IOM

WORKING FOR A HEALTHY FUTURE

North Staffordshire 'Streetcar' Bus Rapid Transport Scheme Health Impact Assessment

MAIN HIA REPORT

FINAL

Report prepared by: Dr Salim Vohra, Centre for Health Impact Assessment
Dr Marcus Chilaka, University of Salford
Judith Ball, Centre for Health Impact Assessment
Gifty Amo-Danso, Centre for Health Impact Assessment

Contributions by: Dr Sue Wright, West Midlands Public Health Observatory

COMMISSIONED BY

NORTH STAFFORDSHIRE Regeneration PARTNERSHIP

renew
North Staffordshire
changing places: transforming lives

NHS
North Staffordshire

NHS
Stoke on Trent

RESEARCH **CONSULTING** SERVICES
Multi disciplinary specialists in Occupational and Environmental Health and Hygiene

www.iom-world.org

The IOM is a major independent centre of scientific excellence in the fields of occupational and environmental health, hygiene and safety. We were founded as a charity in 1969 by the UK coal industry in conjunction with the University of Edinburgh and became fully independent in 1990. Our mission is to benefit those at work and in the community by providing quality research, consultancy and training in health, hygiene and safety and by maintaining our independent, impartial position as an international centre of excellence. The IOM has more than 130 scientific and technical staff based in Edinburgh, Chesterfield, London, and Stafford. Consultancy work is undertaken through IOM Consulting Limited which is a wholly owned subsidiary.

IOM's core values are: independence, integrity and authority.

The Centre for Health Impact Assessment was set up in September 2007 to provide a strategic focus to the HIA research and consulting work of IOM.

The vision of IOM CHIA is to be a Centre of Excellence in:

- Health impact assessment theory and practice
- Healthy public policy
- Evidence-based analysis and evaluation of the impacts of policies and programmes on health
- Researching the wider determinants of health and wellbeing
- Tackling environmental and health inequalities
- Healthy urban planning and development
- Urban and rural regeneration and health

Acknowledgements

We would like to thank and acknowledge the feedback and contribution of:

- The HIA Steering Group

- Steven Johnstone and Matthew Horwell, Knowledge Management Unit, Stoke on Trent City Council

- North Staffordshire RENEW – North Staffordshire Regeneration Partnership

- Stoke-on-Trent City Council

- Staffordshire Moorlands District Council

- North Staffordshire Primary Care Trust

- Stoke NHS

Strategic Consulting Report: 644-00206d

Table of Contents

1   Introduction

1.1.1   This Health Impact Assessment has been commissioned by RENEW North Staffordshire, Stoke-on-Trent Primary Care Trust and North Staffordshire Primary Care Trust to assess **the potential health and wellbeing impacts of the main part of the GREEN LINE ROUTE 'Streetcar' Bus Rapid Transport (BRT) Scheme proposals currently being developed and identify opportunities for maximising the potential positive health and wellbeing impacts and minimising any potential negative impacts.**

1.1.2   The specific objectives of this HIA were to:

i.   **Identify health and wellbeing impacts of the proposed scheme**:
Specifically, to identify and prioritise the potential direct and indirect health impacts on local people (those living near the proposed streetcar route) and users of the scheme during the implementation (potentially involving some physical redesign and modification of the existing road network), operation and decommissioning phases of the scheme. The key areas of focus were on:

- equity impacts;

- impacts on the health of older people, young people, those with reduced mobility, and those with no access to a car;

- effect of modal shift;

- effect on social inclusion and community cohesion; and

- effect on access to facilities.

ii.   **Develop a set of recommendations for optimising the impacts on health and wellbeing:**
Specifically, to develop a range of mitigation and enhancement measures to minimise any potential negative health impacts and maximise the positive health benefits of the scheme. Measures must be feasible, financially viable and deliverable and able to be incorporated into the final detailed design and implementation of the proposed scheme.

iii.   **Identify possible monitoring and evaluation indicators**:
Specifically, to identify possible monitoring and evaluation indicators to judge,

monitor and evaluate the actual health and wellbeing impacts of the proposed scheme should it get the go ahead.

iv. **Prepare an innovation and learning research paper on the feasibility, advantages and disadvantages of using HIA to inform detailed implementation of broad strategic decisions:**

Specifically, to use the action learning from the HIA process, along with any relevant and available research from elsewhere, to evaluate the use of HIA for broad strategic decisions and inform the future use of HIA in North Staffordshire.

1.1.3   The HIA draws on previous and current work on developing a sustainable and viable Streetcar BRT scheme.

2   What is Health Impact Assessment?

2.1   Introduction

2.1.1   This chapter outlines what health impact assessment (HIA) is and the Institute of Occupational Medicine's ethos and approach to HIA.

2.2   Health Impact Assessment

2.2.1   The international Gothenburg consensus definition of HIA is: "A combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population."[1]

2.2.2   HIA is a key systematic approach to identifying the differential health and wellbeing impacts, both positive and negative, of plans and projects.

2.2.3   HIA uses a range of structured and evaluated sources of qualitative and quantitative evidence that includes public and other stakeholders' perceptions and experiences as well as public health, epidemiological, toxicological and medical knowledge. It is particularly concerned with the distribution of effects within a population, as different groups are likely to be affected in different ways, and therefore looks at how health and social inequalities might be reduced or widened by a proposed plan or project.

2.2.4   The aim of HIA is to support and add value to the decision-making process by providing a systematic analysis of the potential impacts as well as recommending options, where appropriate, for enhancing the positive impacts, mitigating the negative ones and reducing health inequalities.

2.2.5   HIA uses both a biomedical and social definition of health, recognising that though illness and disease (mortality and morbidity) are useful ways of understanding and measuring health they need to be fitted within a broader understanding of health and wellbeing to be properly useful (See Figure 2.1).

---

[1] WHO European Centre for Health Policy; Health impact assessment: main concepts and suggested approach; Gothenburg consensus paper; WHO Regional Office for Europe; 1999.
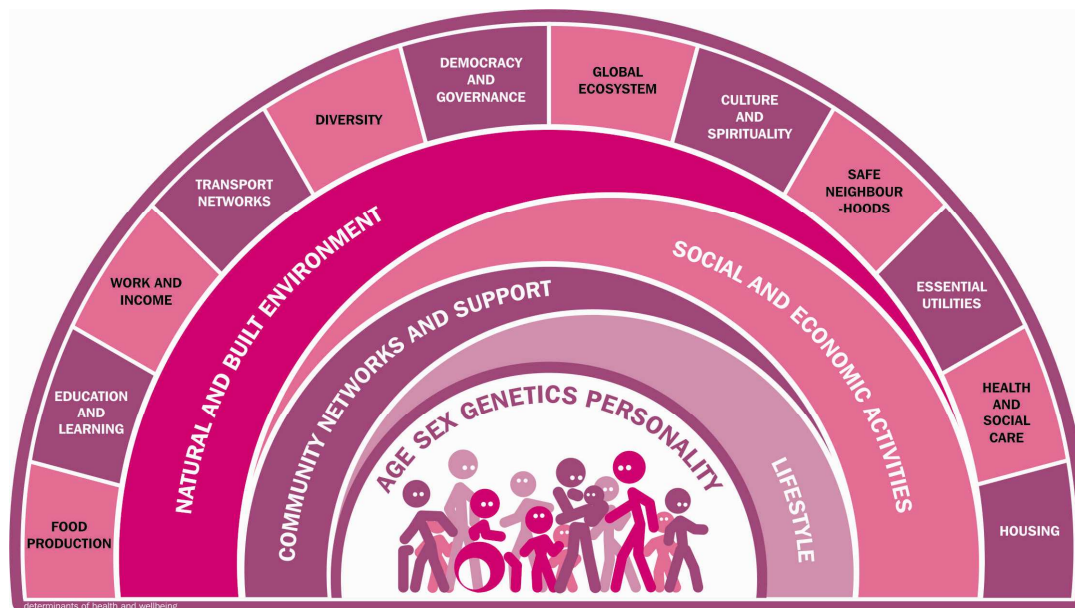
Figure 2.1: The determinants of health and wellbeing[2]

2.2.6   HIA therefore uses the following World Health Organization psycho-social definition of health in our work: Health is "the extent to which an individual or group is able to realise aspirations and satisfy needs, and to change or cope with the environment. Health is therefore a resource for everyday life, not the objective of living; it is a positive concept, emphasizing social and personal resources, as well as physical capacities."[3]

2.2.7   This definition builds on and is complementary to the longer established World Health Organization definition that "Health is a state of complete physical, social and mental wellbeing and not simply the absence of disease or infirmity"[4].

