how people feel about themselves and the environment in which they live. There is a definite feel-good factor associated with the tram, and all respondents commented on how this tied with the successful Capital of Culture bid.

6.4.3 Services

Public transport
In relation to public transport services, there is a positive sense in the tram being a properly planned service, which cannot be re-routed on an ad hoc basis (like the buses). The regularity of the service every few minutes will have a positive impact on passenger usage.

Another benefit mentioned by one stakeholder is around the current lack of mobility in the city centre, in that certain areas of the city centre are cut off from others due to the road network. Merseytram links the city centre to the Pier Head, and so will attract people there, and this should enhance people’s ability to travel about, as well as bring some economic benefits to the Pier Head district.

6.5 Potential negative impacts of Merseytram Line 1 scheme

6.5.1 Socio-economic environment

Families / communities / social networks
A key informant was critical of the tram development and how it would improve the quality of life for people in Merseyside. The cost of the Line 1 development was seen as too expensive for ultimately small gain that would benefit people who are more affluent:

“If you could spend £146,000,000 on improvements to the public realm ... walking, cycling and better buses ... (you could have) a bus every 5 minutes .. this is a very inefficient way to spend money”

However it must be stressed this was one person’s view and in the absence of information on the fares policy guaranteeing parity for bus and tram fares.

There were concerns that the disruption of social networks during the construction phase of the scheme, eg where roads were fenced off and difficult to cross, may persist into the operational phase.

Safety (including RTAs)
One stakeholder in Kirkby commented that as well as the positive aspects for young people accessing work and educational facilities in Liverpool, a potential drawback might be in taking disaffected youth into Liverpool late at night. This could create the circumstances for these young people to engage in risk taking behaviour, including anti-social behaviour. There were similar concerns about anti-
social behaviour of young people on trams during the day, although there was some reassurance in having conductors and CCTV.

Some respondents wondered about RTAs associated with trams: Are RTAs more likely because they are quieter? Are you more likely to be seriously injured or killed compared to an accident with a bus? It was clear that tram safety design measures contained in the Design Guide need to be further elaborated to reassure stakeholders.

Local economy
The key negative impacts relate to education and the local economy, in that it could mean that local business and services at the Kirkby end of the line suffer as people access jobs and services in Liverpool. Similarly there may be a danger to the infrastructure of Kirkby, if lots of young people vacate the area. Another view was that there might be more competition for jobs local to Kirkby, as Kirkby becomes more accessible to Liverpool residents; this was seen as a particular problem for Kirkby people with low skills who could only access local low paid jobs as travel costs would make working outside the area prohibitive.

The construction phase was also seen as the potential of disrupting trade for local shops and businesses along the line as well.

6.5.2 Physical environment

Traffic
There was widespread concern about the length of the construction phase and the impacts on congestion and general disruption to traffic during this time.

Air quality
Some respondents commented on the decrease in air quality during the construction phase particularly from dust; however measures to reduce that would be in operation. Exceedances would be monitored, but complaints from residents would also be responded to.

Noise
Noise was considered to be potentially significant for those residents adjacent to where the tramline is being constructed.

'Some people will be subject to noise and dust for months and months.'

In spite of the proposal promoting low noise emissions from Merseytram during operation, there were concerns from some respondents based on experiences of residents who lived near the tramline Manchester and also from noise complaints concerning the Nottingham tram.

Buildings
Some respondents commented on the lines of the tram spoiling the view of some of Liverpool’s attractive buildings in the city centre, although commented that this had not damaged the image of attractive buildings in Manchester.
Travel behaviour; pricing, speed, convenience

Many respondents were concerned about pricing and felt this was potentially the most important issue of the tram, especially given the high levels of socio-economic deprivation along the line of the route. It must be stressed that this was in the absence of information on Merseytram's fares policy. Unless prices remain fixed at an affordable level, it was thought that this could have serious consequences for enhanced social exclusion along the route, whereby the bus service becomes the public transport service for those too poor to use the tram. One stakeholder commented:

“If you were going to go for a poorly paid job .. the costing might be a barrier”

This issue was also raised forcefully by a key informant, who commented on the way tram systems in the UK are inherently beneficial to middle class, affluent commuters:

“the tram is a large expensive public sector programme for making middle class people .... better off”. (It) does not have the impact on poorer groups...because the fares system is stacked against them”

The key informant also commented on the strange paradox that a city with high levels of social deprivation also has a very significant use of one of the costliest travel modes (i.e. shared taxis). The tram development, therefore, is seen as indicative of a peculiarly British way of approaching issues of sustainability and social exclusion that has not place for a truly integrated transport system. This view was reflected by several other respondents.

Many people thought that the tram would only be used by those who lived within reasonable working distance of the Merseytram Line 1 alignment. It was thought to be highly unlikely that people using the train between Kirkby and Liverpool would convert to using the tram because it was so fast.

6.5.3 Services

Public transport

One key informant was critical of the poor infrastructure, which inhibits people getting from their homes to the tram stops. There was said to be too much emphasis on providing a nice tram system, but people that experience high levels of social exclusion, particularly elderly people, will find it difficult walking to the stops. He argues:

“walking conditions ... becomes of critical importance if you're a little bit unsteady on your feet.. or you have a visual difficulty”

In addition it was thought that the introduction of the tram would have a detrimental effect on the bus industry in the area. There were also queries concerning the financial viability of the tram based on the experiences of Sheffield, Birmingham and Croydon.
Transport planning
The key informant also delivered a damning indictment of transport planning’s failure to produce a strategy to integrate the city whilst tackling social exclusion. The key argument is that research indicates that tram systems only reach a small proportion of people living nearby to stations. Thus the tram network will hardly encroach upon areas of intense poverty in Liverpool:

“800 metres .. that’s your catchment area, and it ain’t much .. if you run through lots of deprived wards .. you’ll be lucky to pick up 5% of the geographical area”

However, the blame for inadequate planning lies more with central government, who are seen as preferring tram developments, as they involve private sector monies – this is seen as saving the government many millions of pounds. These values are seen as underpinning the rationale behind deregulation and privatisation of transport services, and it is the poorer communities (elderly, benefit claimants, etc) who bear the brunt of such macro-economic mismanagement.

Possible deregulation
There were concerns from some Kirkby residents that a potential negative impact would be if the trams suffered the same as when buses were deregulated. This adversely affected local bus services, so that after 6 p.m. the service more or less finishes, making it virtually impossible to get out of Kirkby after this time if you did not have access to a car. So long as there is no similar impact, then older people in particular will find it easy to socialise more, visit relatives, etc.

6.6 Evidence from Merseytram’s consultation exercise
6.6.1 Merseytravel held a six-week public consultation on the Merseytram proposals in the Spring 2003. Approximately 9,147 people responded to questionnaires, which showed 90% in favour of the scheme. A total of 6,563 respondents (71.8%) said they "strongly supported " the scheme, and a further 1,659 (18.1%) said they "supported" the Merseytram project.

On the breakdown of the figures, 85% of people said they supported the proposed line and the Liverpool City centre loop. Of these, 45.8% said they would welcome reliable journey times, and 36.9% stated they would look forward to travelling in safety with security.

6.6.2 Reasons for Supporting Merseytram
The top 5 reasons were:

Line 1
1) Environmental benefits
2) Reduced congestion
3) Convenience/Accessibility of Merseytram
4) Merseytram being a reliable and fast service
5) Improvement to existing public transport
City Centre Loop
1) Convenience/Accessibility benefits
2) Reduced congestion
3) Environmental benefits
4) Employment opportunities
5) Merseytram being a reliable and fast service

6.6.3 Future Use of Merseytram

Of the 9,147 responses...
• 83% would use Line 1
• 91% would use the City Centre Loop.
• Of the 6,473 car-owning respondents, 62% would use the Park and Ride facility.

Top Characteristics of Merseytram
People were asked to identify the most important features of Merseytram…
For Line 1, the top 5 important features were:
1) Reliable journey times
2) Safety and security
3) Fast journey times
4) Trams are environmentally friendly
5) Reasonable fares

For the City Centre Loop, the top 5 were:
1) Reliable journey times
2) Safety and security
3) Convenient stop locations
4) Trams are environmentally friendly
5) Fast journey times

Kirkby Options
As part of the public consultation two alternatives for the Merseytram terminus in Kirkby were presented. The alternatives reflected various development proposals that were being considered at the time. The results of the consultation showed no strong preference for either of the options.

Following further technical discussions the route via Cherryfield Drive was approved due to its proximity to the existing Town Centre including the shops, college, municipal offices and the new proposed bus station, which will be improved to form an interchange with Merseytram.
SECTION 7: IMPACT ANALYSIS

7.1 Introduction

7.1.1 Data from the profiling, documentary analysis and from the fieldwork have been collated and analysed to identify evidence of the potential health impacts of the Merseytram Line 1 scheme on the population most likely to be affected by the scheme. Twenty-two interviews and focus groups were conducted with community and organisational stakeholders, as well as with key informants, independent witnesses with expertise in transport or transport and health. The matrices below define the Potential Health Impacts of the strategy on different health determinants and their subsequent effect on health outcomes. The Direction indicates whether this impact is a health gain (+) or loss (-). Scale is a measure of the severity of the impact (in terms of effects on mortality, morbidity and well being) and the size/proportion of the population affected - is represented by the number of symbols as follows:

<table>
<thead>
<tr>
<th>Severity/population proportion</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>---- or ++++</td>
<td>---- or +++</td>
<td>-- or ++</td>
</tr>
<tr>
<td>Illness/injury</td>
<td>---- or +++</td>
<td>-- or ++</td>
<td>- or +</td>
</tr>
<tr>
<td>Well being</td>
<td>-- or ++</td>
<td>- or +</td>
<td>negligible</td>
</tr>
</tbody>
</table>

The Likelihood of impact describes the probability that the impact will occur. The likelihood can be definite (in the case of retrospective HIAs), probable, possible or speculative - which in turn relates to the strength of the evidence. Where there is a close correlation between evidence from all data sets (which includes published literature and information from stakeholders/key informants), this is regarded as strong evidence. In addition to the analysis of the potential health impacts on the 'Merseytram' population as a whole, the potential impacts on health inequalities are also discussed. The impact analysis considers:

- The construction phase of the scheme
- The operational phase of the scheme
7.2 The construction phase of the scheme

Table 7.1 Construction Phase

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction workers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment/Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in temporary employment opportunities (90 FTEs), potentially 50% reserved for Merseyside workers - &quot;health enhancing&quot;, reduced risk of premature mortality, physical and psychological ill health</td>
<td>+++</td>
<td>Probable</td>
</tr>
<tr>
<td>Increased exposure to employment-related risk factors; Low-skilled, low pay work, 'job strain' working conditions - self-reported ill-health, increased risk of cardiovascular disease in long term, musculo-skeletal disorders, mental illness</td>
<td>--</td>
<td>Possible</td>
</tr>
<tr>
<td>Safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased risk of work-related accidents and injuries to workers (comparable to similar construction activities)</td>
<td>--</td>
<td>Possible</td>
</tr>
</tbody>
</table>
### Merseytram communities

#### Social support
- Disruption of social networks (stress 'buffers') in vicinity of construction work - short term: reductions in physical and emotional well being; longer term: increased risk of heart disease

#### Safety
- Increased risk of accidental injury to the public (comparable to similar construction activities)

#### Crime
- Increase in 'opportunistic' crime, eg vandalism, theft on sites - increase in fear of crime, psychological distress, social well being

#### Local economy
- Increase in indirect and induced employment opportunities
- Reduced access, restricted movement of goods

#### Traffic
- Increase (10-20%) in vehicle movements

#### Air quality
- Increase in NO\textsubscript{2} and PM\textsubscript{10} - increase in respiratory symptoms from vulnerable groups
- Increase in deposited dust - reduced quality of life, increase in respiratory symptoms from vulnerable groups

#### Noise
- Slight increase in noise levels for short duration - effects on communication, hypertension & cardiovascular disease, increase in annoyance/aggressive behaviour in vulnerable individuals

#### Access
- Reduced access to/from/within the affected areas - reduced mobility, increased social isolation

#### Health inequalities
- Health inequalities between the Merseytram area and elsewhere in Merseyside, and within the Merseytram zone may be temporarily exacerbated

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#### 7.2.1 Affected populations

The evidence indicates that the construction phase will affect 2 key cohorts:

- Employees of Merseytram construction contractors/subcontractors
- Communities - residents and workers - adjacent to the Line during construction

In addition, regular road users along the proposed route will also be affected during the demolition and construction work.
7.2.2 Construction workers

Unemployment/Employment

The ES states that the construction phase is estimated to create approximately 90 full time equivalent positions directly involved in the construction of the scheme; half of these are being reserved for local people.

There is overwhelming evidence from the literature of the relationship between unemployment and health, but also work and health. The health effects of unemployment have been reported in many studies. An effect is found even when social class and behavioural factors such as smoking are taken into account. Unemployment tends to affect both physical and mental health. The British Medical Association (1998) reported that male unemployment causes three excess deaths for every 2000 unemployed men. The Acheson Report (1998) found that unemployed people had lower levels of psychological well being, ranging from depression and anxiety to self-harm and suicide. Gerhsuny (1994) and Bartley et al (1999) showed that improvements in psychological health were not immediate on their return to employment. A recent review of a number of studies showed a higher prevalence of ill health and excess mortality for both men and women who are unemployed (Bartley et al, 1999). Interestingly, Gallie et al (1994) found that unemployed people whose social networks largely consisted of other unemployed people found it 'more difficult to escape from unemployment itself.' Unemployment also has an indirect affect on health via health determinants - it affects family income levels, which affects nutrition and housing, as well as being associated with risk-taking behaviour.

However, whilst employment is seen as the most effective means of tackling poverty and social exclusion, concerns are being raised about the changing trends in employment and their effects on health. Trends in employment are demanding greater labour market flexibility and as a consequence increased job insecurity. Insecure or temporary jobs, such as often found in the construction industry, tend to be associated with the following employment factors and health impacts:

Table 7.2 Employment factors associated with insecure jobs and the associated health impacts

<table>
<thead>
<tr>
<th>Employment factors</th>
<th>Health Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>High exposure to work hazards, eg noise, vibration, hazardous equipment and environments</td>
<td>Increased risk of accidental injury</td>
</tr>
<tr>
<td>Negative attitudes to work and the employing organisation</td>
<td>Poor self-reported health, mental health problems, eg mild depression</td>
</tr>
<tr>
<td>Low-skilled, manual work</td>
<td></td>
</tr>
<tr>
<td>Low pay</td>
<td>Effort - reward imbalance model associated with increased incidence of heart disease and cardiovascular disease precursors, eg hypertension</td>
</tr>
<tr>
<td>'High demand, low control' working conditions (job strain model)</td>
<td>Job strain model associated with increased risk of heart disease, musculo-skeletal disorders, mental illness and sickness absence</td>
</tr>
</tbody>
</table>
In addition, in insecure jobs as the anticipated job loss approaches there is deterioration in self-reported health status; these and other negative health effects may not dissipate after regaining employment.

As indicated in section 4, the construction industry is one of the most hazardous industries to work in. It also has statistically higher prevalence rates for musculo-skeletal disorders, spine/back disorders, asbestosis, mesothelioma, and dermatitis.

The main hazards are:

- Falls from height, eg ladders, scaffolds
- Being struck by excavators, lift trucks or dumpers
- Overturning vehicles
- Being crushed by collapsing structures

The creation of employment opportunities during the Merseytram's construction phase will have positive health impacts if this is associated with removing people from unemployment. If within the application of the Merseyside Construction Initiative this results in increasing economic activity in areas where unemployment is currently high (such as the Merseytram area), this will help to reduce health inequalities between areas, although this will be on a very small scale.

The draft Code of Construction Practice manual defines minimum standards of construction practice for contractors and their sub-contractors in addition to their statutory duties under Health & Safety and other legislation.

The Code of Construction contributes to reducing the risk of work-related accidents. However, as with construction activities of this type, some work-related accidents and injuries may occur to tram construction workers during this period. In addition, the temporary and insecure nature of this construction work indicates these workers will also be exposed to other employment-related risk factors. Mitigating measures need to be introduced to reduce the incidence of construction work-related injuries and ill-health (section 8).

7.2.3 Merseytram communities

Social Support
The ES states that the construction phase will 'cause a degree of disruption' in the effected communities (p.145), most likely communities either side of the construction site areas. Although the mitigation measures are recognised, construction work is still likely to effect opportunities for social networking in the Merseytram area. Appleyard & Lintell, (1976) showed that as the volume of traffic increases in a given interactions with people decreases. Evidence from stakeholders emphasised the importance of family and community life to many people. In addition concerns were raised about the disruption of the tram's construction to this.

Various epidemiological studies (Berkman & Syme, 1979; House et al, 1988; Stewart-Brown, 1998) show that social support - the extent and support of personal networks - can protect against premature mortality, prevent illness, and aid recovery. Social support works either directly by promoting well being, or indirectly
by buffering the adverse effects of stressors. Low levels of social support have been linked to increased mortality rates from all causes: people with few social contacts may be at more than twice the risk of those with many contacts. Evidence indicates that lack of social support can increase mortality from heart disease by up to four times (Greenwood et al, 1996). In addition depression and lack of social support have been shown from systematic reviews to be independently associated with increased risk of coronary heart disease (Hemingway & Marmot, 1999). Social networks, integral to social support, are a vital part of social capital, described as the ‘glue that holds societies together’ (Grootaert, 1998). However in addition to these personal interactions are the links with institutions, and the distribution of power or social control. The World Bank has described this as the ‘missing link’ in social and economic development.

It is probable that existing social networks will be temporarily disrupted in and around the construction area. The reduction in this stress ‘buffer’ will have probable negative short-term effects on physical and emotional well being. There is also a small but increased risk of longer-term clinical conditions such as heart disease; this is most likely to affect those people already under emotional stress. Merseytravel's Code of Construction Practice and Considerate Contractors Scheme will help to reduce the negative impacts of the construction phase on disrupting these social networks.

**Safety**

In addition to safety considerations for construction workers, evidence from trends in construction accident statistics and HIAs of the construction phase of other developments indicate the potential risk of accidents from construction traffic, equipment or materials to members of communities, particularly children, living adjacent to the development sites.

There is a probable increased risk of accidental injury from development works to members of the public. Mitigation measures through the Code of Construction Practice will seek to reduce the risk of accidental injuries to the public with measures for reducing risks to construction workers during the construction phase.

**Crime**

Crime and the fear of crime featured strongly in the evidence from community stakeholders, particularly older people. During the construction phase there may be an increased risk of opportunistic crime, eg vandalism, theft, on construction sites. In addition there is an increased risk of aggressive behaviour as a result of exposure to loud noise levels.

There is a growing literature of the impacts of crime and the fear of crime on psychological distress and ill health as well as social well being. Psychological distress ranging from reduced self-esteem, increased depression and anxiety, to behaviour disorder and suicidal tendencies have been associated with different types of crime. Norris and Kaniasty (1994) showed that victims of crime in addition to the psychological effects also developed avoidance behaviours (not going out) as well as an increased fear of crime. The fear of crime can profoundly affect the quality of people’s lives causing mental distress and social exclusion. It often exceeds the actual risks of being victimised and is not necessarily the result of
previous victimisation. Evidence from the British Crime Survey indicates that women and older people tend to be more worried about crime (Mirrlees-Black et al, 1996), but are less likely to be victims of street crime. There is some evidence (McCabe and Rane, 1997) that crime also affects other aspects of behaviour, such as sleeping, alcohol consumption and the use of health services.

The Code of Construction Practice will minimise the risk of crime. 24 hour security will be provided at work sites and these will also be secured with fencing and lockable gates, and will be well lit. Security cameras and intruder alarms may also be used. However there may be a slight increased risk in the incidence of crime from construction sites. If crime does occur there is an increased but very low risk of increased fear of crime from, eg older people within the affected communities. Fear of crime can affect people’s mental well being and quality of life.

Local economy
There was clear evidence from stakeholders, profiling data and official documents indicating that the Merseytram area was far from thriving; remarks about food deserts suggest the difficulty communities, particularly older or disabled people, have in accessing high quality affordable food at local food retailers. The construction phase will have both short term and permanent effects on the local economy. Permanent effects relate to the demolition of businesses along the tram route, however, it is assumed that the effects on job losses will be minimal. Short-term negative effects relate to the restriction in access to all sections of the economy - employees, suppliers, distributors and customers - and the related extended travelling/journey time.

A vibrant economy is essential to creating and maintaining jobs, the health-related evidence for which has already been discussed, as well as resourcing public services.

It is acknowledged that the net effect of the construction phase will be an increase in indirect and induced jobs in Merseyside. However, although the Code of Construction Practice will minimise access issues associated with construction work, there will inevitably be slight delays in travelling to and from the Merseytram area, effecting the ‘generalised cost of a journey’ (Steer Davies Gleave, 2004). This may have some short term negative impacts on local business. This may effect the well being of some people but is not anticipated to have health impacts of significant importance.

Traffic
Stakeholder and documentary evidence from the ES (p. 141) indicates a likely increase (10-20%) in vehicle movements due to construction traffic; concerns were expressed that this would lead to congestion and disruption to traffic. There are a number of road-traffic-related impacts, which have associated health impacts and will be considered below.

Air Quality
Documentary evidence from the ES suggests that whilst there will be some increase in NO2 and PM_{10} during the construction phase on average, this was not considered significant (as defined by IEA Guidelines). However there are concerns that part of the City centre tram route coincides with the designated Air Quality
Management Area (AQMA) for NO\textsubscript{2}. This designation indicates that the annual mean for NO\textsubscript{2} is likely to exceed the Air Quality Objectives 2000. It has been estimated that 75\% of NO\textsubscript{2} is from road traffic in urban areas (WHO, 2000). Although some consideration of measures to reduce NO\textsubscript{x} emissions from road traffic has been taken account of, eg the City Centre Movement Strategy (CCMS) there is concern that the delay in implementing these has not. As such it is considered that the 15-20\% estimated increase in vehicle movements in the AQMA area of the City centre (p. 141) due to the tram’s construction road traffic might in fact have a more significant impact on air quality due to NO\textsubscript{2}.

Various outdoor studies have shown that children with long-term exposure show more respiratory symptoms, reduced lung function and greater incidence of chronic cough, bronchitis and conjunctivitis. Although there is insufficient evidence to indicate a dose-response causal relationship between NO\textsubscript{2} and these health effects, it is deemed appropriate to take the ‘precautionary principle’ approach. This is particularly so in view of the very poor respiratory health experienced by people living in the City centre and the potential to exacerbate this.

NO\textsubscript{2} levels from construction traffic will increase during construction, although this will be minimised as a result of the Code of Construction Practice. These increases whilst not significant overall may not be compensated by reductions in NO\textsubscript{2} from other road traffic restriction measures, particularly in the City centre. There is insufficient epidemiological evidence to indicate quantifiable estimates of the increase in respiratory symptoms. However if there is a net increase in NO\textsubscript{2} there may be some increase in respiratory symptoms in people with pre-existing conditions. It is suggested that the ‘precautionary principle’ approach is taken.

The ES (p. 203) indicates that there will be a slight increase in dust deposition from construction, but that this will be minimised by appropriate mitigation measures. The increase in dust was of concern to stakeholders and was described in documentary evidence as most affecting households within 50m of the boundaries of the construction site. Whilst it is acknowledged that there are no statutory requirements for deposited dust standards, based on the evidence from the construction phase of another HIA, the importance of the implementation and enforcement of mitigation measures is argued to be significant to households in close proximity of this work. It is likely to affect their quality of life, and for some, their physical and mental wellbeing.

There is evidence to indicate a slight increase in deposited dust due to demolition and construction work of the tram; mitigation measures will reduce dust deposition. However there is still likely to be some increase in dust particularly for households close to this work. It is possible that this may affect some individuals’ quality of life, and the physical or mental health of people with pre-existing conditions.

**Noise**

The ES (p. 161-171) predicts noise levels ranging from 61 dB for track laying at Canada Boulevard to 92 dB for enabling works at Wapping Bridge based on modelling noise emissions from previous construction work. The duration of the construction work for different elements of the construction process varies from a few weeks to several months. However, it is noted that the noisiest activities will occur for a shorter period of time. These are unmitigated noise levels, which could
be reduced by up to 10 dB with the implementation of the Code of Construction Practice. Evidence from stakeholders also raised concerns about the noise levels. Whilst night-time working will be kept to a minimum it will take place for fixed periods at a number of locations, subject to LCC and KMBC approval.

At a national level there is an increase in noise complaints. There is strong evidence that shows the adverse effects of noise on communication, school performance, sleep and aggressive behaviour, as well as cardiovascular effects and hearing impairment (WHO, 2000). If background noise levels exceed 45 dB, this will effect communication; this has obvious significance for young children's development. Children are known to show impaired reading acquisition, attention and problem solving abilities when exposed to high noise levels. In an area where there is a current skills deficit, the construction phase could have significant effects on the early stages of the next generations development. Educational attainment is a key predictor of future health status. This could be exacerbated even further with night-time working where sleep disturbance occurs at levels above 30 dB LAeq continuous noise or 45 dB LAmx indoors.

Annoyance response broadly increases with sound level with most people being moderately annoyed at 50 dB LAeq and seriously annoyed at 55 dB LAeq (Lorm &. Gesundheit, 1995); this is exacerbated if it is accompanied by vibration and interrupts social or work activities. Loud noise also increases aggression in pre-disposed individuals, and levels above 80 dB LAeq reduce helping behaviour. There is increasing evidence that noise levels of 65-70 dB LAeq effects hypertension. At individual level the effect is small but at a population level this represents an increased risk to heart disease.

Affects on hearing were considered a small risk, as impairment tends to be a result of cumulative exposure to loud noise over several decades.

The ES indicates that noise levels will increase during construction. These will be minimised using various mitigation measures. There may be some residual noise that people may be exposed to for short periods of time. This represents a small but increased risk of negative health effects on people living or working close to the noise source as described above. Children are particularly vulnerable.

Access
As has been previously mentioned, there will undoubtedly be access issues during the construction phase, due to delayed journey times. Although these access issues are mitigated for there may be slight effects on access to shops, eg food shops and the post office, as well as essential services such as GP surgeries close to the construction work. This will most affect people whose mobility is already compromised such as older people and people with physical disabilities. For some it may increase the risk of social isolation, which may be in addition to the isolation they are currently experiencing.

The construction work will slightly reduce accessibility to, from and within the affected areas. Access to essential goods and services may be restricted, particularly for some vulnerable people. Reduced mobility may also increase social isolation and ultimately have negative psychosocial health impacts, eg depression. Emergency service response times may be negatively affected.
### 7.3 The operational phase of the scheme

#### Table 7.3 Operational Phase

<table>
<thead>
<tr>
<th>Potential Health Impacts</th>
<th>Direction/Scale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifestyle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Travel behaviour</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in sustainable, healthier transport modes</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>• Modal shift from bus to Tram</td>
<td>-</td>
<td>Probable</td>
</tr>
<tr>
<td>• Modal shift from car to Tram</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Some increase in cycling, walking reduced risk of developing heart disease, diabetes (2), obesity, fall in hypertension etc</td>
<td>++</td>
<td>Probable</td>
</tr>
<tr>
<td>• Reduction in health inequalities between Merseytram zone and elsewhere</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Mobility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in mobility increased access to job, education opportunities, social networks</td>
<td>++</td>
<td>Probable</td>
</tr>
<tr>
<td>• Reduction in health inequalities between Merseytram zone and elsewhere</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Low, but increased risk of accidental injury involving the tram and pedestrians, cyclists</td>
<td>--</td>
<td>Possible</td>
</tr>
<tr>
<td>• Reductions in fear of crime associated with public transport increased use of tram</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>• Electromagnetic effects – the National Radiological Protection Board has concluded that there is no clear evidence that electromagnetic fields emanating from alternative or direct currents to which people are exposed everyday activities can give rise to adverse health effects</td>
<td>Negligible</td>
<td>Probable</td>
</tr>
<tr>
<td><strong>Socioeconomic environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Employment/unemployment</strong></td>
<td>++</td>
<td>Possible</td>
</tr>
<tr>
<td>• Increase in employment opportunities (309 net FTEs) to deprived communities</td>
<td>+</td>
<td>Probable</td>
</tr>
<tr>
<td>• Reduction in health inequalities between Merseytram zone and elsewhere</td>
<td>+</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Local economy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Enhance local economy by increasing access to job opportunities/work</td>
<td>+</td>
<td>Speculative</td>
</tr>
<tr>
<td>• Facilitate inward investment to the area by increasing mobility of the workforce</td>
<td>+</td>
<td>Speculative</td>
</tr>
<tr>
<td><strong>Education/training</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Increase in access to education opportunities 'health enhancing'</td>
<td>+</td>
<td>Probable</td>
</tr>
</tbody>
</table>
Physical environment

Traffic/transport

- Reductions in bus travel - Probable
- Some increase in cycling, but not in isolation of other policy initiatives + Possible
- Reduction in health inequalities between Merseytram zone and elsewhere - Possible

Air quality

- Marginal reduction in $N_2O$ and $PM_{10}$ (stabilising effect on air pollutant emissions) + Probable

Noise

- Reductions in noise levels, benefiting vulnerable groups in some areas ++ Probable
- Increases in noise levels in other areas -- Probable

Access

- Increased access to opportunities, goods, services to Merseytram population level, but vulnerable groups may not benefit as much ++ Probable
- Access to health services enhanced ++ Probable

Services

- Reduction in bus services - Probable
- Maintain emergency vehicle response times + Speculative

7.3.1 Affected populations

As previously mentioned, when operational Merseytram will impact on the health of people who live and work in the wards adjacent to the alignment. Within those wards, evidence from the literature and stakeholders indicates that there are a number of population sub-groups who are most vulnerable to the effects of road transport and who therefore need to be considered with respect to the potential effects on health inequalities.

- Groups at risk of road traffic accidents - general: motor cyclists, cyclists (children), pedestrians, (children, lower socio-economic groups, boys), car occupants (children); tram specific: pedestrians, cyclists

- Groups at risk from poor air quality - car/bus users, people with existing heart or respiratory disease, older people, 'responders' (people who are susceptible to allergic responses from pollutants), children, pregnant women

- Socially isolated groups - older people, ethnic minority groups, people with disabilities or limiting long term illness, people on low incomes

- Groups at risk from noise - children, shift workers, people pre-disposed to aggressive behaviour, people with existing hypertension or heart disease
In addition Merseytram will have impacts beyond the immediately affected communities, particularly Liverpool City centre and Kirkby, but even more widely across Merseyside by virtue of the public transport investment decisions made.

7.3.3 Lifestyle

Travel behaviour

Evidence from the literature, stakeholders and key informant indicates that whilst Merseytram can act as a catalyst to switching transport mode, a number of additional measures are needed to make extensive, sustainable changes to travel behaviour, eg:

- stops need to be within easy walking distance,
- access to free parking (if multi-travel mode),
- competitive public transport fares,
- competitive travel time,
- frequent service (to reduce travel time, convenience),
- safety on public transport,
- reliability,
- convenience,
- safe cycle paths,
- cycles loans/cycle lock-ups,
- restricted access to cars,
- better information about transport effects and alternatives,
- better integration (if multi-travel mode)

It is clear that Merseytram cover many of these measures and go some way with others. However, the success with which Merseytram facilitates the switch from car to tram use, in particular, as the primary transport mode will depend very much on how all these factors are addressed simultaneously. There was evidence from evaluations of tram use elsewhere and surveys on transport attitudes that the major impact would be on the shift in public transport use, particularly from bus to tram.

There is evidence to suggest that Merseytram will influence travel behaviour towards more sustainable and healthier transport modes; however a number of associated factors will need to be addressed in order to facilitate extensive, sustainable changes.