2.2.8   The general methodology is based on established good practice guidance on HIA developed by the Department of Health and the Devolved Regions. [5][6][7][8]

---

[2] Adapted by Salim Vohra and Dean Biddlecombe from Dahlgren G and Whitehead, Policies and strategies to promote social equity in health; Institute of Future Studies; Stockholm; 1991.

[3] World Health Organization; Health Promotion: A Discussion Document on the Concepts and Principles; WHO Regional Office for Europe; Copenhagen; 1984.

[4] World Health Organization; Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June 1946, and entered into force on 7 April 1948.

[5] Health Development Agency, Introducing health impact assessment (HIA) informing the decision-making process, England; 2002.

[6] NHS Executive; Resources for HIA: Volumes 1 & 2; England; 2000.

[7] Welsh Assembly Government and Health Challenge Wales; Improving Health and Reducing Inequalities: a practical guide to health impact assessment; 2004.

[8] Public Health Institute of Scotland; HIA: a guide for local authorities; Scottish HIA network; 2001.

Fig 2.2: A systems view of regeneration and health impacts (adapted from Hirschfield et al, 2001)

Strategic Consulting Report: 644-00206d
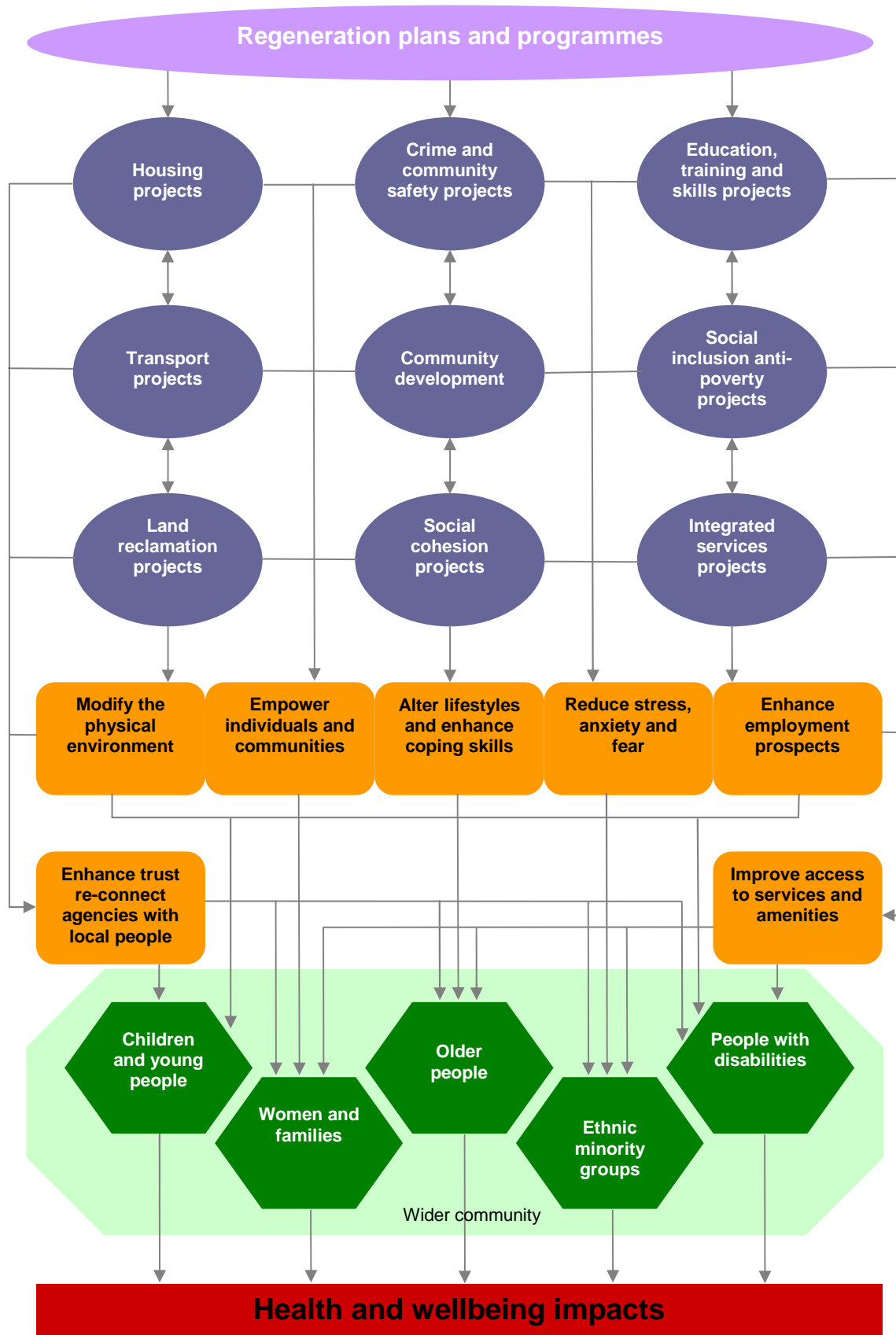
2.3 A holistic approach to health impacts

2.3.1 This HIA takes a holistic or 'systems view' of potential health impacts and Figure 2.2 shows how this HIA conceptualises the general links between regeneration plans and programmes and health and wellbeing impacts. [9]

2.4 General steps in HIA

Screening

2.4.1 This stage assesses the value of carrying out a HIA by examining the importance of a plan or project and the significance of any potential health impacts.

Scoping

2.4.2 This stage sets the 'terms of reference' for the HIA i.e. the aspects to be considered, geographical scope, population groups that might need particular focus, what will be excluded from the HIA, how the HIA process will be managed and so on.

Baseline assessment and community profile

2.4.3 This stage uses routine national and local datasets e.g. national census, local surveys, area profiles, and other demographic, social, economic, environmental and health information to develop a community profile with a strong focus on health and wellbeing issues, and identification of vulnerable groups, as a baseline from which to assess the potential positive and negative impacts on health and any health inequalities.

Stakeholder consultation and involvement[10]

2.4.4 This stage applies to intermediate and comprehensive HIAs where no previous consultation on a development has taken place. It uses workshops, questionnaires, interviews, surveys and other methods of consultation and involvement to engage key stakeholders, in particular local people, in the identification and appraisal of the potential health and wellbeing impacts, in the

---

[9] Hirschfield et al; Health impact assessment: measuring the effect of public policy on variation in health; University of Liverpool; 2001.

[10] **Rapid HIAs** are rapid desktop analyses that take days or weeks to carry out. **Intermediate HIAs** are detailed desktop analyses with some focussed stakeholder consultation or feedback, e.g. stakeholder workshops and interviews, that take weeks and months to carry out. **Comprehensive HIAs** are exhaustive analyses involving comprehensive consultation of stakeholders through representative surveys, workshops and interviews that take a year or more to carry out.

development of mitigation and enhancement measures; and in developing options for monitoring and evaluating the identified impacts.