Physical activity

Evidence from the profiling data indicates a high percentage of the economically active population in the Merseytram wards already walks to work; 17.7% compared with 10.6% for Liverpool and 9.3% for Knowsley. This suggests there may be less scope for increasing the proportion of people that walk to work as their primary transport mode. However, although there is a low proportion who drive or are passengers in a car or van (39.9% and 8.0%) in the Merseytram wards compared to the Liverpool and Knowsley averages, it may be possible to influence a modal switch to Merseytram, which will involve an increase in walking to and from the Merseytram stops. There is a low proportion 1.7% (for Merseytram wards, Liverpool and Knowsley) who bicycle to work compared with Merseyside, and elsewhere. This may also be a transport mode where Merseytram could facilitate an increase in activity.
There is strong scientific evidence showing the health benefits of regular, moderate, sustained activity (e.g., US Dept. of Health & Human Services, 1996; Vuori & Oja, 1998):

- 50% reduction in risk of developing heart disease (equivalent to not smoking)
- 50% reduction in the risk of developing late-onset diabetes
- 50% reduction in developing obesity
- 30% reduction in the risk of developing hypertension
- 10/8 mmHg decline in hypertension (equivalent of drug interventions)
- Reduced risk of osteoporosis
- Relief of symptoms of depression and anxiety
- Prevention in falls in the elderly

There are also risks associated with activity, particularly from RTA risk with cycling on roads; however, estimates show that there is 20 times greater benefit to life expectancy to cycle (BMA, 1992).

The main impact of Merseytram on physical activity will be if car users convert some car journeys to tram journeys and either walk or cycle to and from tram stops. Whilst an increase in cycling is indicated, the extent of this is unclear. As identified above, measures to facilitate this switch need to be in place to maximise the potential health benefits from increased walking and cycling. This is particularly important for improving health in the area in view of trends in physical activity, obesity, and cigarette smoking.

**Mobility**
Merseytram will provide frequent, high quality public transport between Kirkby and Liverpool City Centre. Stakeholders believe this will enhance the mobility of people living in these areas, which currently are heavily reliant on car use because of a limited bus and train service. Evidence from the literature indicates that this enhanced mobility may be affected by the relative differences in travel costs; however, the fares policy ensures that bus and tram fares will be comparable. With enhanced mobility, access to employment and education opportunities will be facilitated as well as social inclusion and networking. The potential health benefits relate to the increased opportunities for work and social support, which have been previously discussed. 'Mobility for all' has been assured in the tram and access to the stops within the scheme design and specification.

Merseytram will contribute to meeting the demand for increased mobility for the Merseytram population. Enhancing the mobility of these deprived communities will help reduce the difference in mobility between car owners and non-car owners.

**Personal safety**
Evidence indicates a four-fold increase in risk from accidental injury to pedestrians and cyclists from trams compared with buses and an increased risk of death in the order 9 to 15 times. A communiqué from HSE Railways Inspectorate indicates the greatest risk is with non-segregated sections of tramline,
'Most recent concern has been related to risks associated with rails in the carriageway, and in Nottingham there have been a number of reports of cyclists injured by falling when crossing the rails at an oblique angle. Future schemes should consider this aspect more closely.'

Although this represents a low risk overall (very small numbers were involved) it is a potential increased risk (this is assumed without quantitative data on potential reductions in motor vehicle use) and would be appropriate to examine the cost effectiveness of protective measures in more detail.

There is a low but potential increase in risk for pedestrians and cyclists involved in accidents with the tram (as compared with buses); within these groups children are the most vulnerable.

As indicated in earlier sections, crime was a major source of concern for stakeholders. There was support for the proposals in the scheme, i.e. conductors and CCTV at stops and in cars, which were felt would deter anti-social behaviour and criminal behaviour. This in turn will contribute to the use of the Tram.

The measures that are proposed in the Merseytram scheme, including the use of conductors and CCTV, might reduce the fear of crime of potential passengers, which in turn may contribute to Merseytram’s patronage.

7.3.4 Socio-economic environment

*Employment/Unemployment*

The ES indicates that 309 (net) full-time equivalent positions will be created as a result of Merseytram. Of these, 260 will be directly related to the operation and maintenance of the Tram. Most importantly, Merseytram will increase access to employment opportunities in areas where there is high unemployment and economic inactivity, which potentially will have positive health impacts as previously described. Unlike some other schemes, Merseytram fares will not be more expensive than buses. There were concerns from stakeholders that the short to medium term employment developments will tend to be in low paid service sectors, which would benefit people who lived in their immediate vicinity only, i.e. developments in Liverpool would not necessarily benefit Kirkby people. Longer term job prospects through eg Objective One opportunities are thought most likely to benefit Merseyside boundary areas rather than the Merseytram zone (Steer Gleave Davies, 2004).

Merseytram has the potential to increase employment opportunities to people from deprived areas. However Merseytram is less likely to increase access to low paid jobs for people who live a distance from these jobs as it will become less financially viable with transport costs.
Local economy
The SACTRA’s report on transport and the economy described the relationship between traffic growth and the economy: as the economy grows so there is an associated growth in the movement of goods and people. However whilst income growth affects traffic growth, so too does price, speed and quality - there does not need to be an automatic increase in road traffic volume. Thus Merseytram could facilitate local economic growth and contribute to reducing the rate of growth of road traffic and congestion with the successful switch from car to Tram journeys for existing travellers and the adoption of Tram use for new travellers.

Merseytram will impact positively on the local economy by facilitating the transportation of people to work and supporting employment.

Social Support
As discussed above in 7.3.2, Merseytram could enhance mobility, which in turn will enhance access to friends and families. The health benefits of social support have been described in 7.2.2. Importantly, Merseytram has the potential to enhance mobility for many groups.

Merseytram will potentially have a positive impact on social support by enhancing the mobility of people. It impacts positively on health inequalities by making sure many groups can use the tram.

Education/training
Merseytram will potentially enhance educational opportunities by facilitating access to educational facilities. With regard to noise and the potential impacts on educational attainment at school, the noise reductions predicted will have potential positive indirect health impacts.

Merseytram will potentially enhance educational opportunities by enhancing ‘mobility for all’. The reductions in noise levels will also potentially benefit the educational development of children who live or attend school along the tram route.

7.3.5 Physical environment
Traffic/transport
Evidence from the ES suggests that there will be no effect on junction capacity with Merseytram’s operation; whilst some stakeholders supported this assessment, others were more optimistic suggesting there could be more positive impacts including the reduction of road traffic and congestion. As suggested in 7.3.2 (Travel behaviour) in order to achieve the modal shift from car to tram use a number of factors need to be addressed simultaneously. As such the 'no effect' impact is potentially possible, but this means to maintain existing levels of road traffic in an environment where the trend is for road traffic growth, some existing and 'new' car users will convert to tram use. Indications from the Merseytram consultation results suggest this is probable. The impact of the Tram installations on 'Blue Badge' parking is of concern in view of the mobility and social isolation of people with disabilities already. The relocation of these parking places to a site that is agreeable to transport planners and representatives of disabled people, eg Disabilities Rights Commission, prior to the removal of any existing parking facilities is strongly supported.
It was acknowledged in the ES that bus travel is likely to be reduced; this supports other evidence from stakeholders, tram evaluations and attitudes to transport surveys. However the impacts on the integration with bus transport was less clear. Evidence from the literature indicates that this is one of the important factors to maximise tram and public transport use as a whole.

The ES predicts an increase in cyclists and cycling. Whilst the provision of secure cycle facilities at some stops creates a supportive environment for cyclists and cycles, this alone may not have this desired effect of increased cycling. Merseytram is likely to have no significant impact on baseline road traffic flows or current congestion. It may have a temporary negative impact on 'Blue Badge' parking locations, which may affect people with disabilities accessing the City centre. It will probably reduce bus travel, but there is no assessment on effects on multi-modal transport use as a result of integrated public transport. The proposals whilst supporting cycle use, are not thought to support increased cycling in isolation.

Air quality
The ES predicts Merseytram’s marginal but positive impacts on air quality. It uses the 'no effect' predictions in road traffic flows from the traffic models discussed above. Some stakeholders believed that the effects would be smaller than expected for such a large project and others thought any improvements would largely depend on the shift from car to tram use. If the 'no effect' impact is not achieved other measures such as the CCMS may help maintain NOx and PM10 levels. The current air quality issues for the City centre in particular and the effects of the different pollutants on respiratory and cardiovascular health have already been mentioned in 7.2.2.

The operation of Merseytram will have a marginal but positive impact on air quality for both NO2 and PM10. These small changes are unlikely to impact on health of the population at large but may benefit those vulnerable groups previously identified. However if successful in contributing to reducing the rate of growth of road traffic, Merseytram will be helping to stabilise these pollutant levels.

Noise
Evidence from stakeholders and key documents indicates a probable decrease in noise emissions from road traffic, although it was acknowledged that this would depend on the rolling stock that was ultimately commissioned, and also on road traffic. Increases in noise levels are expected in some areas.

Overall, the operation of Merseytram is expected to have a negligible impact on noise levels in most areas. However, increases in noise levels are expected in three locations. These predicted increases could have negative health impacts (see 7.2.2 above) on people in the Merseytram area, especially vulnerable groups.

Access
As described earlier, access to work and education opportunities could be improved as well as to goods and services. Whilst it was apparent that an improvement in the direct access for residents to health services at the Royal Liverpool University Hospital on Prescot Street will be achieved, it was unclear how Kirkby residents may benefit from improved access to their acute health services at Aintree NHS Hospitals, Fazakerley. An integrated tram/bus shuttle may be one
possibility. Very positively, the tram service will improve access to approximately 20 GP practices.

At a population level, Merseytram will probably have a positive impact on increasing access to employment and education opportunities, as well as goods and services by enhancing mobility. Access to health services is an issue for less affluent groups and is an important factor in non-attendance for appointments. Extending links between health facilities such as Fazakerley Hospital and Merseytram need to be considered.

### 7.3.5 Services and Public Policy

#### Public transport

It is clear that Merseytram and its effects cannot be considered in isolation from other transport plans, eg CCMS, cycling and walking strategies. These are clearly linked and supportive. However it was unclear how the phasing of these plans related to each other; with optimal phasing they could enhance each other's effectiveness. In particular the impacts of Merseytram on bus services between Liverpool City and Kirkby Town centres is expected to be a reduction in service. Also Merseytram was expected to increase the integration of public transport services. It must be mentioned that although the introduction of the Merseytram follows national transport policy, it is at odds with developments in Europe, which was supported by other evidence from the literature and one key informant.

There will be a reduction in bus services between Liverpool City and Kirkby Town centres as a result of Merseytram. Merseytram impacts on and is impacted on by a number of other transport plans, the phasing of which are important. Merseytram will enhance the integration of public services, but this could potentially be enhanced further.

#### Emergency services

Merseytram could help maintain emergency vehicle response times through its predicted effects on road traffic flows.

#### Other public services

Merseytram is likely to indirectly but positively impact on other services such as education, job centres, health services by improving access to these services. For health services this may contribute to reducing the proportion of patients who fail to attend appointments, so helping improve efficiency within the health service.

### 7.4 Implications of policy dynamics

#### 7.4.1

The impact analysis considers the impacts based on the Merseytram scheme proposal as described in the ES. Where appropriate it considers proposed mitigation measures, comments on these and suggests further action if appropriate. However it is recognised that should any aspect of the proposal not be implemented as described, eg if conductors were not used, this would have an additional impact. The main risk identified to this is funding.
SECTION 8: RECOMMENDATIONS

8.1 Conclusions

8.1.1 The Merseytram Line 1 Scheme represents a major development in Liverpool and Knowsley with an investment of over £234 million, £170 million from central Government and the remainder from local public and private sector bodies, as well as from EC grants. Interestingly the political momentum for increasing light rail as seen by the target in 'Transport 2010' is not reflected to the same extent in Europe. It is not clear if and how this may affect EC investment in the scheme, and the implications for the final scheme. There is generally a clear synergy between the proposal and other local and national transport plans; the phasing of these is clearly important to ensure the plans reinforce each other.

5.2.1 There is general support for the introduction of Merseytram Line 1 as proposed, as it has the potential to meet many needs, including health needs within the Merseytram area and beyond. The construction phase may have some negative health impacts for both construction workers and affected communities, in spite of the extensive mitigation measures identified in the draft Code of Construction practice; however these are no greater than would be expected from similar construction activities. The operational phase is likely to have positive health impacts contributing to an improvement in the health status of those communities close to the alignment by its direct and indirect effects on a range of key health determinants.

5.2.2 Proposals for action to enhance health benefits further and reduce health risks are discussed below. Although there were isolated concerns about light rail transit systems, the level of investment, and ultimately whether this represented value for public money, it is clear from the analysis of alternative schemes that Merseytram represents the most suitable option.

8.2 Proposed action

8.2.1 Reduced employment-related health risks for construction workers:

- Consider IOSH 'Global Best Practice in Contractor Safety' guide and CONIAC/HSE 'Working Well Together' campaign best practice guide for inclusion in health and safety requirements in the Code of Construction Practice (CoCP).
- Examine feasibility of developing an exit strategy for temporary Merseytram construction workers including skills development training

8.2.2 Reduce adverse effects of the Tram's construction phase to communities:

- Include the development of a Merseytram Community Forum within the liaison remit of Merseytravel, eg make open to all people who live and work in the affected wards and supported by community development workers, providing a monthly forum to discuss demolition/construction works with contractors, the Concessionaire and Merseytravel.
• Develop a Merseytram Area Agreement between contractors and affected communities detailing standards of service communities can expect (as defined in the CoCP, including safety, security, cleanliness, timing of night-time working, decision-making.

• Target additional community development support from agencies to the affected areas and particularly vulnerable groups.

• Explore options to use alternatively fuelled construction work vehicles

8.2.3 Enhance the positive and reduce the negative impacts of Merseytram Line 1 operation

• Facilitate changes in travel behaviour of car users into the City centre by examining the factors identified in section 7 paragraph 7.3.2,
  ➢ Safe cycle paths
  ➢ Cycle loans
  ➢ Better information about the effects of transport effects

• Enhance existing measures to change travel behaviour: review continental models for better integration with bus/train travel.

• Work with City centre businesses to develop mobility plans with employees targeting people who travel to work by car and who travel within/close to the Merseytram area; review approach adopted by Mitsubishi and Bae through Merseytravel’s Travelwise Team.

• Examine opportunities by which Merseytram can support access to NHS facilities for patients and staff, eg NHS ‘healthy transport plans’, bus/tram integrated services to Fazakerley hospital.

• Agree ‘Blue Badge’ parking relocation prior to removal of existing facilities.

8.2.4 Enhance synergy between related strategies and plans

• Examine phasing of related strategies, eg restrictions in workplace parking coinciding with the Tram’s introduction

8.2.5 Monitor and evaluate the HIA

• Support action described in section 9.
SECTION 9: MONITORING AND EVALUATION

9.1 Introduction

Evaluation is essential to ensure that the key lessons of an intervention are learnt and that they influence future practice. Evaluation is therefore central to the development of evidence-based policy.

9.2 Proposals for the evaluation

9.2.1 The evaluation may be conducted at three levels:

Level 1 A retrospective evaluation looking at the process of the HIA: for example: effectiveness of steering group meetings, stakeholders’ engagement in data collection, conduct of workshops and interviews. This evaluation could be undertaken in one or more workshops and should be conducted after publication of the HIA.

Level 2 A prospective evaluation to assess the immediate impact of the HIA as measured by:
- the extent to which the HIA recommendations were incorporated into the Merseytram proposals; and
- the extent to which the HIA recommendations were implemented.

This evaluation could be undertaken in one or more workshops and should be conducted 6 months after publication of the HIA.

Level 3 A prospective evaluation of the influence of the HIA on the health of the population, eg monitoring accidental injuries of Merseytram construction workers. This may be limited, as there is the complexity of identifying individual causes of deterioration or improvement in health outcomes when many determinants act as confounding factors.

9.2.2 An alternative approach is to measure what happens to the determinants of health that were identified by the HIA and which were the subject of its recommendations. For example: has been the impact of the mitigation measures on ensuring equitable access to the Merseytram through fare policies, what percentage of Tram passengers were former car or bus users?

9.2.3 For this phase of evaluation, a participatory approach is recommended. This has a number of advantages: it facilitates a sharing of lay and professional knowledge, it helps generate a critical awareness of problems within the Merseytram community, and it is more likely to produce relevant results and lead to appropriate action.

9.2.4 This phase of the evaluation could be conducted by for example trained local people involved in the Merseytram Community Forum. Funding would be required to provide appropriate training and support for the researchers, but the nominal cost involved would represent a valuable investment in community engagement.
9.2.5 The participatory evaluation could be undertaken through a series of interviews and workshops and should be conducted 12 months after publication of the HIA.
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APPENDICES

Appendix 3

Question Schedule 1 for Community Stakeholder Focus Groups and Interviews

BEFORE YOU START...

Facilitators welcome everyone, and introduce yourself and ask everyone to introduce themselves.

Explain the purpose of the focus group/interview: to get their views on living in Liverpool or Kirkby and based on their knowledge and experience, how the Merseytram project might affect this.

Explain facilitator's role, the discussion group procedure and time, agenda/themes for discussion, and small group's rules of 'politeness' – all have a say/no right or wrong, interested in range of experiences and opinions.

Confirm confidentiality/Chatham House rules - nothing is attributable to any individual.

Mention tape recorder (if being used).

Ask to complete consent form.

THEME 1 - 'What is health?'

Ice breaker/mind-mapping session on what 'health' means

'What kinds of things do we think of when we talk about health?'

Facilitator's prompt: WHO definition of health (1946):

"...a state of complete physical, mental, spiritual and social wellbeing and not merely the absence of disease and infirmity"

Give following examples:

**PHYSICAL**

Biological functioning of the body

**MENTAL**

Ability to think clearly and coherently

**SPIRITUAL**

Religious beliefs, personal creeds / principles

**SOCIAL**

Ability to make and maintain relationships with other people

**EMOTIONAL**

Ability to recognise emotions and to express appropriately. Coping with stress, tension, depression and
anxiety.

Introduce Rainbow model
5 minutes

THEME 2 - 'What it is like living and working in Liverpool or Kirkby?'
'Tell me about the area. What are the good things (and why) about living/working in Liverpool or Kirkby? What are the bad things (and why)'

Facilitator note: Refer to matrices 1, 2 and 3 and ask FG/interviewee to comment on these (if they haven’t already). In particular, need to draw out their views on:
- mobility and access (to people, goods, services, employment),
- air quality,
- road traffic accidents,
- noise
- community spirit
- the causal relationship of the above with different transport modes, road traffic etc

15 minutes maximum

THEME 3 - 'What is the well being and health of people living and working in Liverpool or Kirkby currently like?'
How would you describe the health and well being of people in Liverpool or Kirkby?

Facilitator note: Refer to Theme 1 (different dimensions of health and ill health/well being continuum) and ask FG/interviewee to complete matrix 4.

Are there any people - groups or individuals - in particular who have better or worse health/wellbeing in Liverpool or Kirkby?
Facilitator’s prompt:
- Older people
- Young children
- Young people
- Men
- Women
- Parents
- Black and Minority Ethnic groups
- People with disabilities

Complete matrix 5

Referring back to matrices 1-3, what do you think affects health and well being?
Complete matrix 4.
15 minutes maximum

THEME 4 - 'What are your views about the Merseytram project?'
Facilitator: go over details of the Merseytram project circulated before the FG/interview.

Referring back to matrices 1-3 what do you think the effects of the Merseytram Line 1 will be on these?

Facilitator's note: go through the aims/objectives of the Merseytram and it's route. Complete matrix 1-3.

20 minutes maximum

THEME 5 - 'What will the effects be on the well being and health of people in Liverpool or Kirkby?'

Referring back to matrix 4 and health and well being in Liverpool or Kirkby, what do you think will be the effects of the Merseytram project on this? Complete matrix 4.

Referring back to matrix 5 how do you think Merseytram will affect the health, wellbeing and quality of life of different groups of people? Complete matrix 5.
  - Older people
  - Young children
  - Young people
  - Men
  - Women
  - Parents
  - Black and Minority Ethnic groups
  - People with disabilities

Prioritising
What do you think are the most positive impacts from the changes? Matrices 1-5
What do you think are the most negative impacts from those changes? Matrices 1-5
Rank in order of importance
What changes would you like to see in the strategy proposals? Why?

20 minutes maximum.

Thank you for talking with us.
Question Schedule 2 for Organisation Stakeholder Focus Groups/Interviews

BEFORE YOU START...

Facilitator/s welcome everyone, and introduce yourself. Explain facilitator's role, the discussion group or interview procedure and time, agenda/themes for discussion, and small group's rules of 'politeness' (if appropriate) – all have a say/no right or wrong, interested in range of experiences and opinions. Confirm interview/focus group conditions as described in letter. Mention tape recorder (if being used). Request consent form is completed. If appropriate - open discussion on concepts of health.

THEME 1 - 'What is your role?'

Tell me about what you do (in Liverpool or Kirkby).

Facilitator prompts:
How long have you been working there?
Who are your clients?

5 minutes maximum

THEME 2 - 'What is it like living and working in Liverpool or Kirkby?'

Tell me about the area (Liverpool or Kirkby). What are the good things (and why) about living/working? What are the bad things (and why)?

Facilitator note: Refer to matrices 1, 2 and 3 and ask FG/interviewee to comment on these (if they haven't already). Ask interviewee to elaborate on those areas they have particular experience of/knowledge in. Particularly need to draw out their views on:

- mobility and access (to people, goods, services, employment),
- air quality,
- road traffic accidents,
- noise
- community spirit
- the causal relationship of the above with different transport modes, road traffic etc

15 minutes maximum
THEME 3 - 'What is the well being and health of people living and working in Liverpool or Kirkby currently like?'

How would you describe the health and well being of people in Liverpool or Kirkby?

Are there any people - groups or individuals - in particular who have better or worse health/wellbeing in Liverpool?

Referring back to matrices 1-3, what do you think affects health and well being?

**Facilitator note:** Refer to positive health concept/dimensions and following special interest groups:
- Older people
- Young children
- Young people
- Men
- Women
- Parents
- Black and Minority Ethnic groups
- People with disabilities

Ask why/what evidence/experience etc they have of this. Complete matrix 4.

15 minutes maximum

THEME 4 - 'What are your views about the Merseytram Line 1 proposals?'

What involvement have you had in the development of the proposals?

*If have been involved (Project Proponent):*

What are the expected inputs, outputs and outcomes during
1. The construction phase?
2. The operational phase?

What is the assessed risk status/level for successful delivery of these outputs and outcomes at each phase?

Describe these risks (hazards), likelihood, severity (type, distribution).

*If have NOT been involved:*

Facilitator: go over and elaborate the details of the Merseytram Line 1 proposals circulated before the FG/interview.
ALL:
Referring back to matrices 1-3, consider 2 scenarios:
Scenario A - what will happen by 2006 WITHOUT the Merseytram Line 1?
Scenario B - what do you think the effects of the Merseytram Line 1 will be on those health determinants listed?

Facilitator's note: Complete matrix 1-3. Why/what is their evidence?

20 minutes maximum

THEME 5 - 'What will the effects be on the well being and health of people?'
Referring back to matrix 4 and health and well being, consider the above 2 scenarios: Scenario A - what will happen by 2006 WITHOUT the Merseytram Line 1?
Scenario B - what do you think the effects of the Merseytram Line 1 will be health & well being?

How do you think the proposals will affect the health, wellbeing and quality of life of those different groups of people?
- Older people
- Young children
- Young people
- Men
- Women
- Parents
- Black and Minority Ethnic groups
- People with disabilities

Facilitator's note: Complete matrix 4. Why/what is their evidence?

Prioritising
What do you think are the most positive impacts from the changes? Matrices 1-4
What do you think are the most negative impacts from those changes? Matrices 1-4
Rank in order of importance
What changes would you like to see in the proposals? Why?

20 minutes maximum.

Thank you for talking with us.
### MATRIX 1

#### SOCIO-ECONOMIC ENVIRONMENT

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<th>Health determinants</th>
<th>Good things (&amp; why)</th>
<th>Bad things (&amp; why)</th>
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## MATRIX 2

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# MATRIX 3

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<th>Bad things (&amp; why)</th>
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<th>Negative effects of Merseytram</th>
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### MATRIX 5

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<th>Worse Health</th>
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<th>Negative effects of Merseytram</th>
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</tr>
<tr>
<td>Women</td>
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<td>Parents</td>
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<td>People with disabilities</td>
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</table>
Appendix 4

Additional Profile data

Demographics
The table below shows the percentage of people from different ethnic groups living within each of the 9 wards, as well as the relative figures for Liverpool, Knowsley, Merseyside, North West Region and England. It should be emphasised that very small ethnic groupings have been collapsed in order to provide a clear summary picture.

This process of collapsing ethnic variables has been undertaken as follows:


- ‘Chinese: British’ is comprised of ‘Chinese’ and ‘Chinese or Other Ethnic Group’.

## Appendix 4 Table 1 BME Population Groups

<table>
<thead>
<tr>
<th>Area</th>
<th>White: British</th>
<th>Black: British</th>
<th>South Asian: British</th>
<th>Chinese: British</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>91.0</td>
<td>2.3</td>
<td>4.6</td>
<td>0.8</td>
</tr>
<tr>
<td>North West</td>
<td>94.4</td>
<td>0.6</td>
<td>3.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Merseyside</td>
<td>97.1</td>
<td>0.5</td>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Knowsley</td>
<td>98.4</td>
<td>0.3</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Liverpool</td>
<td>94.3</td>
<td>1.2</td>
<td>1.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Cherryfield</td>
<td>98.5</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Kirkby Central</td>
<td>98.8</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
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<tr>
<td>Abercromby</td>
<td>82.6</td>
<td>3.4</td>
<td>3.2</td>
<td>6.3</td>
</tr>
<tr>
<td>Clubmoor</td>
<td>98.7</td>
<td>0.1</td>
<td>0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Everton</td>
<td>94.9</td>
<td>0.9</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Gillmoss</td>
<td>96.1</td>
<td>0.3</td>
<td>0.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Kensington</td>
<td>90.3</td>
<td>2.4</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Smithdown</td>
<td>84.0</td>
<td>3.5</td>
<td>3.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Tuebrook</td>
<td>95.7</td>
<td>0.9</td>
<td>0.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Merseytram Average</td>
<td><strong>93.3</strong></td>
<td><strong>1.3</strong></td>
<td><strong>1.2</strong></td>
<td><strong>2.2</strong></td>
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</tbody>
</table>
The table below consists of comparative occupational classification data for the Merseytram wards and wider geographical areas.

**Appendix 4 Table 2**  
**Occupational Socio-Economic Classification – All People**

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage aged 16-74: Higher Managerial</th>
<th>Percentage aged 16-74: Lower Managerial</th>
<th>Percentage aged 16-74: Never Worked</th>
<th>Percentage aged 16-74: Long term unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>3.5</td>
<td>18.7</td>
<td>2.7</td>
<td>1.0</td>
</tr>
<tr>
<td>North West</td>
<td>2.9</td>
<td>16.8</td>
<td>3.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Merseyside</td>
<td>2.2</td>
<td>15.5</td>
<td>4.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Knowsley</td>
<td>1.8</td>
<td>12.6</td>
<td>6.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Liverpool</td>
<td>1.6</td>
<td>13.5</td>
<td>6.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Cherryfield</td>
<td>1.2</td>
<td>7.3</td>
<td>9.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Kirkby Central</td>
<td>0.9</td>
<td>7.2</td>
<td>10.2</td>
<td>2.4</td>
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<tr>
<td>Abercromby</td>
<td>1.5</td>
<td>10.8</td>
<td>5.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Clubmoor</td>
<td>1.1</td>
<td>7.9</td>
<td>8.2</td>
<td>3.3</td>
</tr>
<tr>
<td>Everton</td>
<td>1.4</td>
<td>9.6</td>
<td>8.5</td>
<td>2.4</td>
</tr>
<tr>
<td>Gillmoss</td>
<td>1.9</td>
<td>16.5</td>
<td>5.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Kensington</td>
<td>0.9</td>
<td>10.1</td>
<td>9.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Smithdown</td>
<td>0.6</td>
<td>7.9</td>
<td>10.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Tuebrook</td>
<td>1.3</td>
<td>12.2</td>
<td>6.8</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Merseytram Average</strong></td>
<td><strong>1.2</strong></td>
<td><strong>9.9</strong></td>
<td><strong>8.2</strong></td>
<td><strong>2.8</strong></td>
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</tbody>
</table>
### Appendix 4 Table 3  Residents Claiming Incapacity Benefit

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>Number of Incapacity Benefit Claimants</th>
<th>Percentage of population claiming Incapacity Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>49,138,831</td>
<td>1,823,010</td>
<td>3.7</td>
</tr>
<tr>
<td>North West</td>
<td>6,729,764</td>
<td>391,170</td>
<td>5.8</td>
</tr>
<tr>
<td>Merseyside</td>
<td>1,362,026</td>
<td>104,460</td>
<td>7.7</td>
</tr>
<tr>
<td>Knowsley</td>
<td>150,459</td>
<td>13,425</td>
<td>8.9</td>
</tr>
<tr>
<td>Liverpool</td>
<td>439,473</td>
<td>41,975</td>
<td>9.6</td>
</tr>
<tr>
<td>Cherryfield</td>
<td>5,823</td>
<td>685</td>
<td>11.8</td>
</tr>
<tr>
<td>Kirkby Central</td>
<td>6,258</td>
<td>765</td>
<td>12.2</td>
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<tr>
<td>Abercromby</td>
<td>11,473</td>
<td>1,325</td>
<td>11.5</td>
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<tr>
<td>Clubmoor</td>
<td>13,387</td>
<td>1,410</td>
<td>10.5</td>
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<tr>
<td>Everton</td>
<td>7,398</td>
<td>1,080</td>
<td>14.6</td>
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<td>Gillmoss</td>
<td>18,665</td>
<td>1,475</td>
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<tr>
<td>Kensington</td>
<td>12,740</td>
<td>1,910</td>
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<tr>
<td>Smithdown</td>
<td>10,757</td>
<td>1,510</td>
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<tr>
<td>Tuebrook</td>
<td>14,490</td>
<td>1,690</td>
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<tr>
<td><strong>Merseytram Average</strong></td>
<td><strong>11,221</strong></td>
<td><strong>1,317</strong></td>
<td><strong>12.1</strong></td>
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</tbody>
</table>
A variety of indicators have been produced for each dimension of deprivation for all English wards, and these have been gained through accessing a variety of information sources, including Department of Social Security benefits data and University Colleges Admissions Service (UCAS) data. Through using various statistical techniques, it is possible to provide a score for each ward with respect to each of the six dimensions given above. This allows us to describe each type of deprivation within a particular geographical area, and to compare this across other wards. Consequently all English wards can be ranked relative to each other for each of the dimensions. Given that there are 8,414 wards in England, a rank of 1 is assigned to the most deprived ward and a rank of 8,414 is assigned to be the least deprived ward.

*The rank of employment and income scale* is produced through a count of the sheer numbers of people experiencing income and employment deprivation, and then ranking those totals.

*The average of ward ranks* is a population weighted average of the combined ranks for the wards in a district. It is a useful measure in that it summarises the district taken as a whole, including both deprived and less deprived wards. All the wards in a district need to be included to obtain such an average, as each ward contributes to the character of that district. This measure is calculated by averaging all of the ward ranks in each district. The ward ranks are population weighted within a district to take account of the fact of variations in ward size.

*Extent* is the proportion of a district’s population living in wards that rank within the most deprived 10% of wards in the country. It aims to portray how widespread high levels of deprivation are in a district. It only includes districts containing wards that fall within the top 10% of the most deprived wards in England, so some districts will not have an overall score for this measure. A rank of 158 indicates a district with no score.