Evidence and analysis

2.4.5   This stage involves the collation of key evidence and the systematic analysis of the potential impacts, their significance, the groups likely to be most affected and the strength of the evidence for these impacts through the use of matrices and models.

Mitigation and enhancement measures

2.4.6   This stage involves the identification of a range of measures to minimise the potential negative health effects and maximise the positive health benefits identified in the previous stages.

Health impact statement

2.4.7   This stage produces the final HIA report or health statement.

2.4.8   It involves summarising the key conclusions, options and recommendations emerging from the assessment including identifying, where appropriate, monitoring indicators to ensure that health and wellbeing are maintained during the whole lifecycle of a project or plan.

Follow up

2.4.9   This stage involves the active follow up of the project or plan to monitor and/or ensure that mitigation and enhancement measures have been put in place after a project or plan is approved.

2.4.10 It can also involve: a) presentation of the findings to key professional stakeholders; b) the development and implementation of a health impact communication plan to ensure that local communities fully understand the findings of the HIA and how and why it was carried out; and c) the evaluation of the effectiveness and value of the HIA process itself.

3 Methodology and Scope of this HIA

3.1 Introduction

3.1.1 The following sections outline the methodology applied to this HIA. They concern the following: a definition of the study area and study population; sources of information consulted; stakeholder consultation and involvement; assessment criteria and assessment framework.

3.1.2 This HIA used a rapid desktop approach in addition to specific focused discussions with key public sector stakeholders involved in the development of the scheme.

3.1.3 The methodology and methods used were based on existing good practice guidance in the UK.

3.1.4 This HIA used existing data and information from earlier and concurrent assessment studies and consultations as well as routine data sources.

3.1.5 The assessment was largely qualitative.

3.1.6 The HIA was undertaken between December 2008 and March 2009.

3.1.7 There were two tasks within this HIA:

- Prepare a rapid HIA report on the main part of the Green Line Streetcar BRT Scheme.

- Prepare an innovation and learning paper on the action learning that occurred during the HIA process to evaluate the feasibility, advantages and disadvantages of using HIA to inform detailed implementation of broad strategic decisions. This paper is provided as a separate report.

3.1.8 A HIA project steering group made up of a range of stakeholders provided advice, guidance and support during the HIA. A full list of HIA Project Steering Group members is provided in Appendix A.

3.2   Screening

3.2.1   A screening was undertaken by the HIA Project Steering Group to identify a strategic transport proposal on which a HIA could be undertaken and to enable an evaluation of HIA in relation to such strategic transport proposals.

3.3   Scoping

<u>Study area</u>

3.3.1   The geographic scope of this HIA was the proposed green line route within the Stoke-on-Trent conurbation including the University of Keele and its surrounding area.

<u>Study population</u>

3.3.2   The population scope of this HIA was

3.3.2.1   residents living adjacent to/near the Green Line route;

- who are existing bus users

- who are not existing bus users

3.3.2.2   residents living further away;

- who are existing bus users

- who are not existing bus users

3.3.2.3   non-resident/ temporarily resident visitors to the area.

3.3.3   The key population sub-groups that our HIA focused on were: older people; people with disabilities; women; children and young people; people from minority ethnic backgrounds and those on low incomes/or unemployed.

<u>Determinants of health considered</u>

3.2.8   The key determinants of health and wellbeing considered were:

- infectious diseases

- non-infectious/chronic diseases (including the effects from air, water, soil and noise pollution)

- physical injury (including poisoning)

- mental health and wellbeing (including nuisance and annoyance effects)

- employment and enterprise

- housing and shelter

- transport and connectivity

- learning and education

- crime and safety

- health and social care

- shops and retail amenities

- social capital and community cohesion

- culture and leisure

- lifestyle and daily routines

- energy and waste

- land and spatial.

Proposed route for the Green Line Streetcar

3.2.8 Detailed work has already been undertaken in identifying the most feasible and viable route taking into account the following factors:

- Connecting key services, amenities and facilities

- Ensuring a fast service

- The commercial viability and long term sustainability of the proposed route

- Likely patronage (bus usage)

- The technical consideration of how the proposed route fits with the wider bus and public transport network

- Future extensions additions to the bus network

- Highway engineering considerations in terms road width, access and use.

3.2.9　Given the above, and the fact that the Green Line is one of a number of Streetcar routes that will be established over time, serving different parts of Stoke, it was not considered appropriate for this HIA to re-examine the proposed route in terms of assessing possible alternative road routes.

3.4　Baseline assessment and community health profile

3.4.1　This was difficult to develop as the users of the scheme are not clearly geographically localised. Many users of the service are likely to live within walking distance of the route; however a significant number are also likely to use other bus services as well as private cars to get to a Green Line bus stop in order to use the service. Additionally, it is difficult to establish what kinds of occasional visitor users there could be apart from business visitors and tourists visiting the potteries.[11]

3.4.2　The typical groups of people likely to be affected by the scheme were:

3.4.2.1　**Residents living adjacent to/near the Green Line route** who a) use existing bus services on the Green Line route regularly to access work/study/access services in and around the Green Line route (and who may transfer to another bus service); b) do not use existing bus services on the Green Line route or use them only occasionally but who regularly work/study/shop/access services in and around the Green Line route; and c) do not use existing bus services along the Green Line route or use them only occasionally and who do not regularly work/study/shop/access services in and around the Green Line route.

3.4.2.2　**Residents living further away from the Green line route** who a) use existing bus services on the Green Line route regularly to access

---

[11] Stoke-on-Trent is colloquially known as 'The Potteries' because it is widely considered to be the home of the pottery industry in England. It is famous for its china and earthenware manufacturers such as Royal Doulton the majority of which have either closed or moved manufacturing to countries with cheaper labour costs.

work/study/access services in and around the Green Line route (and who may transfer to another bus service); b) do not use existing bus services on the Green Line route or use them only occasionally but who regularly work/study/shop/access services in and around the Green Line route; and c) do not use existing bus services along the Green Line route or use them only occasionally and who do not regularly work/study/shop/access services in and around the Green Line route.

3.4.2.3   **Non-residents/ temporarily resident leisure and business visitors** who a) come more than once over a period of weeks, months or years and b) those who come only once.

3.4.2.4   In each of these categories there would be older people; people with disabilities; women; children and young people; people from minority ethnic backgrounds and those on low incomes/or are unemployed.

3.4.3   The typical uses identified were:

3.4.3.1   Green Line Streetcar service users would use the service to a) get to a destination on the GLS BRT route (most likely reason), b) get off and walk for 10-15 min to get to a destination a distance away from the GLS BRT route or c) transfer to another bus service to get to a destination that is outside 10-15 min walking distance.

3.4.4   Because data specific to the groups outlined above was unavailable, a generic baseline assessment and community health profile was undertaken. This includes health profiles of Stoke on Trent City and Newcastle Under Lyme, and describes the neighbourhood zones within which the Green Line Scheme lies.

3.5   Stakeholder Consultation and involvement

3.5.1   Stakeholder involvement included specific focused discussions with key public sector stakeholders involved in the development of the scheme.

3.5.2   Community consultation and involvement was not included in the scope of this HIA because there has already been consultation on the value of the scheme. Additional consultation/engagement would not have added much value and future

localised community consultation/engagement was planned once the funding for the Streetcar Scheme was in place.

3.6   Evidence and analysis

3.6.1   This HIA used existing literature reviews/reviews of the evidence of the health impacts of transport to inform the analysis of the likely major positive and negative health impacts of the proposed Streetcar BRT scheme. However this HIA identified no specific literature on the health impacts of bus rapid transport schemes.

3.6.2   The HIA was based on a document analysis and desk-top health impact analysis using a matrix table to analyse the potential positive and negative health and wellbeing impacts.