*Local Concentration* is a way of identifying districts’ ‘hot spots’ of deprivation. It defines the ‘hot spots’ by reference to a percentage of the district’s population. This is the mean of the population weighted rank of a district’s most deprived wards that capture exactly 10% of the district’s population.
### District Level Deprivation in the North West

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<tr>
<th>Local Authority</th>
<th>Rank of Employment Scale</th>
<th>Rank of Income Scale</th>
<th>Rank of Average of Ward Scores</th>
<th>Rank of Average of Ward Ranks</th>
<th>Extent Rank</th>
<th>Local Concentration Rank</th>
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<tr>
<td>Barrow-in - Furness</td>
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<td>164</td>
<td>24</td>
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<td>Bolton</td>
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<td>28</td>
<td>65</td>
<td>78</td>
<td>43</td>
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<td>Bury</td>
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<td>163</td>
<td>184</td>
<td>103</td>
<td>75</td>
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<td>248</td>
<td>236</td>
<td>158</td>
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<td>Ellesmere Port / Neston</td>
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<td>207</td>
<td>112</td>
<td>156</td>
<td>58</td>
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<td>Fylde</td>
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<td>287</td>
<td>245</td>
<td>235</td>
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<td>3</td>
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<td>124</td>
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<td>102</td>
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<td>5</td>
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<td>Macclesfield</td>
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<td>296</td>
<td>294</td>
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<td>38</td>
<td>61</td>
<td>39</td>
<td>18</td>
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<td>Vale Royal</td>
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<td>167</td>
<td>186</td>
<td>146</td>
<td>142</td>
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<td>90</td>
<td>156</td>
<td>181</td>
<td>119</td>
<td>127</td>
</tr>
<tr>
<td>Wirral</td>
<td>7</td>
<td>14</td>
<td>56</td>
<td>70</td>
<td>57</td>
<td>9</td>
</tr>
</tbody>
</table>
WHO's Strategy on Road Traffic Injury Prevention

The World Health Organisation (WHO) has paid a great deal of attention to the impact of transport systems on human health, and this has been demonstrated in various forms. Clear efforts have been made by the WHO to emphasise to policy-makers, health officials and researchers, at the international level, the magnitude of road traffic injuries. This is to facilitate informed decision-making, as well as increase attention to this significant health problem.

A recent report (WHO, 2000) has provided up-to-date, accurate data on injuries, which serves as a reference document on the ranking of injuries among other leading causes of the burden of disease. The report emphasises that injuries, including those caused by road traffic accidents, ought not to be regarded as random, unavoidable ‘accidents’. Using the Global Burden of Disease 2000 database, the report combines mortality data derived from national systems with surveys, censuses, epidemiological studies and health service data to provide a comprehensive view of global mortality and morbidity.

The results of this analysis, which are disaggregated into the six WHO regions (i.e. African Region; Region of the Americas; South East Asian Region; Eastern Mediterranean Region; European Region; and Western Pacific Region), draws some startling conclusions in relation to road traffic. These include:

- Road traffic and self-inflicted injuries are the leading causes of injury-related deaths world-wide;
- The leading injury-related causes of death among children aged 5-14 are traffic injuries and drowning;
- On a world-wide basis, road traffic injuries are the leading injury-related cause of death and burden of disease in males;
- In high-income countries, road traffic injuries, self-inflicted injuries and interpersonal violence are the three leading causes of death among people aged 15-29 years;
- In most of the six Global Regions, road traffic injuries are the leading cause of injury-related deaths. However, in Europe, self-inflicted injuries is the leading injury-related cause of death; and
- Since 1998, road traffic injuries have risen to the 9th leading cause of death world-wide.

More recently, the WHO has developed a strategy for road traffic injury prevention. This strategy (WHO, 2001) highlights that roughly 1.2 million deaths occur annually, and many more cases of disability. It underlines the rapidly growing nature of this problem, whereby projected deaths in 2020 are
expected to reach 8.4 million. Furthermore, it points to the role played by rapid urbanisation (and motorization) within developing countries as accounting for much of this steep rise, which is blamed on a lack of appropriate road engineering, combined with inadequate (or non-existent) injury prevention programmes in the public health sector.

However, on a positive note, the strategy document highlights the preventable nature of these injuries. Seat belts, child car seats, motorcycle helmets and traffic calming measures, for example, have in recent years contributed to preventing these kinds of injury.

Nonetheless, the strategy document emphasises that traffic-related injury prevention efforts have occurred in wealthier countries, and that poorer countries bear the brunt of deaths and permanent disability from such collisions. The WHO sees poor and vulnerable people’s lack of influence over policy decisions as an explanation for the inadequate public health response to road traffic injuries. In addition, WHO argues that road traffic injuries are often seen as being the proper concern of transport agencies, rather than public health agencies. However, WHO admits that its own involvement has been “sporadic and unsustained”, and this is due to a lack of personnel, as well as poor donor response to tackling this issue. The following table, taken from the 5-Year Strategy, illustrates the differential impact of road traffic injuries in different regions of the world:

### Appendix 5 Table 1
**Distribution of road traffic deaths and mortality rates by WHO Region**

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>AFR</th>
<th>AMR</th>
<th>EMR</th>
<th>EUR</th>
<th>SEAR</th>
<th>WPR</th>
<th>WORLD</th>
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<td>INCOME GROUP</td>
<td>HICs</td>
<td>LMCs</td>
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<td>LMCs</td>
<td>HICs</td>
<td>LMCs</td>
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<tr>
<td>Total RT Deaths (000)</td>
<td>170</td>
<td>49</td>
<td>126</td>
<td>72</td>
<td>66</td>
<td>107</td>
<td>336</td>
</tr>
<tr>
<td>% of Global RT Deaths</td>
<td>14.5</td>
<td>4.2</td>
<td>10.8</td>
<td>6.1</td>
<td>5.6</td>
<td>9.1</td>
<td>28.6</td>
</tr>
<tr>
<td>RT Deaths per 100,000</td>
<td>28.2</td>
<td>16.1</td>
<td>25.3</td>
<td>15.2</td>
<td>16.8</td>
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<td>% of all deaths due to RTI</td>
<td>1.8</td>
<td>1.9</td>
<td>4</td>
<td>1.9</td>
<td>1.7</td>
<td>2</td>
<td>2.5</td>
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**Key to Abbreviations**
- AFR= African Region
- AMR= Region of the Americas
- EMR= Eastern Mediterranean Region
- EUR= European Region
- SEAR= South East Asian Region
- WPR= Western Pacific Region
- HIC= High Income Groups
- LMC= Low / Middle Income Groups

The above table clearly shows the disproportionate impact of road traffic injury within low and middle income groups in comparison with high income groups for different WHO regions. Deaths from road traffic injury per 100,000 of the population are consistently higher in LMCs than HICs.

The key thrust of the strategy, therefore, is to develop proposals that are appropriate, cost-efficient and effective. Appropriate measures are those which take into account the complexities of the traffic injury problem, the availability of resources within the country, as well as what has been shown to work elsewhere.
The WHO strategy document also makes the telling point that in 1998, disability-adjusted life years lost from road traffic injuries were the 9th leading cause of disability-adjusted life years lost worldwide. However, by 2020 it is anticipated that road traffic disability-adjusted life years lost will move from the 9th to become the 3rd leading cause.

The WHO 5-year strategy aims to integrate road traffic injury prevention into public health programmes around the world, in order to reduce the high levels of road traffic injury. The strategic objectives are as follows:

- Build capacity at a national and local level to monitor the magnitude, severity and burden of road traffic injuries;
- Incorporate road traffic injury prevention and control into public health agendas around the world; and
- Promote action-orientated strategies and advocate for prevention and control of the health consequences of motor vehicle collisions.

WHO’s strategic framework has taken into account competing needs and expectations, as well as limited resources in many countries. It addresses the following issues:

- Gaps in knowledge: The absence of scientifically based epidemiological, economic and risk factor data at national level, particularly for developing countries.
- Current and planned efforts in the public health sector.
- Opportunities for collaboration and co-ordination within the public health sector
- Finding the balance between the need for descriptive information, as well as information regarding effective interventions and the need to put in place known effective interventions
- Available public health expertise and opportunities for capacity development in both public health and road traffic injury prevention, especially in low income countries.

**WHO Helmet Initiative**

WHO initiatives have focused upon unnecessary death and disability caused by helmetless cyclists suffering head injuries. This initiative was set up in 1991, and was created to promote the use of bicycle and motorcycle helmets worldwide. It serves to stimulate public health agencies to address injury control issues, and to promote effective interventions.

Four key strategies have been adopted to promote universal helmet use. These are:

- To collect and distribute better data regarding the surveillance of injuries;
- To develop a generic programme to promote the use of helmets.
- To evaluate legislative approaches to assist in the promotion of helmets.
- To encourage international collaboration for the promotion of helmets.
The Role of HIA in Influencing Transport Policy

In recent years, the WHO has emphasised the considerable potential of HIA to address the complex issues of health risks and impacts of transport policies (Dora & Racciopi, 2001). Prior to the 1990s, health impacts had been mentioned in the context of transport, but were rarely quantified or explored in much detail, except in relation to air pollution and transport injuries. However, growing environmental concerns led to the consideration of transport, environment and health as an issue in its own right, requiring both national and international action.

Consequently the Third Ministerial Conference on Environment and Health adopted a Charter on Transport, Environment and Health based upon four key components. These are:

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<td>Bringing awareness of the nature, magnitude and costs of the health impacts of transport into intergovernmental processes;</td>
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<td>Strengthening the arguments for integrating health into transport policies by developing in-depth analysis of the evidence (including the work of economists and health scientists);</td>
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<td>Developing national case studies (such as the health impact assessment study of two stroke engine motorcycles in Italy); and</td>
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<td>Engaging ministries of environment, health and transport as well as intergovernmental and non-governmental organisations.</td>
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The WHO emphasises the added value provided by HIA to the policy debate by highlighting the links between decisions made in the transport sector, and the wide range of health risks and benefits that these entail. This involves an understanding of the policy decisions at stake in the transport sector, as well as identifying key actors, their respective interests, and the power relations that govern how they relate to each other. As a consequence of this approach, health arguments have been used to strengthen environmental ones, as well as to clarify costs and benefits in ways that are useful to economists and administrators. This approach raises issues of health equity, which bring to the forefront the interests of society as a whole.

The WHO also recognises a further role of the HIA framework in ensuring that transport-related decisions consider health effects in a systematic and coherent way. It argues that this cannot only be achieved through advocacy, but requires the establishment of a set of rules and procedures for the application of HIA.

In relation to future developments, WHO argue that the European experience has shown that HIA can fulfil the need for simple procedures to be systematically applied, at least at a minimal screening level. Further progress will require that some of the gaps in using HIA as part of the strategy to improve the health and environment performance of transport be filled. These gaps - identified during the work with politicians, economists and health scientists – focus on the need for methods and tools. For HIA practitioners, these include models for quantifying health impacts that link up with models
being used to plan transport and land use and for estimating transport-related health costs, and capacity building on how to use such tools.

Similarly, users of the results of HIAs require further access to knowledge and experience gained with HIA implementation at different stages of policy-making, and with evaluating the impact of different HIA approaches. Which approaches have greater impacts at each level of decision-making, how much quantification is useful at the appraisal stage, how much can be achieved with screening and advocacy alone, and the role of participation are aspects requiring further documentation and evaluation.

The role of comparative risk assessment in supporting HIA for transport policy.

WHO has also highlighted the potential of comparative risk assessment (CRA) in being combined with HIA to produce healthier transport policies (Kjellstrom et al, 2003). CRA is a method used to compare different health risks within a population, and can be used to create healthier public policies. It is defined by WHO as the systematic evaluation of the changes in population health that result from modifying the population’s exposure to a risk factor, or else a group of factors. Like HIA, it enables local users to compare different sources of ill health within a population according to available research. The key differences between CRA and HIA is that CRA places different risk factors into a single measure that incorporates mortality and morbidity: disability-adjusted life years (DALYs). A significant advantage of this approach is that it allows markedly different health risks to be compared within a relatively systematic way. In relation to transport, for example, DALYs can be used to compare the health risks from road traffic accidents with the risk of respiratory disease that is caused by traffic-related air pollution.

However, although CRA is a quantified system that is useful for comparing important scientific issues when assessing changes to health caused by transport decisions, it cannot take into account factors associated with more qualitative aspects of life. This is particularly so when health interests are entangled with broader issues, such as economic well-being and socially ‘healthy’ communities. Therefore, it is suggested that the involvement of stakeholders through the HIA framework can bring these factors into decision-making processes.

Kjellstrom et al suggest that the following stakeholders may be affected by transport decisions:

- Local residents with enhanced (or reduced) access to essential services;
- Local residents who may be affected by air or noise pollution;
- Local residents who lose opportunities for physical activity if open spaces or recreational areas are converted to traffic corridors;
- Transport users and pedestrians who are affected by traffic accidents;
- Politicians responsible for transport and health care provision;
• Transport users who are either encouraged or discouraged to ‘active’ modes of transport (i.e., transport that involves more physical exercise beneficial to health than driving a car, such as walking, cycling, or using public transport); and

• Health care services that respond to road traffic accidents and treat injuries.

The report provides the following examples of ways in which CRA has been used to support HIA within a transport setting:

**Australia and Sweden**

HIA was used to explore a proposed motorway bypass in Melbourne in 1995 (Dunt et al., 1995). This study included road traffic accidents, diseases associated with air pollution from traffic, and noise effects. It was used as “a projection of future health status based on traffic flow estimations and other local conditions that would exist if the motorway were or were not constructed”.

Community input was regarded as integral during this HIA. Community groups were represented on the steering group, and public meetings were held at which issues of concern to local people could be raised. These were then incorporated into the models that were used, and influenced the analytical approach used for traffic projections.

The HIA concluded that the motorway would have an overall benefit on health, given that reductions in injuries from road traffic accidents and noise pollution on existing roads outweighed the risks of any increase in air pollution. However, such an increase was not quantified, and the tendency for motorways to increase traffic may have negated any estimated benefits.

Proponents of CRA advocate that a formal comparative approach in this instance would have led to a more systematic analysis of the health issues, but no data were available to support a more comprehensive assessment. Although HIA is less rigorous in the comparative sense to CRA, this does allow for greater flexibility in accommodating the data that is available.

Nonetheless, the downside of HIA’s flexibility is reflected in an analysis of the extent to which health aspects have been incorporated into environmental impact assessments. Of 28 road projects in Sweden during the 1990s (Alenious, 2001), for example, only 5 had involved any health expertise. Other issues that were raised centred upon noise, the dangers of transporting hazardous goods on the new road, and the potential health impacts of air pollution – yet no attempt was made to quantify these health impacts. The analysis concluded that HIA of road projects in Sweden was poorly developed.

Studies undertaken by Kunzli (1999) have revolved around HIA of transport-related air pollution by using data from Austria, France, and Switzerland. An assessment of exposure to air pollution was based upon emission inventories, atmospheric dispersion modelling, monitoring data, and utilising geographic information system (GIS) techniques.
The analysis of total mortality due to road toll and air pollution was subsequently presented in tabular form. The ratio calculations, showing the comparative likelihood of mortality from traffic accidents and traffic-related air pollution for France, Austria, Switzerland and New Zealand, had a major influence on the interpretation of air pollution issues. It led directly to initiatives to develop improved CRA for different European countries, Australia and New Zealand. Furthermore, investments in further air pollution reduction, including public transport expansion, cleaner diesel fuels, and stricter vehicle emission controls have subsequently been implemented, or else are under consideration.

**CRA and HIA: Opportunities and Obstacles for Joint Approaches**

This discussion concerning the WHO’s support of HIA in developing healthy transport policy emphasises HIA’s value in providing a structure that encourages stakeholder participation, as well as potentially generating more ‘socially robust’ policy decisions. However, CRA offers strengths in the comprehensive and systematic use of scientific information to yield more ‘scientifically robust’ outcomes. Consequently, applying CRAs within a flexible HIA framework has the potential to enhance decision-making along both social and scientific dimensions.
European Transport Policy

In September 2001, the European Commission (EC) adopted a White Paper on European Transport Policy (EC, 2001). This document describes what has been achieved so far, both at the Union and Member States levels, and what should be done in the near future.

The White Paper recognises the inherent contradiction between a European society that demands greater and greater mobility, whilst public opinion is increasingly intolerant of chronic delays and poor quality services. The transport system, therefore, must be optimised to meet the demands of European enlargement, and the development should be economically, socially and environmentally sustainable.

Since the Commission’s first White Paper on the future development of a common transport policy in 1992, the guiding principle has been the opening-up of the transport market. This has been achieved, with the exception of the rail industry. Air transport has been opened up to competition, leading to a large reduction in consumer prices, better quality service and a wider range of choice.

However, despite the successful opening up of the transport market, the lack of fiscal and social harmonisation has meant that there has been no harmonious development of the common transport policy. This has caused:

- Unequal growth in different modes of transport, with the road making up 44% of the goods transport market, compared with 41% for short sea shipping, 8% for rail and 4% for inland waterways.

- Congestion on the main road and rail routes, in towns and at airports.

- Harmful effects on the environment and public health, as well as the considerable toll of road traffic accidents.

The White Paper argues that the level of congestion has begun to threaten economic competitiveness. Within the trans-European transport network, 10% of the road network is affected daily by traffic jams. Such delays result in consumption of an extra 1.9 billion litres of fuel, which amounts to 6% of annual consumption. Traffic forecasts suggest that road congestion will increase substantially by 2010 if nothing is done, and the costs attributable will amount to 1% of Community GDP. This is partly due to transport users not always covering the costs that they generate, as well as the poor organisation of Europe’s transport system.

Transport growth in an enlarged European Union

The White Paper emphasises that the main factor behind the growth in demand for transport is the growth in car use. The number of cars has tripled in the past 30 years, and will become even greater in those countries joining an enlarged EU, where access to a motor car is seen as a symbol of freedom. Unless radical new measures are adopted, so that Member States can use modes of transport more rationally, the EC warns that heavy goods vehicle traffic alone will increase by nearly 50% over its 1998 level.
The White Paper warns that energy consumption is responsible for approximately 28% of carbon dioxide emissions. The EC, therefore, calls for strong efforts to preserve air quality and combat noise pollution in order to meet the needs of the environment and the concerns of the population without compromising the competitiveness of the transport system and the economy.

Furthermore, the EC calls for consistent measures to be taken at national or local level that relate to different policy environments, so that a comprehensive strategy can be created that goes beyond European transport policy.

The key elements to this are:

- An economic policy that takes account of certain factors contributing to increasing demand for transport services;
- Urban and land-use planning policy to avoid unnecessary increases in the need for mobility generated through unbalanced planning of distances between home and work;
- Social and educational policy, with better organisation of working patterns and school hours to avoid overcrowding roads, particularly by traffic departing and returning at weekends (ie when most road accidents occur);
- Urban transport policy in major conurbations, in order to strike a balance between modernisation of public services and more rational use of the car, given that compliance with international commitments to curb carbon dioxide emissions will be decided in the cities and on the roads; and
- Transport research policy to make the various efforts made at Community, national and private levels more consistent, along the lines of the European research area.

**Principal measures proposed in the White Paper**

There are 60 specific measures to be taken at Community level under the transport policy, which includes an action programme extending until 2010, with milestones along the way. Detailed proposals will be based on the following guidelines:

- Revitalising the railways
- Improving quality in the road transport sector
- Promoting transport by sea and inland waterways
- Striking a balance between growth in air transport and the environment
- Building the trans-European transport network
- Improving road safety
- Adopting a policy on effective charging for transport
- Developing high quality urban transport
- Putting research and technology at the service of clean, efficient transport
- Developing medium and long-term environmental objectives for a sustainable transport system

Those measures relevant to Merseytram are described in more detail below.
Improving road safety
As with WHO, the EC highlights the need for improved road safety, and that each year there are 41,000 deaths on Europe’s roads. Consequently, the EU should set itself the target of halving the number of deaths by 2010. The EC argues that guaranteeing road safety in towns should be a precondition for developing other means of public transport, such as cycling. Further proposed measures include harmonising signs at particularly dangerous black spots, as well as the checks and penalties in relation to speeding and drink-driving.

Adopting a policy on effective charging for transport
The EC argues that the individual modes of transport do not always pay for the costs that they generate, and that this leads to dysfunctioning of the internal market, as well as distorting competition. Furthermore, it feels there is no real incentive to use the cleanest modes, or the least congested networks. As such the EC calls for:
- Harmonisation of fuel taxation for commercial users, particularly in road transport;
- Alignment of the principles for charging for infrastructure use.

Developing high-quality urban transport
The EC calls upon local public authorities to reconcile modernisation of the public service and rational use of the car. This is in accordance with meeting the international commitments to reduce carbon dioxide emissions made at Kyoto.

Putting research and technology at the service of clean, efficient transport
In this regard, the EC calls upon the European Research Area to put facilitate co-ordination and increase efficiency in the system of transport research. In particular, it demands action on cleaner, safer road and maritime transport, as well as on integrating intelligent systems in all modes, so as to enhance efficient infrastructure management.

Developing medium and long-term environmental objectives for a sustainable transport system
Developing a sustainable transport system will require a variety of measures and policy instruments. Therefore to support the package of proposals to be implemented by 2010, the analysis in the White Paper stresses:
- The risk of congestion on the major arteries, coupled with regional imbalance;
- The conditions for shifting the balance between modes;
- The priority to be given to clearing bottlenecks;
- The important new place given to users at the heart of transport policy; and
- The need to manage the effects of transport globalisation.

White Paper: A strategy for revitalising the Community’s railways
The White Paper on EC railway policy (EC, 1996) aims to lay down a strategy to revitalise the Community’s railways by creating a sound financial basis, ensuring freedom of access to all traffic and public services and by promoting the integration of national systems and social aspects. It provides a useful context to the direction of transport policy developments in the EU.
Sustainable mobility: 2000-2004 action programme

Another EC programme relevant to Merseytram is the Sustainable Mobility programme. The 2000-2004 action programme (EC, 1998a) aims to implement a common transport policy that is safe, efficient, competitive and socially and environmentally friendly. It summarises its priorities in the transport sector for the period up to 2000, based on its Action Programme for 1995 to 2000 and its work programme for 1999. It then sets out its longer-term perspectives for the period 2000-2004.

The Action Programme recognises that in recent years some progress has certainly been made on transport, but argues it has not achieved as much as it could have done. The general thrust is that transport in Europe, both in the EU and beyond, must be made more efficient and competitive, and its overall quality has to be improved. Furthermore, efficient transport systems will make the sector more competitive and give a boost to growth and employment. To achieve this, it calls for the following:

- improved market access and functioning, particularly in the rail sector and ports, and the elimination of obstacles which remain in other sectors (in particular civil aviation);
- integrated transport systems to be set up by continuing to develop Trans-European networks and promoting intelligent transport systems, such as the Global Navigation by Satellite System (GNSS);
- the introduction of fair and efficient pricing to reduce the distortions of competition between modes of transport and between Member States;
- giving more attention to the social aspects of transport, including working conditions and working time; and
- monitor the implementation of Community legislation, particularly on State aids and competition.

In the longer term, the objectives described above must be maintained over the period 2000-2004. The Commission sets out an exhaustive list of tasks to be achieved during this period, which include:

- Studying the feasibility of a European Transport Data System;
- Clarifying the regulatory framework, including State aid guidelines;
- Improving the interoperability of transport systems and deploying intelligent transport systems;
- Considering the role of logistics in the transport economy;
- Achieving greater convergence in standards for training and professional qualifications;
- Examining problems and performance in the different modes of transport;
- Finding less environmentally-damaging energy alternatives for transport;
- Putting in place a new regime for Alpine transit;
- Examining the role of international organisations responsible for transport in Europe and the transport implications of UN and WTO reports.

Developing a citizen's network

A legislative document (EC, 1998) published in 1998 seeks to develop a system of local and regional passenger transport by providing the public authorities, operators and user groups with appropriate tools and establishing a policy framework that promotes sustainable mobility.
The document refers to the Amsterdam Treaty, which includes sustainable development as one of the European Union’s objectives. Transport has a key part to play in achieving this goal. A well-functioning European transport system needs a good, sustainable local and regional passenger transport structure. This is primarily a matter for local, regional and national authorities, working with transport operators and users, amongst whom there is a high degree of consensus on the fundamental need to shift away from dependence on private cars and make transport systems more sustainable.

Practical methods of making transport systems more sustainable and shifting away from excessive dependence on private cars area have direct relevance to transport systems on Merseyside and Merseytram and include:

- Raising the quality and accessibility of public transport services and increasing their capacity to respond flexibly to changes in transport needs;
- Making walking and cycling more attractive by offering more favourable conditions;
- Reducing the demand for travel, for example by reversing the trend for housing, jobs, schools, etc. to disperse to places which are hard to reach except by car;
- Removing psychological barriers to the use of alternatives to cars;
- Actively managing car use in congested areas;
- Making transport an essential component of strategies for spatial planning, economic development and social cohesion;
- Fostering new, flexible working time arrangements;
- and Pulling all this together to create a door-to-door transport system which people can use as an integrated Citizens’ Network.

The document calls for the integration of travel services, facilitating less costly and effective door-to-door travel whatever the number of transfers or the distances involved. One of the key principles is intermodality, as it allows different means of transport to be used as part of seamless transport chains.

In order to support the role of local and regional passenger transport while complying with the principle of subsidiarity, the Commission has drawn up a three-year work programme covering four key areas, which are described in the appendix.

**Promoting Road Safety in Europe**

Developing safer roads across Europe is a key element of the EU’s transport policy. A recent report (EC, 2001) sets out, with the requisite level of detail, specific measures in accordance with what the Commission has already endorsed, and reaffirms the overall of halving the number of road accident victims by 2010.

In order to ensure a sharing of responsibilities, and in accordance with the competencies of each party involved (EU, Member States, regional and local authorities, industry, transport companies and private users), this programme aims to encourage road users to improve their behaviour, to make vehicles safer, and to improve road infrastructure. It provides for the setting up of a European Road Safety Observatory within the Commission. Furthermore, it proposes that all the parties concerned, whether public or private, should subscribe to a European Road Safety Charter.
Promoting clean urban transport in Europe

Urban transport contributes to global warming. More than 10% of all carbon dioxide emissions in the EU come from road traffic in urban areas, which is also the main source of carbon monoxide and fine particulates in European cities. These emissions pollute the immediate area and pose serious health hazards. The Kyoto protocol calls for an 8% cut in total EU carbon dioxide by 2008–2012 with respect to 1990 levels, but if current trends continue, CO₂ from transport will be some 40% higher in 2010 than it was in 1990. Therefore the challenge for future urban transport systems will be to meet the demand for accessibility for people, including people with reduced mobility and goods, while at the same time minimising the impacts on the environment while safeguarding the quality of life.

The European Union is working toward the definition and implementation of a strategy to promote sustainable mobility in an urban context that would include a range of actions such as:

- promoting market take-up of lower-consumption vehicles and new propulsion technologies to reduce emissions
- promoting the use of improved collective and non-motorised modes in conjunction with mobility management schemes
- demand management schemes such as parking controls and access restrictions
- information systems for better traffic management and improving traffic flow
- integrated intermodal freight and passenger transport systems such as city logistics and improved terminals
- fair and efficient pricing regimes
- Supporting integrated land-use and urban transport planning to minimise the need to travel and facilitate collective transport
- promoting efficient public transport modes to people with reduced mobility
- supporting and promoting cycling
- possible contribution of Teleworking

Policy-related Initiatives

To carry this challenging agenda forward, the EC has developed the following initiatives:

ELTIS - European Local Transport Information Service - is funded jointly by the European Commission and the International Union of Public Transport (UITP). It is a guide to current transport measures, policies and practices implemented in cities and regions across Europe.

CITIZEN’S NETWORK BENCHMARKING INITIATIVE was carried out in 1998–99 and developed a set of indicators to compare one local passenger transport system with another. These indicators are available on ELTIS. Merseytravel was a contributor to this initiative.

EPOMM – European Platform on Mobility Management - is an international partnership of seven EU member states supported by the EC aiming to promote and develop the concept of Mobility Management in Europe and to
fine tune its implementation in EU Member States and the other European countries.

PEOPLE WITH REDUCED MOBILITY - People with reduced mobility (PRM) represent an important proportion of the EU population (about 35-40%). They are principally disabled people, elderly people but also people with a large amount of luggage or shopping bags, people with children in buggies, people with temporary injuries. The Commission has carried out and is currently promoting a series of initiatives aiming to facilitate and improve the accessibility to public transport for these citizens.

CYCLING AND WALKING is by nature a clean mode of transport and has a potential for development given that a significant share of all EU road trips (50%) do not go beyond 5 km. The European Commission as therefore carried out a series of initiatives aiming to promote cycling and walking.

Revitalising the Community's railways
The reasoning for this White Paper is that the railway sector is seen to be in decline and its market share as falling. Rail was felt not to respond to market changes or customers' needs. However, rail is seen to have characteristics that could make it an increasingly attractive form of transport in Europe. Many possibilities already exist for improving and developing services, and new areas of opportunity may open up. To meet these challenges, the Community was felt to be in need of a new kind of railway.

For the railways to flourish clear financial objectives and a proper division of responsibilities between the State and the railways was seen as essential. The railways must have a financial structure that allows effective, independent management. Railway finances should be organised as follows:

- Member States should relieve railways of the burdens of the past; and
- The railways should be run on a commercial basis.

Introducing market forces into rail was seen as strengthening the market, giving management and workers incentives to reduce costs, improve service quality and develop new products and markets. Various proposals have been drawn up by the EC to achieve this. It proposes extending access rights to railway infrastructure for all freight services and international passenger services. In relation to domestic passenger transport, the EC examines several options for improving the institutional framework for developing the railways. The Commission proposes modification of Community legislation to require the separation of infrastructure management and transport operations into distinct business units, with separate management and balance sheets; and promoting the creation of a number of trans-European rail freeways for freight.

The aim is to offer citizens satisfactory mobility thanks to continuity and quality of transport services, and to contribute to sustainable development, social cohesion and regional balance in the European Union.

The Commission's proposals are as follows:
To improve the quality/price ratio in the transport sector;

To generalise the use of public service contracts agreed by the State and the transport operator; and

To study the practical problems associated with introducing market forces.
EC Work programme to increase citizens' networks

**Stimulating information exchange** by developing a European Local Transport Information Service (ELTIS). This will consist of a database about local and regional passenger transport of all types, with information coming from the POLIS network of cities and regions and the International Union of Public Transport (UITP). Users will be able to consult the service electronically by using the World Wide Web.

**Stimulating the benchmarking of service performance** to enable public authorities and transport operators to benefit from comparison of the performance of their local and regional transport systems with systems in other countries. In this respect, the Commission will present a Communication on benchmarking of transport. In addition, the European Committee for Standardisation (CEN) intends to adopt standard definitions that can be used in setting quality criteria for passenger transport. From 1999 onwards, the Commission has sought to encourage widespread use of benchmarking by public authorities and operators. A handbook on benchmarking local public transport has been produced to ensure that a database of results obtained is widely available.

**Establishing a political and legal framework** that promotes increased use of local and regional passenger transport systems and helps to achieve the objectives of the European Union's common transport policy with regard to efficiency, quality and sustainable mobility. The Commission plays an important part in the development of this policy framework. In land use planning, for example, it encourages good practice with regard to transport through instruments such as the trans-European transport network, regional policy, and cohesion policy. In transport telematics, it makes the most of the potential of telematics applications to improve the efficiency and quality of transport services and help to overcome obstacles to their integration. The Commission emphasises that information obtained through new telematics applications (in real time, accessible at home, at work and on the move) should cover as many different forms of transport as possible. This should include public transport routes and timetables, the degree of congestion on the road network, and the availability of parking. Making use of the potential of regional transport will also provide increased mobility for women, disabled people and the elderly, and help to reduce pollution, energy consumption and CO2 emissions from transport and make optimum use of public spending.