3.6.3   The identified impacts were then classified using the levels defined in Table 3.1.

3.6.4   The potential impacts were compared to a 'Do Nothing' option for the implementation, short term operation and long term operation and decommissioning phases of the proposed scheme.

Table 3.1: Definition of the levels of potential impact

Significance Level	Criteria
Major +++/--- (positive or negative)	Health effects are categorised as a major positive if they prevent deaths/prolong lives, reduce/prevent the occurrence of acute or chronic diseases or significantly enhance mental wellbeing would be a major positive. Health effects are categorised as a major negative if they could lead directly to deaths, acute or chronic diseases or mental ill health. The exposures tend to be of high intensity and/or long duration and/or over a wide geographical area and/or likely to affect a large number of people (e.g. over 500) and/or sensitive groups e.g. children/older people. They can affect either or both physical and mental health and either directly or through the wider determinants of health and wellbeing. They can be temporary or permanent in nature. These effects can be important local, district, regional and national considerations. Mitigation measures and detailed design work can reduce the level of negative effect though residual effects are likely to remain.
Moderate ++/-- (positive or negative)	Health effects are categorised as a moderate positive if they enhance mental wellbeing significantly and/or reduce exacerbations to existing illness and reduce the occurrence of acute or chronic diseases. Health effects are categorised as a moderate negative if the effects are long term nuisance impacts, such smell and noise, or may lead to exacerbations of existing

Significance Level	Criteria
	illness. The exposures tend to be of moderate intensity and/or over a relatively localised area and/or of intermittent duration and/or likely to affect a moderate-large number of people e.g. between 100-500 or so and/or sensitive groups. The negative impacts may be nuisance/quality of life impacts which may affect physical and mental health either directly or through the wider determinants of health. The cumulative effect of a set of moderate effects can lead to a major effect. These effects can be important local, district and regional considerations. Mitigation measures and detailed design work can reduce and in some/many cases remove the negative and enhance the positive effects though residual effects are likely to remain.
Minor/Mild +/- (positive or negative)	Health effects are categorised as minor/mild whether, positive or negative, if they are generally lower level quality of life or wellbeing impacts. Increases or reductions in noise, odour, visual amenity, etc are examples of such effects. The exposures tend to be of low intensity and/or short/intermittent duration and/or over a small area and/or affect a small number of people e.g. less than 100 or so. They can be permanent or temporary in nature. These effects can be important local considerations. Mitigation measures and detailed design work can reduce the negative and enhance the positive effects such that there are only some residual effects remaining.
Neutral/No Effect ~	No health effect or effects within the bounds of normal/accepted variation.

3.6.5   For each potential health impact ten key issues were considered

- Which population groups are affected and in what way?
- Is the effect reversible or irreversible?
- Does the effect occur over the short, medium or long term?
- Is the effect permanent or temporary?
- Does it increase or decrease with time?
- Is it of local, regional or national importance?
- Is it beneficial, neutral or adverse?
- Are health standards or environmental objectives threatened?
- Are mitigating measures available and is it reasonable to require these?
- Are the effects direct, indirect and or cumulative?

3.7   Recommendations

3.7.1   A set of general recommendations were developed for the implementation, operation and potential closure of the scheme.

3.8   Follow up

3.8.1   An assessment was made on the possible monitoring and evaluation indicators that could be used.

3.9   Limitations of this HIA

3.9.1   Lack of information relating to the current users of bus services in Stoke e.g. demography of users, distance walked to and from bus stops from home and at destination and attitudes to bus services. This information is difficult and expensive to collect and of limited value unless part of a regular programme of data collection.

4 Background to the Streetcar BRT Scheme

4.1 Introduction

4.1.1 This chapter provides background details on the Streetcar BRT scheme.

4.1.2 A Business Case for Funding the Streetcar Scheme is currently being developed. Only when funding is awarded will the scheme go ahead.

4.2 Background to the proposed scheme[12]

4.2.1 The proposal is part of the recommendations in the North Staffordshire Integrated Transport Study (NSITS) conducted in 2004-05 which was a comprehensive assessment of all aspects of transport across North Staffordshire. The study considered the long term transport strategy for the sub region for the next 15 – 20 years.

4.2.2 This identified that on sustainability, viability and cost grounds a rapid bus transport scheme similar to those found in York, Coventry, Edinburgh and Leeds was the best way forward to meet the transport needs of Stoke on Trent, stimulate the economy and move more people away from using private cars for transport in and around Stoke on Trent.

4.2.3 The study included a considerable amount of consultation and stakeholder engagement where there was agreement on the need to improve the existing bus network.

4.2.4 Two initial lines have been identified, namely the Green Line (North to South) and the Blue Line (East West). The Green Line is planned to run from Keele University, via Stoke town centre and Hanley City centre to Kidsgrove; and the Blue Line would be designed to connect the Newcastle town centre and Meir via Hanley City centre and Stoke town centre.

---

[12] Nichol, J. North Staffordshire Public Transport Network - The Streetcar Project. North Staffordshire Regeneration Partnership. 2008

4.2.5 This health impact assessment is focused on the segment of the Green Line that stretches from Keele University to the Hanley City Centre.

4.2.6 The Bus Rapid Transport Network (Streetcar) is intended to link key traffic generation sites to the City Centre and other key town centres within North Staffordshire. The Streetcar would provide more reliable, comfortable, flexible and faster transport links between the main regeneration growth points within the sub region, such as Keele University, Newcastle Town Centre, The University Hospital of North Staffordshire, Stoke-on-Trent Town Centre & train station, Staffordshire University, and the City Centre Business District.

4.2.7 Among several other considerations, the Streetcar project is envisaged as complementing the wider regeneration efforts in North Staffordshire by creating some employment and making jobs more accessible, as well as positively enhancing the image of the sub region. It is also envisaged that there will be a modal shift from private cars to public transport, with an attendant reduction in congestion, road traffic accidents, and environmental pollution.

4.2.8 The Bus Strategy of the North Staffordshire Local Transport Plan (LTP) also identifies bus travel as a key area for improvement during the life of the LTP and beyond. This would take the form of both infrastructural and service improvements. Three key pieces of work have been developed to take the LTP Bus Strategy forward. These are outlined below.

4.2.9 A revised **Quality Bus Partnership** (QBP) has been agreed with the major bus operator (First Potteries) and this will seek to improve the quality of passenger facilities along key routes as well as improvements to buses, customer care and passenger information.

4.2.10 In tandem with the QBP a **Core Bus Network** (CBN) has been developed which identifies the key corridors for investment in bus reliability. This will attract the lions share of the LTP capital funds for the foreseeable future.

4.2.11 The bus services will also be improved through a **Punctuality Improvement Partnership** (PIP) which seeks to improve on the punctuality of services which may be caused by congestion or excessive dwell times at stops. Initiative such as off bus ticket machines and the promotion of weekly/monthly and annual travel cards would greatly help the PIP.

4.3 Aim of the proposal[13]

4.3.1 The aim is to provide a high quality bus service that meets the needs of managerial and professional commuters and move them from their private cars towards regularly using bus public transport to make their daily journeys to and from work.

4.3.2 The focus of the proposal is on these workers because they are the group that is most resistant to using bus-based public transport and are likely to make up the largest group of people that move into the Stoke on Trent and North Staffordshire area because of the wider regeneration that is occurring.

4.3.3 It is important to note that other transport initiatives are being developed for other key bus users, such as those who are unemployed and looking for work, to enable them to access job opportunities that can be found further afield from their local neighbourhoods.

4.4 Details of the proposal

4.4.1 Limited stops to increase speed of travel along the route. Stops every 620 metres.

4.4.2 High quality buses with greater comfort than existing buses.

4.4.3 High quality bus stops with Real Time Passenger Information (RTPI).

4.4.4 Significant infrastructure improvements along the route e.g. junctions, intersections, priority routes for buses, pedestrian crossings, cycle paths, etc.