**Using the European Union's financial instruments effectively.** The European Commission seeks to manage these funds and programmes so as to optimise the potential contributions from a sustainable local and regional passenger transport system. In its review of the guidelines for the trans-European Transport Network (TEN-T), for example, the Commission has paid particular attention to the question of local and regional connections to the TEN-T (whether to include intermodal passenger terminals in the guidelines).

All in all, the Commission's work programme is intended to provide practical assistance to numerous institutions throughout Europe which contribute to the development of local and regional transport for the citizens' benefit: the public authorities, transport companies and user groups.
UK Transport Policy

Priorities for the UK’s Road Safety strategy

• Safer for children

Road traffic accidents are the leading cause of accidental injury amongst children and young people. Every year, over 130 children die and more than 4,500 are seriously injured while walking and cycling, many of them close to their homes. Another 60 die and over 1100 are seriously injured travelling in cars. The overall rate of serious road injuries to children is better than the European average. But, despite recent improvements, the UK child pedestrian record is still particularly poor, especially compared with other European countries.

An action plan is proposed that identifies the four key stages in road safety education, targeting:

- Babies and very young children through advising their parents and first teachers on protection in cars and teaching safe behaviour on the road.
- Primary age children - through child pedestrian training schemes and, later, cycle training, alerting parents to the risks of cycling in particular traffic conditions.
- Older children - by providing road safety information as they change school and go on longer journeys on their own.
- Older teenagers - providing advice as they contemplate much more independent mobility.

• Safer drivers – training and testing

Better driving skills and better driving behaviour would make an enormous difference to reducing the number of road casualties. The following measures are introduced:

- Instil in young people the right attitudes towards road safety and safe driving.
- Guide learner drivers to take a more structured approach to learning, to prepare them for their driving career, not just to pass a test.
- Raise the standard of tuition offered by driving instructors.
- Improve the driving test in the light of better understanding about what needs to be examined and effective ways to do it.
- Focus on the immediate post-test period for novice drivers.
- Enhance the status of advanced motoring qualifications.
- Address the needs of professional drivers.
- Bring safety benefits for all categories of motor vehicle.

• Safer drivers – alcohol, drugs and drowsiness

Over 16,000 casualties in 1998, including 460 deaths, were caused by accidents where at least one driver was over the legal alcohol limit (0.08% in the UK). Even a very small amount of alcohol affects driving. Drugs too, both illegal and medicinal, can impair driving skills. According to the latest research, fatigue may be the principal factor in around 10% of all accidents. The following measures are proposed:
Introduce new measures to reduce drink-driving further. Develop more effective ways to tackle drug-driving. Carry out research to improve understanding of drug-driving. Strengthen and enforce laws on driving time for lorry, bus and coach drivers. Make people aware how much tiredness contributes to road accidents and advise drivers and employers how to cut the risks.

Transport and the economy
This SACTRA report discusses the theories that deal with the linkages between transport improvements (defined as 'all types of transport investment or policy initiative'), reductions in transport costs and enhanced economic activity, and describes these as strong. However in practice empirical evidence suggests that in mature economies with well-developed transport systems, transport investments that yield lower transport costs produce only modest rates of returns in terms of economic growth and productivity improvement. In addition, it indicates that there are often both 'winners' and 'losers' with transport interventions - the 'two way road argument': improved accessibility between two areas may sometimes benefit one area over the other.

The prospect of 'decoupling' economic growth from traffic growth was examined. It suggests that traffic growth is exceeding economic growth, that is, each unit of output is associated with a greater amount of movement of people and goods. Evidence presented indicates that income growth does indeed affect traffic growth, but that the price, speed and quality of transport also influence the amount of traffic. As such, the SACTRA conclude that it is potentially feasible to reduce the volume of traffic resulting from a particular level of economic activity by policy interventions. However, once an optimal transport price level has been achieved which balances environmental damage and other costs, non-price traffic reducing measures, such as reallocation of road capacity, were considered appropriate in order to assist economic performance. Because of the limited evidence available on specific traffic reduction measures at a national level, no targets for traffic reduction were recommended.

The final question to be considered by the SACTRA was whether the economic impacts of a transport intervention were adequately captured with current appraisal methods. The SACTRA went to great lengths to stress a holistic approach needs to be taken; that is, the model needs to include both direct and indirect benefits and costs to both transport users and non-users, and then convert them into the economic effects, such as reduced wage costs. The issues identified in the report are that, firstly, not all the transport effects are known (especially behaviour changes) and they have different monetary values, secondly, 'imperfections' in the economy - the economic context of the intervention affects the economic impacts, and finally, there is a spatial distribution of effects.

Recommendations from the report were to introduce a new, improved formal procedure to appraise all potentially important transport policies or projects on whether the transport prices were higher or lower than the social costs. This was to be followed by a wider economic impact assessment of the full transport costs and benefits.
The UK's Strategic Rail Authority

The Strategic Rail Authority provides a focus for strategic planning of the passenger and freight railways with appropriate powers to influence the behaviour of key industry players. The Authority’s role is to:

- promote the use of the railway within an integrated transport system;
- ensure that the railways are planned and operated as a coherent network, not merely a collection of different franchises;
- work closely with local and national organisations, including local authorities, Regional Planning Conferences, Regional Development Agencies, transport operators and the Highways Agency and the equivalent organisations in Scotland and Wales to promote better integration;
- participate actively in the development of regional and local land use planning policies, and ensure as far as possible that decisions on the provision of rail services dovetail with these policies;
- ensure that rail transport options are assessed in a way which constitutes good value for money and optimise social and environmental gains;
- take a view on the capacity of the railway, assess investment needs, and identify priorities where operators' aspirations may conflict with one another;
- promote the provision of accessible transport for disabled people;
- keep under review and advise Government on the contribution that the railway can make to sustainable development objectives;
- draw up policies and criteria for any future framework for competition between passenger train operators.

Furthermore, the Strategic Rail Authority, is to ensure that arrangements are made so that train operators structure and market their fares to offer value for money for their customers, and to reflect the fact that the railway is a national network which needs to be marketed accordingly and in a way which encourages people to switch from car to train.

For Merseyside, in so far as the Merseyside Electrics Networks is concerned, Merseytravel is the SRA and takes the role of the SRA as detailed above.
Transport mode and health: evidence from the literature

Transport mode and environmental impacts

There has been much interesting discussion concerning how best to limit the environmental impacts of transport on human health. The general discussion has focused on transport’s social, economic and environmental impacts, and the requirement for a series of measures at the local, national and international level. Researchers in the UK and abroad have indicated the role that public transport must play in such a strategic role to reduce CO$_2$ and other emissions from the transport sector. Not only is public transport more energy efficient per passenger kilometre and less polluting than cars or air travel, but it offers an alternative that could enable restrictions on the more polluting travel modes to be more acceptable.

However, within the UK there appears to be some contradiction between moves to plan for healthier transport policy, whilst there has also been an ongoing process of deregulation and withdrawal of the state from the transport market. Bus privatisation and the deregulation of services occurred in 1986, and British Rail was privatised in 1995-1997.

Potter and Enoch (1997) consider the development of environmental policies for both bus and rail services. The review of bus services considers Groningen (Netherlands), Ottawa (Canada), Oxford (UK) and Pittsburgh (USA), all of which have developed good-practice, bus-based public transport systems.

The Dutch model makes it extremely difficult for private motor vehicles to pass from one part of the city centre to another, as well as containing elements of parking restraint, a comprehensive cycleway network and a largely pedestrianised city centre. Overall in Groningen, car use is below the 50% target suggested for UK urban areas by the UK’s Royal Commission on Environmental Pollution. The Canadian system has developed many innovations, including a hierarchy of express, limited stop and all stop services, as well as computerised information systems that provide passengers and operators with travel data. The Oxford model is the only one where bus services have been developed in the context of a privatised, deregulated system. Privatisation appears to have some benefits here: two private companies compete with each other, and there has been a large increase in the number of passenger trips made in the city. This growth is attributed to a mix of improved service levels for passengers (both quantity and quality), lower fares, and an expanding level of demand due to increased economic activity, and the implementation of rigorous anti-car measures contained in the local authority’s transport strategy. Figures suggest an increase in bus use of roughly 30%, which contrasts sharply with the decline by a third elsewhere in the UK. The Pittsburgh model combines the presence of exclusive busways with the beginnings of a new Light Rapid Transit network, and the increase in daily ridership on certain busways has created two new busway developments.

The authors conclude that this case study approach has highlighted that measures to promote bus use need to be carefully integrated with a mix of complementary land use, car restraint and economic policies, and ideally under circumstances of changing attitudes to travel behaviour. This requires
strong political will at an organisational level, both in starting up and maintaining this process. Bus operators need to continually aim to improve service quality, if only to maintain modal share, given that public expectations continue to rise. A further conclusion is that when the level of political will or financial commitment begins to fall, cultural and economic factors begin to work against the public transport provider.

There are strong implications here for having an effective bus service between Liverpool and Kirkby that can augment the Merseytram service. In this way, the added value of a regular bus service can be an important factor in encouraging greater levels of physical activity, as well as reducing levels of social exclusion. The authors comment further on the need for local authorities and bus companies to recognise the mutual benefits of working together, and point to the recent development of ‘quality partnerships’ in the UK, whereby bus companies agree to improve service quality in return for local authority support in upgrading infrastructure. Edinburgh, Leeds, Bristol and Birmingham are all recognised as having pro bus local authorities.

However, the authors highlight some fundamental problems in developing such partnerships, particularly in relation to investment by private companies, who tend to require either the stability provided by a local monopoly, or else the prospect of strongly expanding demand. Developing a franchising system is seen as having various merits, not least that it allows local authorities to directly address longer-term social and environmental objectives. The drawbacks, however, tend to include increased levels of bureaucracy.

The privatisation of British Rail under the 1993 Railways Act led to the former unified and nationalised railway being restructured into 100 separate companies, including 25 passenger Train Operating Companies (TOCs), the infrastructure company Railtrack, six rail freight companies, three rolling stock leasing companies plus other companies covering maintenance, engineering and other support services. The authors conclude that the strategic environmental impacts of rail relate to the sort of markets rail operators seek to develop and the general mix of price, quality, coverage, reliability and integration with other transport systems. Consequently the effect of privatisation upon rail’s overall role in transport in Britain is highly uncertain, with a mixture of positive and negative impacts. These can be summarised as follows:

*Positive impacts of rail privatisation*

- more aggressive and professional marketing of train services by TOCs;
- finding better ways of using and training staff to enhance customer care and thereby increase productivity;
- increase integration of rail and bus services, especially from new owners of TOCs which also operate buses; and
- improved services operated by some individual TOCs could attract travellers from road to rail on certain routes.

*Negative impacts of rail privatisation*
- Loss of negative interaction, leading to more complex ticketing, lack of co-ordinated timetable information, especially for trips involving more than one TOC;
- Major staff reductions in order to reduce costs adversely affecting services and service quality / reliability;
- Integration and joint ticketing with bus services reducing, especially where seen as anti-competitive; and
- TOCs are likely to promote profitable off-peak leisure and long-distance business travel rail markets that generate additional travel rather than shift passengers from road and air to rail.
- Fragmentation of the rail industry.

**Transport mode and accessibility**

The Merseytram Line 1 development seeks to achieve various goals, including a reduction in the level of social inclusion, particularly along the route from Kirkby to Liverpool that is affected by significant levels of multiple deprivation.

Transport systems are a key factor in economic development. An ineffective transport system limits economic and social opportunities. Furthermore, the greatest transportation implications for the sustainability of a region stem from the energy and environmental consequences of car travel.

Murray et al (1998) consider these issues in the context of the development of the South East Queensland region of Australia, which includes Brisbane, the Sunshine Coast and the Gold Coast. Population growth and urban development are seen as representing formidable challenges for transport systems, particularly in order that short and long-term objectives can be maintained. Ensuring that certain modes of transport area available for use is an important consideration, as is the provision of a transportation option for those without access to a motor car. In addition, where the distances or barriers to access a service are too great, then the mode of transport is unlikely to be used. Similarly, where the cost is either too expensive or unaffordable, then utilisation of the service also becomes less likely.

Since the 1960s, increased transportation demands have been linked closely with the rapid expansion of road building programme, as well as the removal of the Brisbane tram system. However, there has been renewed interest in public transport planning in Queensland, partly motivated by a desire to provide a transport option to people lacking a private vehicle, as well as a growing awareness of the problems of car dependency.

There appear to be some important parallels with the Merseytram development, in that the strategy being developed in Queensland recognises that sustainable regional development must include public transport service provision as a component of the transportation planning process. The onus within Queensland, therefore, is on producing an interconnected combination of bus, rail or ferry services subsidised by local, state and/or federal governments. Thus the Integrated Regional Transport Plan (IRTP) for South East Queensland seeks to develop a transportation system that can meet anticipated needs without sacrificing desirable aspects of quality of life. This approach reflects others in Sydney and Perth, in that it accepts that private vehicle travel is both an established and necessary part of existing transport
systems, whilst recognising that increasing the percentage of private vehicle trips is an undesirable outcome of growing and expanding metropolitan regions. Within the context of Merseyside, therefore, an integrated system that develops other transport modes in addition to Merseytram would be part of a sustainable approach.

Within South East Queensland, the IRTP specifies a policy goal for public transport in the region of at least 90% total population coverage within 400 meters of a bus, rail or ferry stop. Sustaining suitable service coverage is an important objective, as the time taken to reach a public transport stop has a major effect on total travel time, which is closely linked with potential usage. A distance of 400 meters is seen to represent a comfortable walk for most people in normal conditions. Consequently, access is destined to be a specified distance (or travel time) to a public transport stop, which then enables policy makers to identify all of the areas within the threshold distance of all stops. Once these areas have been identified, it is then possible to show the total number of people in a region having suitable access.

However, although the policy objective of providing 90% population access in South East Queensland is a common transportation objective throughout Australia, its achievement is extremely limited. Using 1996 census data, only 55% of the population had suitable access to public transport using the 400 metre coverage criterion. On closer examination, the 90% goal is not reached until the criterion adopted is 8.8 kilometres (i.e. well beyond the stated distance of 400 meters). Indeed access to public transport has actually worsened, given that 58% of the population had access using data from the 1991 census. A further important issue is that increasingly large numbers of older Australians are seeking to retire in these coastal areas, which suggests a growing proportion of the population with a potential need for public transport services.

The authors conclude that public transport services in South East Queensland are unlikely to meet the needs and requirements of people in the rural areas. Therefore, the idea of service coverage should reflect the spatial, socio-economic and demographic characteristics of potential users rather than trying to set public transport goals for the entire region. However, they argue that priority should be given to improving access to areas containing a high proportion of transport disadvantaged groups (such as the elderly, pensioners, low income earners) or areas that contain a high probability of increasing public transport patronage. Such an approach would focus attention on providing service access to those most likely to use it. Clearly this resonates strongly with the Merseytram development, given the high levels of socio-economic deprivation that exists within the Merseytram zone (see health profile). The pricing structure is crucial if the development is to reach the most socially disadvantaged, and so subsidised fares for low wage earners and pensioners may well be the key element for a genuinely wide-reaching service.

The authors are critical of service improvements through strengthening and widening the transport coverage within the greater Brisbane region, through initiatives such as increasing travel speed by providing separate bus lanes. Their criticism is due to the fact that existing service provision is already efficient, and so any increasing coverage is highly speculative and may have
little net effect, perhaps a 3% increase at most. Further criticism is levelled at the Briztram light rail project, which will only enhance public transport in areas already provided with relatively good public transport access. This does not relate to the Merseytram development, given that low economic activity is coupled with a bus service between Liverpool and Kirkby that is deemed unsatisfactory. Consequently the potential for widening access to public transport within the Merseytram zone is significantly greater than it would be within Brisbane.

Transportation and reducing car travel

There has been much debate about how best to encourage car drivers to switch to other methods of transport. A research study undertaken by Stokes (1996) reported on a survey of 456 car commuters into Liverpool, in order to identify which particular group might be tempted onto public transport. Those with the most potential for these formed one third of those sampled, and were those who already use public transport for another journey purpose. Access to a free parking space at work was a further significant factor supporting car dependence. Further work by Steg and Vlek (1996) reported on a survey of regular car users in three Dutch cities (Groningen, Amsterdam and Eindhoven). Their study found that those most likely to reduce car use were those classified as being highly aware of the problems of such use, and already travel lower than average miles per annum, with less of that mileage by car.

Curtis and Carey (1997) explore this issue by means of a household estate survey in Oxfordshire. Respondents were asked whether they had ever considered travelling to work by other means than a car; and whether it would be practical to do so. The survey found that part-time workers and younger people (20-24 year olds), together with those aged over 50 years, were least likely to have considered a change, both within higher and lower social and economic groupings. Similarly, a large proportion of respondents intimated that it was not practicable to travel regularly to work by non-car means, and socio-economic grouping made little difference in this regard.

A key group of reasons given for people not using non-car methods of commuting relates to concerns about the public transport system; whilst the majority concern was with increased journey time, other concerns included transport cost, frequency and reliability. Other important reasons included fear of assault, as well as traffic injury (especially for would-be cyclists). This study has some important implications for the Merseytram Line 1 development, in that it emphasises the need for the tram to keep to timetables, as well as for costs to be maintained at a level that is not prohibitively expensive. The issue of fear of assaults suggests that commuters must be reassured as to their personal safety, and this can include having uniformed ticket checkers / traffic officers on board the trams.

Curtis and Headicar conclude that it is possible to identify particular groups of people who may be more susceptible to changing from car use to an alternative mode for the journey to work. The relative affluence of the sample group in Oxfordshire, whose majority of travel mileage is for the journey to work, emphasises the potential benefits to be made from encouraging modal shift for this group. The key group would appear to those travelling short
distances to work of 5 miles or less. Furthermore, in some areas there is no realistic alternative to the car, but where there is an alternative, a valuable approach is to tackle issues regarding frequency, reliability and cost of transport, whilst simultaneously targeting awareness campaigns at particular groups of individuals along improved public transport routes.

**Promoting an integrated transport system**

The Light Rail Transit Association (LRTA) is a strong exponent of the development of good quality public transport through the use of light rail and tramways. Its submission (LRTA, 1999) to the House of Commons Transport Sub-Committee of the Environment, Transport and Regional Affairs Committee highlights the development of light rail systems internationally in recent years, and argues that light rail is essential for achieving high quality mass transit. It stresses that the combination of high quality core networks of light rail lines integrating as seamlessly as possible with high quality modern bus networks need to be in place before car users can be enticed, taxed or forced out of their cars for urban journey.

Within the UK, LRTA argues that continental models have high levels of planned integration with bus networks operating in the same towns or cities. However, within the UK, deregulation of bus services since 1986 has meant that planned integration has been either destroyed or prohibited. This contrasts strongly with cities such as Hannover, where buses wait across platform for light rail trams to arrive and allow immediate and easy access. Even in Greater London, despite a planned and regulated bus service, there is a lack of integration between buses, underground and Docklands Light Railway. The sole exception, according to LRTA, is the Midland Metro Line One (Birmingham to Wolverhampton), where the same private sector company is the operator of the light rail line, local train services and the majority of bus services.

May and Roberts (1995) have also explored the value of integrated transport. An important way in which it provides benefits is in providing measures that complement each other in their impact on users. This includes park and ride schemes to increase rail and bus usage; or the use of traffic calming to reinforce the benefits of building a bypass; or providing a fares reduction to intensify the impact of traffic restraint. A further strategy involves using parking charges, a fares increase or road pricing revenue as a means of providing finance for new infrastructure.

The authors seek to illustrate the effects that an integrated transport strategy might have in practice through examining results from a range of studies conducted in the UK since 1988. The studies cover areas ranging from major conurbations (i.e. London, Birmingham and Merseyside), through major cities (Edinburgh and Bristol), down to a smaller urban area (Luton / Dunstable). Further differences include the mobility of the population, and the role of the car as the main travel mode.

Those locations showing higher growth are anticipating greater population increases and economic growth. Luton / Dunstable anticipates continued growth, and has a rate of growth that is 15 times greater than that of Merseyside, which is trying to reverse significant population decline and employment over several years. Commenting further on Merseyside, major
restraint measures (such as congestion charging) were not included in the preferred strategy since its introduction was not cost beneficial, and there was a strong political concern that charges would reduce the competitiveness of Merseyside relative to other parts of the North West region. Nonetheless, a programme of selective public transport improvements and some highway capacity reductions (from traffic calming and bus priority measures) was predicted to reduce car travel and retain speeds at current levels, with only limited increases in the numbers of casualties and the amount of fuel consumed.

The authors conclude that the more effective integrated strategies show that the transport systems are sustainable, thereby allowing cities to achieve the economic growth to which they aspire without unwanted increases in congestion and pollution.

The studies, it is argued, provide clear evidence that integrated strategies, or packages, by combining an appropriate set of infrastructure, management and pricing measures, can significantly reduce the scale of urban transport problems.

**Public transport and promoting physical activity**

The relationship between public transport and promoting physical activity has been the subject of considerable debate. Kingham et al (2001) present an analysis of surveys carried out in two large English companies: Mitsubishi Electric Europe and Matra BAe Dynamics. The questionnaires were concerned with six issues: travel habits to work; attitudes to car sharing; attitudes to public transport; cycling; general transport issues; and personal details.

In relation to cycling, a majority of respondents from one firm, and over a quarter of respondents at the other, would cycle regularly all year if they lived closer to their place of work and owned a bicycle. When asked about which improvements would encourage them to cycle, financial incentives would encourage a quarter of car commuting respondents, while loans to buy a bicycle were of limited interest. Significant numbers of respondents also indicated that improved cycle paths and facilities, as well as less traffic on roads, would also encourage them to cycle to work. This suggests that there is an interest in cycling if it were an accessible option. In relation to the Merseytram development, this suggests that improved cycle paths could encourage people on Merseyside to be more physically active, and indicates that an integrated approach would seek to positively encourage cycling whilst developing the Line 1 Merseytram development.

In relation to using public transport, frequency, reliability, convenient drop off sites, better connections and discount tickets were the features which over 40% of car commuting respondents indicated may encourage them to shift to using public transport for their journey to work. This confirms the findings of the Lex Report (1999), which found that 43% of car drivers would use their car less if public transport were better.

Clearly for companies where a significant proportion of the workforce live close to their place of work, it is worthwhile promoting and investing in cycling as a commuter mode. Creating or improving changing facilities and secure cycle
storage facilities would promote cycling use, as would the development of safer cycling routes.

The authors also considered the issue of car sharing, and found that of those who never car share roughly half would consider it. There is potential for car sharing as a way of reducing commuter traffic, and significant number of people appear attracted to the idea of reducing their car use for commuting, whilst still travelling by car.

Stradling et al (2000) have also used survey methods to explore motorists’ behaviour. Despite their low response rate (21%), their study highlighted that measures aiming to assist reduction in private car use will need to be carefully targeted at the different purposes for which people use cars. The survey showed that roughly a third of motorists wished to reduce their car use, yet only 3% of motorists felt that they were likely to make that change, due to being constrained by circumstances. The authors emphasise that sustainable changes that may be integrated into people’s patterns of life will ensue if people are helped to change, rather than forced to change.

Developing healthy public policy

Edwards and Mackett (1996) highlight the decline in the use of public transport in the UK, partly due to the growth in motor car use. Whereas in 1951, 14% of households owned a car and over 60% of travel was by public transport, by 1993 68% of households owned a car, whilst public transport’s share of travel had declined to 11%. There are marked differences in relation to continental Europe: between 1966 and 1993, bus patronage declined by 32% in the UK, yet increased by 16% in the Netherlands, 34% in Germany and 52% in Belgium. Public rail transport increased by 3% in the UK over the same period, yet this statistics is dwarfed by comparative growth in continental Europe: 52% in France, 58% in Germany, 100% in Netherlands and 109% in Belgium.

Attitudes to urban public transport are also markedly different. Whereas Britain led the way in urban public transport, through opening the world’s first metro in London in 1863, and the development of dense tram networks in major UK cities, the post war period saw a rapid decline. Manchester’s last tram (before Metrolink’s development in 1992) ran in 1949, London’s in 1952 and Birmingham a year later. This reflected the national policy emphasis that buses, with their greater flexibility, could provide an adequate service.

However, the authors are sceptical as to whether recent light rail systems in the UK can lead to long term benefits. They point out that although the justification for such high quality systems is usually provided in terms of their positive image and their role in reducing road congestion and stimulating development, neither effect has been substantiated. They argue that such systems are hugely expensive, and are unlikely to be used to capacity. Furthermore, they call for lower cost alternatives, such as bus-based systems, or rail based systems designed specifically to serve corridors with low flows. They conclude that there is a global trend towards busways, and that the UK is out of step by weighting its policy framework so far in favour of conventional light rail systems, and against buses.

Fitzroy and Smith (1998) consider ways to increase public transport’s involvement, and highlight the example of Freiburg in Germany, where
ridership on local public transport doubled between 1983 and 1995. Whereas Edwards and Mackett are highly critical of tram developments within an UK context, the Freiburg experience suggests that the tram has a key role in developing greater public engagement with transport systems. Here, the number of trips by tram (38.6 million in 1995) exceeds that for buses (27.3 million). Similarly, the frequency of the tram service, measured as the ratio of vehicle kilometres to route length, has increased steadily since the mid 1980s, while bus frequencies have remained stable.

The key to success in Freiburg would seem to be the development of season tickets. The so-called ‘environmental protection’ ticket (‘umweltschutzkarte’) is a monthly travel card valid for the whole tariff network, and is freely transferable across friends and family members. Thus Freiburg became the first community in the former Federal Republic of Germany to experiment with a cheap and transferable travel pass. The aim was to reduce environmental damage from vehicle emissions by inducing motorists to switch to public transport, and the prices of these environmental travel passes remained stable for six and a half years, while the prices of other tickets were raised, thereby increasing price discrimination in favour of travel card holders.

In addition to the enhancement of public transport, cycling and walking, traffic restraint measures have been implemented in Freiburg to discourage car use and thereby mitigate the adverse environmental impact of the automobile. These can be summarised as follows:

- **Land use planning**
  Regulations have strictly limited the area of land available for industrial and property development in favour of maintaining a dense and compact land use pattern favourable to both public transport and non-motorised modes.

- **Pedestrianisation**
  Although private cars are completely excluded from the town centre of Freiburg, buses and trams and bicycles cross the zone in every direction.

- **Low speed zones**
  The speed of motor vehicles has been restricted to 30 kilometres per hour in residential areas. This kind of traffic calming reduces traffic noise and pollution levels, as well as improves safety for pedestrians and cyclists.

- **Parking**
  High parking charges in the city centre, residential parking permits and short-term metered parking spaces all serve to discourage private car use. In addition, former car parking spaces in the town centre have been converted into bicycle parking spaces, and this has increased the attractiveness of cycling, as well as encouraged drivers to make use of the park-and-ride facilities that offer 25% of the available parking spaces.

The net impact of this mutually reinforcing package of measures is to have improved the quality of urban life, and so fostered environmentally friendly mobility. The local authorities of Liverpool and Knowsley ought to investigate the potential for learning some of the lessons of the Freiburg experience, so as
to maximise the impact of the Merseytram Line 1 development for promoting healthier and more sustainable transport policy.

It is also important to bear in mind the different cultural approaches that can impact upon light rail developments. Hill’s (1995) comparison of the Toulouse Metro and the South Yorkshire Supertram has highlighted the local and national policy framework that led to a remotely operated, fully segregated and mainly underground metro in Toulouse with an overground, mainly street running, manually operated tramway system in Sheffield.

In Toulouse, a consistent policy framework has encouraged cheap fares, so that an anticipated 20% diversion from other modes can be achieved. There has been unequivocal support within the city of Toulouse, and the choice of a high technology system has enabled the Metro to support Toulouse’s image as a major European city at the forefront of technological innovation. South Yorkshire’s Supertram, however, must operate in competition with a privatised bus and rail network, and is dependent on a weakened regional transport authority having mere powers of persuasion (and a reducing budget to support franchised services) over the independent operators. The authors conclude that the UK government should look to provide consistent long-term support for urban public transport if it is to meet its declared commitment to the development of sustainable transport policies.

Parkhurst (1995) provides an interesting exploration of the merits and demerits of park-and-ride schemes. His study concludes that the long-term effects of such schemes are more complex than generally acknowledged, despite the fact that studies in Oxford and York had confirmed their attractiveness with high levels of satisfaction being reported. Parkhurst notes that some users had switched from travel modes other than a car, whilst others were making additional trips due to the opportunities provided by park-and-ride. Furthermore, he asserts that congestion has remained persistent in both Oxford and York, and is concerned that total travel may have been increased rather than reduced, which was the original intention of such schemes. He concludes that, for park-and-ride schemes to be successful, ‘package’ policies need to be strengthened in order to favour conventional public transport, and that particular care will need to be taken by other local authorities in the UK wishing to adopt park-and-ride schemes.

Criticisms of park-and-ride initiatives are also taken up by Topp (1995) in relation to Germany’s urban transport policy. The goal of such schemes is to achieve multi-modal control and operation of transport according to traffic volume, congestion and exhaust concentration, whilst also controlling inner city parking space, and supplying park-and-ride services simultaneously. However, he argues that such approaches can only make sense if they are combined with a reduction in car traffic within the cities of a comparable amount. Otherwise, the main effect is simply to pump car traffic more effectively into the city, whilst public transport would serve as an overflow. Using the example of Stuttgart, where 410,000 cars cross into the city every day, even the big park-and-ride terminals are small – 30,000 cars parked on 6 terminals instead of being driven into the city will soon be replaced by other cars if the capacity of the urban road network is not considerably reduced.
Topp emphasises that these negative aspects of big park-and-ride terminals at the city’s edge lead to suggestions for a decentralised spatially staggered park-and-ride system combined with considerable improvements in the public transport services for the surrounding area. In this way, overall car traffic reduction, with thoroughfares of regional villages, can be achieved. Furthermore, the bicycle (in the form of bike-and-ride) enlarges the catchment area of a public transport stop by roughly ten fold. Without major changes in transport policy, i.e. raising the prices for car owners, non-car traffic systems will not be financially viable, and instead of a decrease in emissions, there will be an increase.

**Transport mode and risk of accidents**

Different types of transport mode present different types of risk to pedestrians and cyclists. A study of transport risk and illness within the Swedish City of Goteborg compares and contrasts the risks associated with bus and tram traffic for unprotected road users. Using data from hospital’s special traffic injury register and from various other sources of crash and injury data, (Hedelin et al, 2001) found that the risk of suffering a non-fatal injury was four times higher per vehicle-kilometre for tram traffic compared with bus traffic. Furthermore, the risk of death was 9 to 15 times higher for tram traffic. Most of the injured were pedestrians: roughly 39 were injured by trams and 14 by buses. Twice as many cyclists were injured by trams than were injured by buses.

In an interesting discussion of the circumstances of injury, the authors conclude that three quarters of injuries were sustained at bus or tram stops, or at pedestrian crossings. Further analysis reveals that a third of tram injuries, and a quarter of bus injuries, occurred in the dark. There was a very high ratio of 1: 14 between the fatally and non-fatally injured, yet for buses the ratio was 1: 33. An important factor identified by the authors was the injurious nature of trams, due to the ‘non-forgiving’ structure at the front with a hard coupler sticking out and the wide mouth at the front that can entrap people. Furthermore, if a pedestrian falls under the iron wheels of a tram, more harm is caused in comparison with falling under the rubber tyres of a bus, which can sometimes roll over a leg without causing serious harm. The authors recognise that trams are now being equipped with protecting side shields to prevent people from sliding in under the tram. However, they emphasise that the front area also requires modification to a less dangerous design, given that many of the injured people were struck by this part of the tram.

These insights have highlighted the importance of stations, and areas surrounding the Merseytram stations, being extremely well lit so as to reduce the risk of injury. It is also important that the design of the tram takes into account the safety issues identified in this article.