4.4.5 Greening of the route.

4.4.6 The Streetcar will replace some existing bus services along parts of the route, i.e. between Keele University and the City Centre with more frequent services but fewer stops. Although there will continue to be some existing services between

---

[13] Nichol, J. North Staffordshire Public Transport Network - The Streetcar Project. North Staffordshire Regeneration Partnership. 2008

Newcastle under Lyme and Hanley City Centre that will continue to stop at every stop.

4.4.7 The Streetcar will run from 7am to 7pm with an option to run until 10pm. Night buses are currently not a viable option.

4.4.8 The buses would be wheelchair and pushchair accessible.

4.4.9 Ticket prices and discount schemes will remain the same as for standard buses.

4.5 Forecasts and assumptions[14]

4.5.1 The North Staffordshire Regeneration Partnership estimate that:

- 34,254 existing bus users along the route would transfer to regularly using the Streetcar every week.

- 3,783 would transfer from private cars (5% of car users).

- 1,784 users would come from the proposed new housing developments (6% of mode share).

- Approximately 40,000 users per week will use the service (39,821).

- Approximately, 115,000 hours saved per year for Streetcar passengers (2,211 hours per week) as well as 18,000 hours of waiting time saved.

4.5.2 Currently bus usage (patronage) is increasing as is cycling in the Stoke on Trent.

---

[14] Nichol, J. North Staffordshire Public Transport Network - The Streetcar Project. North Staffordshire Regeneration Partnership. 2008

Figure 4.1 High level aerial view of the proposed Green Line and Blue Line routes [Source: RENEW NS]
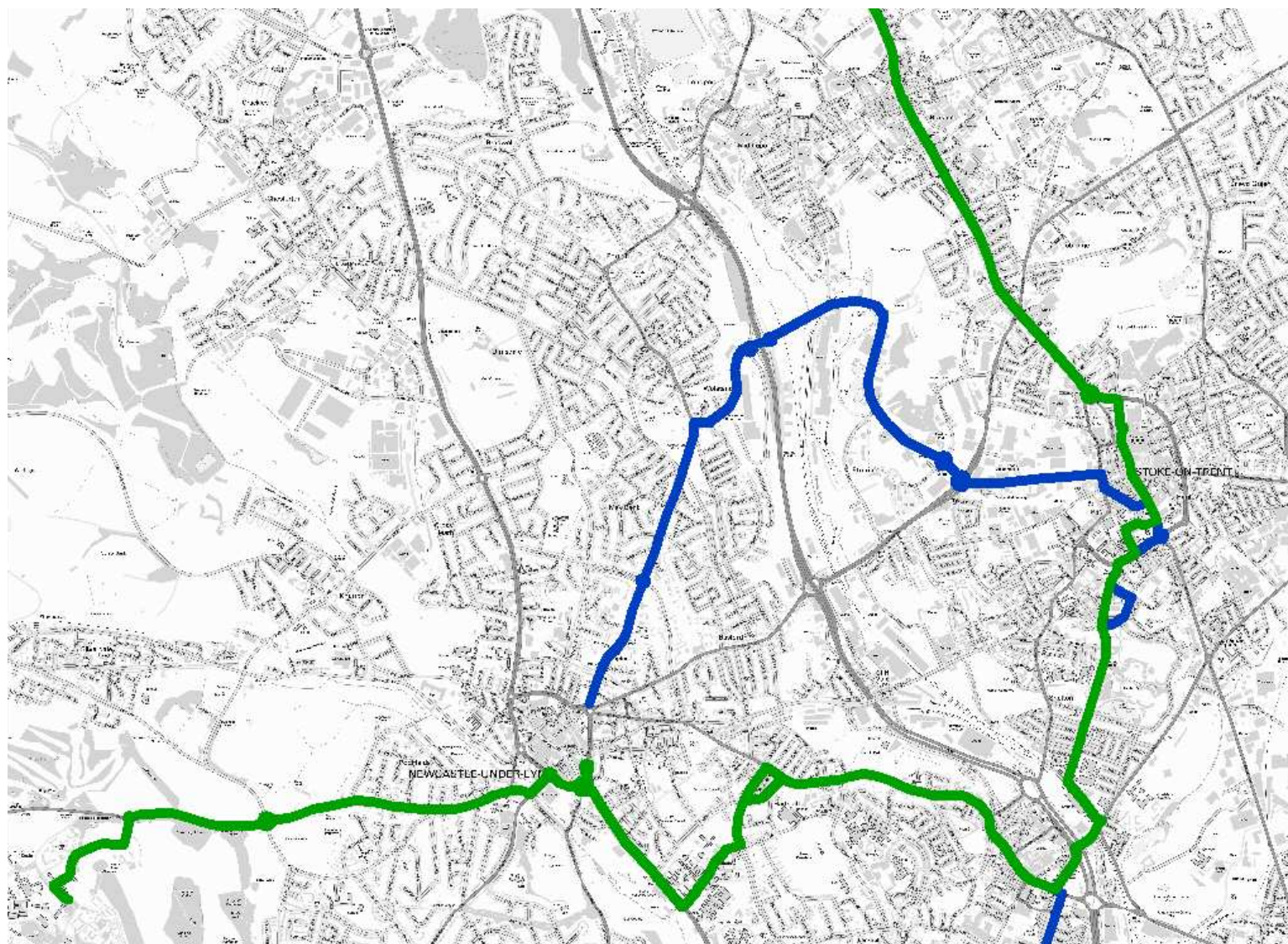
Figure 4.2 Key stops along the Green Line Route [Source: RENEW NS]
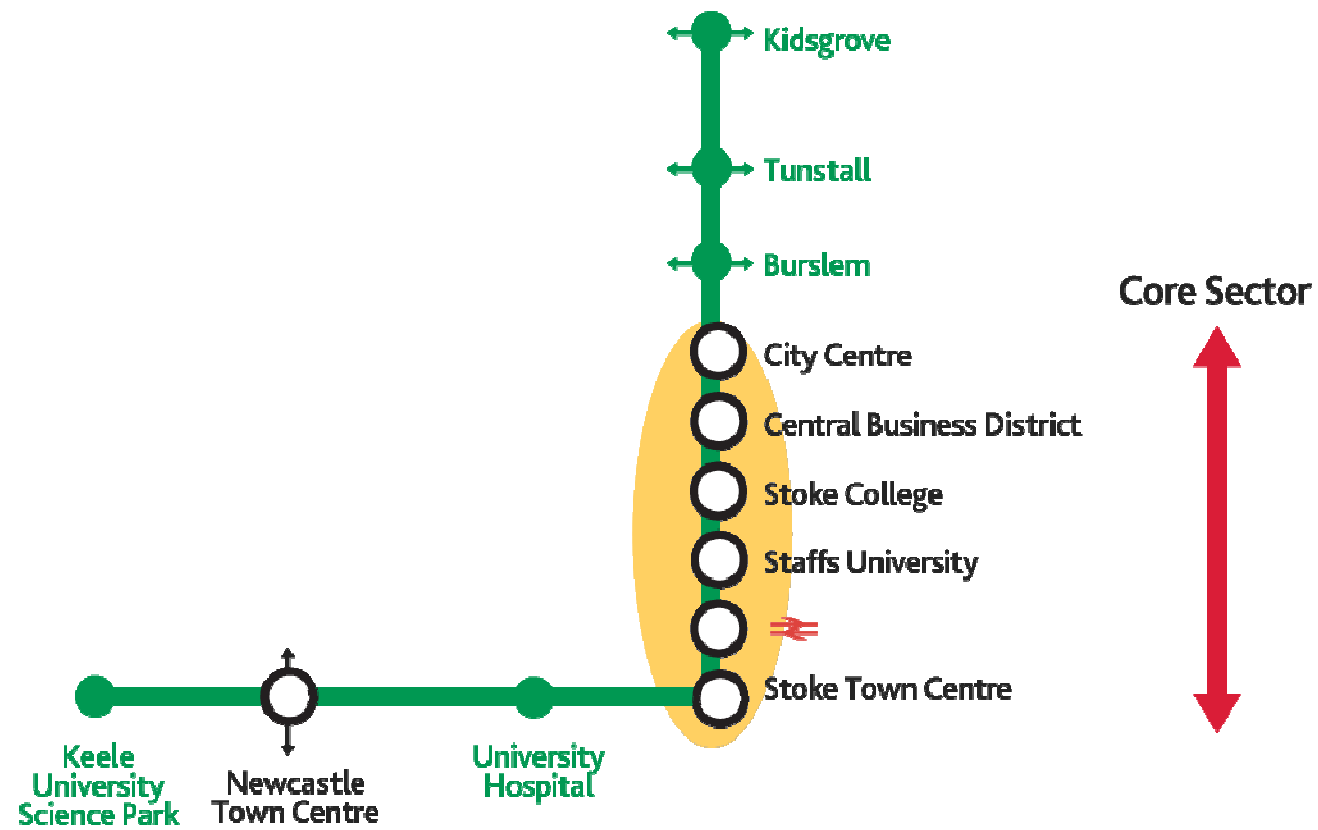
5   Policies Relevant to the Streetcar BRT Scheme and Health

5.1   Introduction

5.1.1   This chapter summarises the key policy context in relation to the proposed Streetcar BRT Scheme.

5.2   National policy

5.2.1   Draft Guidance to regions on delivering a sustainable transport system (Department for Transport (DfT) 2008a)

The draft guidance identifies reductions in greenhouse gases, particularly carbon dioxide emissions, as the single most important aspect in the development of transport options at the regional level.

5.2.2   Building sustainable transport into new developments: options for growth points and eco towns (DfT 2008b)

This document recommends that new developments must be well connected via public transport from the outset and that development proponents should seek to provide direct connections to key destinations such as urban centres and major employment and leisure zones. Additionally, in order to encourage a reduction in car use, it recommends that public transport should be frequent, reliable and easily accessible with early morning and night time transport facilities being considered in order to provide for residents without cars.

5.2.3   Planning Policy Statement 1: Sustainable Development[15]

PPS 1 states that plans and proposals should:

---

[15] Planning Policy Statements (PPSs) set out the Government's national policies on different aspects of land use planning in England. The policies set out in PPSs need to be taken into account by regional planning bodies in the preparation of regional spatial strategies and by local planning authorities in the preparation of local development documents. They can be a material (important) consideration in individual planning applications.

- ensure that the impact of development on the social fabric of communities is considered and taken into account;

- seek to reduce social inequalities;

- address accessibility (both in terms of location and physical access) for all members of the community to jobs, health, housing, education, shops, leisure and community facilities;

- take into account the needs of all the community, including particular requirements relating to age, sex, ethnic background, religion, disability or income;

- deliver safe, healthy and attractive places to live; and,

- support the promotion of health and well being by making provision for physical activity.

5.2.4 Planning Policy Statement 6: Planning for Town Centres

PPS 6 states that:

The Government is seeking to reduce the need to travel, to encourage the use of public transport, walking and cycling and reduce reliance on the private car, to facilitate multipurpose journeys and to ensure that everyone has access to a range of facilities. Good access to town centres is essential. Jobs, shopping, leisure and tourist facilities and a wide range of services should therefore be located in town centres wherever possible and appropriate, taking full advantage of accessibility by public transport.

5.3 Regional policy

5.3.1 West Midlands Spatial Strategy (Government Office for West Midlands (GOWM), 2008)

Policy T1 states that access within and across the Region will be improved in a way that supports the RPG's Spatial Strategy, reduces the need for travel, expands travel choice, tackles congestion, improves safety and protects the environment.

This will be achieved by:

i) measures to improve significantly accessibility and mobility within the Major Urban Areas (MUAs), including the development of high quality sustainable and public transport, so that they are able to accommodate greater levels of development, retain population and attract new jobs;

ii) measures to improve accessibility and mobility in other urban areas, market towns and rural areas so that more sustainable means of travel are encouraged and local regeneration initiatives are supported;

iii) measures to improve national road and rail networks to ensure that strategic links to external markets are maintained and the Region does not become a transport bottleneck undermining national economic growth;

iv) measures to encourage behavioural change across the entire Region; and

v) measures to improve the safety and security of the transport system.

Policy T5 on public transport states that:

The development of an integrated public transport network where all people have access to high quality and affordable public transport services across the Region is a key element of the Regional vision.

Local authorities, transport operators and other agencies, including the Strategic Rail Authority, should work together towards achieving this vision thereby providing attractive and reliable alternatives to the use of the private car.

An integrated hierarchy of public transport services will be developed with the highest priority being given to investment in infrastructure and services to support the regeneration of the MUAs. This will include investment in the development of integrated networks of high quality bus services, including the further extension of bus quality partnerships and the introduction of bus lanes and priority measures, re-allocating roadspace where necessary, with road and junction widening where there is no other practicable solution; and

In all cases, the aim will be to achieve a frequent, reliable, affordable, secure and attractive public transport service which takes into account the needs of all users, including disabled people and others with reduced mobility. Local authorities, the PTE and transport providers should work towards the provision of integrated public transport services with an emphasis on travel information and ticketing arrangements, particularly across boundaries and modes.

5.4 Local policy

5.4.1 North Staffordshire Local Transport Plan (NSLTP) 2006 – 2011

The basic ethos of the LTP is to improve accessibility for everybody in North Staffordshire whether residents, commuters or visitors and whatever their journey purpose. This means that the local authorities want to make it easier for people to get to essential services and facilities such as jobs, schools, healthcare and fresh food shops and to achieve social inclusion. It is especially important for people from disadvantaged and socially excluded groups, for example, people who are mobility impaired, low waged or who live in an area of high deprivation within the conurbation. The four themes are:

- Improving access to the transport network

- Improving access to jobs and local facilities

- Increasing the affordability of sustainable transport

- Improving access to travel information

Since a significant proportion of residents in North Staffordshire do not have access to a car then their quality of life is dependent upon accessibility to services and facilities by other modes of travel. Obviously, good access to healthcare and hospital facilities will be of particular importance. Consequently, improvements to the accessibility of services and amenities through improvements to walking, cycling and public transport facilities will obviously encourage people to become more physically active and improve their general health and fitness. These issues complement the Health Inequalities Strategy being developed by the Directors of Public Health in North Staffordshire which recognise the need for good access to healthcare facilities and greater activity of residents to tackle the key issues of respiratory diseases, obesity, cardiovascular heart disease, stress and cancer.

The evidence of how health and travel are intertwined can be seen in the positive and negative impacts that transport has on health. Firstly, motorised transport has improved access to work and leisure and given opportunities for increased social contact to a great number of people. Economic status and mental health are two aspects of people's lives that might be seen to have benefited from the increased use of the motor car. Improved access to healthcare is a further aspect of transport.

Conversely, the increasing reliance on the car has led to a number of negative effects

notably:

- Lack of physical activity leading to ill health, particularly coronary heart disease.

- Death and injury arising from traffic accidents.

- The environmental impact of road transport on human health such as excessive exposure to air pollution and noise.

- Community severance caused by heavy road traffic.

- The impact on the more vulnerable groups by traffic – particularly people with disabilities, older people, the socially excluded, children and young people.

Alternatives to the car include walking and cycling along with public transport. These are ideal ways of incorporating physical activity into modern lifestyles. By taking a 15 minute walk twice a day i.e. to and from work people would begin to meet the governments recommended exercise levels of 30 minutes of moderate physical activity a day on five days of the week.

5.4.2 Floor Target Action Plan for Physical Activity 2008, Stoke-on-Trent Primary Care Trust (PCT):

Current estimates of physical activity participation in the Stoke on Trent adult population (16+) (n=194,494) indicate:

- 15.8% undertake three or more 30-minute sessions of activity of a least to moderate intensity (MVPA) each week (equating to 30,699 residents)

- 8.0% undertake five or more 30-minute sessions of MVPA each week (equating to 15,544 residents)

- 60.9% undertake zero 30-minute sessions of MVPA each week (equating to 118,329 residents)

Moreover, there is evidence that adults in Stoke on Trent accumulate most of their physical activity from work and domestic activities, rather than leisure pursuits. Despite the low participation rates, 65% of adults cited they have no intention of increasing their levels of physical activity to recommended levels (5 x 30mins of MVPA each week). Important barriers to inactivity include perceived crime, traffic, road traffic accidents, street connectivity, dysfunctional and unmanaged green space.

An ambitious overarching target has been set for Stoke on Trent in this Physical Activity Floor Target Action Plan (FTAP) of: 30% of the Stoke on Trent population (16+) to undertake at least 30 minutes physical activity of at least moderate intensity on three or more days per week by 2012.

A funnel approach has been used to guide us towards this target with the aim to move large numbers of adults undertaking zero activity, towards one session a week, those doing one session per week towards two sessions, and so on.

5.4.3 Joint Strategic Needs Assessment (JSNA) 2007-08, Stoke-on-Trent PCT:

The JSNA states that there are major deprivation challenges facing the people of Stoke-on-Trent. Education levels, income, housing and health are not good. However, there is evidence that the initiatives currently being implemented are showing some benefits.

The assessment of current strategies and action plans suggest that action is being taken on the majority of the major factors affecting the people of Stoke on Trent. However, some gaps have been identified. The recommendations as a consequence are:

Demography, Health and Social Characteristics:

Commissioning of a model for estimating likely population changes over the next fifteen years. In doing so, it must be clear the assumptions made and therefore the caution with which the results need to be interpreted.

Framework for action on reducing poverty and improving income in Stoke on Trent is commissioned.

Local Strategic Partnership gives careful consideration to supporting the Area Implementation Teams covering the greatest concentration of deprived communities to: a) develop action plans that would ensure cost effective interventions are delivered in such a way to improve uptake; and b) mobilising local communities to improve their education and lifestyles.

Children and Young People

Review our approach to tackling childhood poverty and in particular consider how we might complement the national initiative.

Review and mainstream support to ensure language and vocabulary development for children in Stoke on Trent is sufficient to eradicate the gap between Stoke on Trent and national levels by 2010 amongst each successive cohorts of children.

Review the extent to which the needs of children with learning disabilities have been appropriately met.

Working Age People

The major institutions and communities in Stoke on Trent should develop a strategic approach to transforming the economic circumstances of the City as well as the skill base of working age adults in Stoke on Trent.

Stoke on Trent and City Council and NHS Stoke on Trent should ensure that data systems to capture information on the needs of local people with physical and sensory disabilities, mental health needs and learning disabilities are set up and used in the planning process. In particular, the Quality and Outcomes Framework provides for the use of general practice information on mental health and learning disabilities and should be further developed.

Stoke on Trent City Council and NHS Stoke on Trent should commission studies to examine equity of access to mental health services by ethnicity, appropriate geography, age and gender.

Older People

Quality and Outcomes Framework is further developed to provide further information on older people with mental health problems and in particular dementia and depression.

5.4.4   Local Delivery Plan (LDP) 2008/09, Stoke-on-Trent Primary Care Trust (PCT):

The following issue are included in the strategic objectives of the LDP for 2008/09

- To tackle and reduce health inequalities

- Improve health promotion and disease prevention
- Improve public and patient engagement and service accessibility.

A major promise in the Stoke on Trent PCT Local Delivery Plan is to make more services available in the community and also to build more new healthcare facilities. In addition to a new City General and Heywood hospitals, 5 new Primary Care Centres are planned over the next 5 years. With the location of health services in different parts of the city (e.g. the University Hospital of North Staffordshire, GP and Dental practices, as well as other specialist and Community Healthcare facilities).

Additionally, the LDP (2008/09) makes provision for the investment of £2 million into the lifestyle programmes for those at high risk of serious illness. Over the next 3 years, the LDP proposes that 10,000 people will enter the programme and will lose weight and increase their physical activity.

5.4.5   Annual Report of the Director of Public Health 2007-08, Stoke-on-Trent PCT:

The report acknowledges existing progress and highlights five key areas that need strengthening:

- Developing a more strategic approach to tackling health inequalities in priority areas
- Improving the understanding and involvement of Councillors and Non Executive Directors of the Primary Care Trust
- Strengthening performance management
- Developing and promoting community, health champions
- Improving our approach to diversity and community engagement

It also states that the scientific evidence suggests that in order to achieve a level of health in Stoke on Trent comparable to those seen in more affluent parts of England, the following are pre-requisites:

- A minimum level and a distribution of earnings that is comparable to the more affluent parts of the country
- An increase in the number of highly skilled and well-paid jobs both within and near to Stoke on Trent.
- Higher than national average numbers of basic, intermediate and higher level skills and qualifications.
- A community with a national reputation for creating cultural, sporting and leisure opportunities.

- An NHS (primary care, community services and specialist services) with a national reputation for quality.
- A community which embraces change.

5.4.6 Annual Report of the Director of Public Health (2007/08), North Staffordshire PCT:.

The report identifies the health issues of significance for North Staffordshire (Newcastle-under-Lyme and Staffordshire Moorlands). The major health issues are long-term conditions such as cardiovascular disease, chronic heart disease, diabetes, chronic kidney disease, and stroke.

Proposals have been developed through the 'Staying Healthy' component of the PCT strategy to advance healthy life expectancy and improve the quality of life of the people of North Staffordshire. Among these proposals is the plan to make a huge investment in controlling adult and childhood obesity which are among the growing problems for the people in North Staffordshire.

The North Staffordshire PCT acknowledges that real improvements in health and well being can only happen when everyone – individuals, communities, health services, social services, researchers, government agencies – work together in partnership.

5.5 Policy analysis

5.5.1 Overall, the BRT Streetcar is very strongly aligned with national, regional and local policies both in relation to improving local transport systems, improving access and encouraging active forms of travel.

5.5.2 It is one important part of the wider agenda to creating a more sustainable, inclusive and active North Staffordshire.

5.5.3 It will support the goals of increasing physical activity; increasing educational and employment opportunities; increasing the accessibility of healthcare facilities and other services and amenities.

6   Baseline and Community Profile

6.1   Introduction

6.1.1   This chapter provides a rapid health profile of the likely users of the Green Line Streetcar BRT Scheme. It is from this baseline understanding that the predictions on the potential health and wellbeing impacts of the proposed Scheme have been considered.

6.1.2   Descriptions of the various neighbourhoods through which the Green Line Scheme runs are also provided in this chapter.

6.1.3   Stoke-on-Trent is situated approximately half-way between Manchester and Birmingham and the city adjoins the town and borough of Newcastle-under-Lyme, which is administered separately and situated to the west. To the east is the Peak District, which includes part of the Staffordshire Moorlands District, as well as parts of Derbyshire and West and South Yorkshire.

6.1.4   Together with the Borough of Newcastle-under-Lyme and Kidsgrove, Stoke forms the Potteries Urban Area. This, together with the rural Staffordshire Moorlands area, forms North Staffordshire,

6.1.5   Modern day Stoke on Trent is made up from what were originally six separate towns – Stoke, Hanley, Burslem, Tunstall, Longton and Fenton - and the various areas of the city still retain this earlier identity.

6.1.6   Stoke-on-Trent has been built on coal mining, steelworks and the pottery industry. Economically it has been in decline for decades as these industries died out, due to competition from countries with cheaper labour abroad, and this has led to a net migration of people and skills out of Stoke. There is currently a major economic, social and environmental regeneration programme underway that aims to reverse this decline. The Streetcar project forms one part of this overall regeneration programme.

6.2 Stoke on Trent City health profile[16]

The following profile is based on key domains in the *Stoke on Trent Health Profile 2007, 2008,* recently published by the Association of Public Health Observatories.

6.2.1 The health of the people of Stoke-on-Trent is generally worse than the England average.

6.2.2 Many areas of Stoke-on-Trent are among the most deprived fifth of areas in England, although there is a small area that is in the least deprived fifth.

6.2.3 Over the past ten years death rates from all causes and **early death rates from heart disease and stroke and from cancer** have fallen in parallel with average rates for England, but have remained higher than the English average.

6.2.4 In terms of the *'Our Communities'* domain deprivation, **children in poverty,** statutory homelessness, **GCSE achievement (5 A* - C) and violent crime are significantly worse** than the England average.

6.2.5 In terms of the *'Children's and Young People's* Health' domain, smoking in pregnancy is significantly lower than the England average but breast feeding rates, **physical activity in children**, children's tooth decay and teenage pregnancy **are significantly worse** than the England average. **Levels of childhood obesity are higher** but not at a statistically significant level.

6.2.6 In terms of the *'Adult's Health and Lifestyle'* domain, the proportion of adults who smoke, have unhealthy eating habits, or are **physically inactive and obese (1 in 4) is significantly higher** than the England average. Evidence suggests that only 8% of adults exercise (moderate intensity sport and active recreation, excludes active travel) 5 times a week. Levels of binge drinking are higher than the England average but not at a statistically significant level.

6.2.7 In terms of the *'Disease and Poor Health'* domain, **rates of recorded and self-reported ill-health are higher** than the regional and England averages. Rates of incapacity benefit for mental illness, hospital stays related to alcohol, drug misuse and people diagnosed with **diabetes is significantly higher** than the England

---

[16] Stoke-on-Trent Health Profile 2007, 2008. Association of Public Health Observatories

average. Rates of new cases of tuberculosis and rates of hip fractures in the over 65s are similar to the England average.

6.2.8   In terms of the *'Life Expectancy and Causes of Death'* domain, life expectancy for men and women is significantly lower than the England average and rates of infant mortality are significantly higher. Men from the most deprived areas have 5.9 years lower life expectancy than those from the least deprived, and women have 2.4 years lower. Data for the 1998-2005 period indicates that the Infant Mortality Rate (IMR) in Stoke-on-Trent is one-third higher than the regional rate and two-thirds higher than the England & Wales rate. Deaths from smoking, **early deaths from heart disease and stroke, and cancer are significantly worse** than the England average. Deaths from all cancers are more than 30% above regional and national averages. Deaths from heart disease are above the regional and national rates; more than 55% higher in men, and 40% in women. Similarly, the death rate from circulatory disease is 40% above national and regional averages. **Rates of road injuries and death are lower than the England average**.

6.3   Newcastle Under Lyme health profile[17]

The following profile is based on key domains in the *Newcastle Under Lyme Health Profile 2007, 2008,* recently published by the Association of Public Health Observatories.

6.3.1   The health of the people of Newcastle under Lyme is generally close to or worse than the England average.

6.3.2   It has a mix of most deprived and least deprived areas.

6.3.3   Over the past ten years death rates from all causes and early death rates from heart disease and stroke and from cancer have fallen in parallel with average rates for England and there may have been some closing of the gap.

6.3.4   In terms of the *'Our Communities'* domain, deprivation and children in poverty is significantly lower than the England average. Statutory homelessness is similar to the England average. GCSE achievement (5 A* - C) and **violent crime are significantly worse than the England average**.

---

[17] Newcastle under Lyme Health Profile 2007, 2008. Association of Public Health Observatories

6.3.5   In terms of the *'Children's and Young People's Health'* domain, smoking in pregnancy is significantly lower than the England average but breast feeding rates and **physical activity in children** are significantly worse than the England average. **Levels of childhood obesity are also significantly higher**. Children's tooth decay is slightly worse and teenage pregnancy levels are slightly lower than the England average but not at statistically significant levels.

6.3.6   In terms of the *'Adult's Health and Lifestyle'* domain, the proportion of adults who smoke is slightly lower than the England average, the proportion with unhealthy eating habits is similar to the England average, the proportion who are physically inactive is lower though none of these is at a statistically significant level. **However the proportion of adults who are obese is significantly higher** than the England average.

6.3.7   In terms of the *'Disease and Poor Health'* domain, **rates of self-reported ill-health are lower** than the England average. Rates of incapacity benefit for mental illness is significantly higher than the England average. Hospital stays related to alcohol are significantly lower than the England average. Rates of drug misuse are similar to the England average. Rates of people diagnosed with **diabetes is significantly higher** than the England average. Rates of new cases of tuberculosis is significantly lower and rates of hip fractures in the over 65s is lower but not at a statistically significant level.

6.3.8   In terms of the *'Life Expectancy and Causes of Death'* domain, life expectancy for men and women is lower than the England average, rates of infant mortality are higher, deaths from smoking, early deaths from heart disease and stroke, and cancer are worse than the England average but not at statically significant levels. **Rates of road injuries and death are lower than the England average**.

6.4   Green Line Route and Multiple Deprivation

6.4.1   Figure 6.1 shows the proposed Green Line Route for the Streetcar in relation to the Overall Deprivation ranking of the Lower Super Output Areas (LSOAs) that form Stoke-on-Trent. It highlights the fact that there are a significant number of deprived LSOAs along the proposed route.

6.4.2   LSOAs are the fixed geographical area used by the Office for national Statistics to provide a better means of comparing areas than ward boundaries which can often change. LSOAs are defined as areas having an average population of 1,500 residents (minimum 1,000 residents). There are 32,482 LSOAs in England.

6.5   Stoke on Trent Neighbourhood Zones within which the Green Line Scheme lies[18]

6.5.1   The Green Line route passes through the following Neighbourhood Zones:

- NZ01   Goldenhill
- NZ02   Tunstall
- NZ21   Burslem & Sneyd Green West
- NZ22   Forest Park
- NZ23   City Centre, Etruria Road & Festival Park
- NZ24   Shelton North, Etruria, and Snow Hill
- NZ25   Shelton South
- NZ52   Penkhull & Hartshill
- NZ53   Hartshill West
- NZ54   Basford

6.5.2   The Green Line Scheme route south along Scotia Road forms the boundary between the following three zones:

- NZ07   Stanfields & Mill Hill -
- NZ08   Burslem Park, Smallthorne North & Burslem North East
- NZ20   Middleport & Longport

6.5.3   The route around the city centre along the Potteries Way forms the boundary between NZ23 City Centre, Etruria Road & Festival Park and :-

- NZ19   Northwood
- NZ26   Hanley East & Joiners Square

6.5.4   The route only fringes the following area in Stoke Town Centre:

- NZ50   Boothen

---

[18] Steve Johnston, Head of Knowledge Management, Knowledge Management Unit, Stoke-on-Trent City Council.

Figure 6.1 Streetcar Green Line Route in relation to Overall Deprivation Ranking by Lower Super Output Area [Source: North Staffordshire RENEW & Stoke City Council Knowledge management Unit]
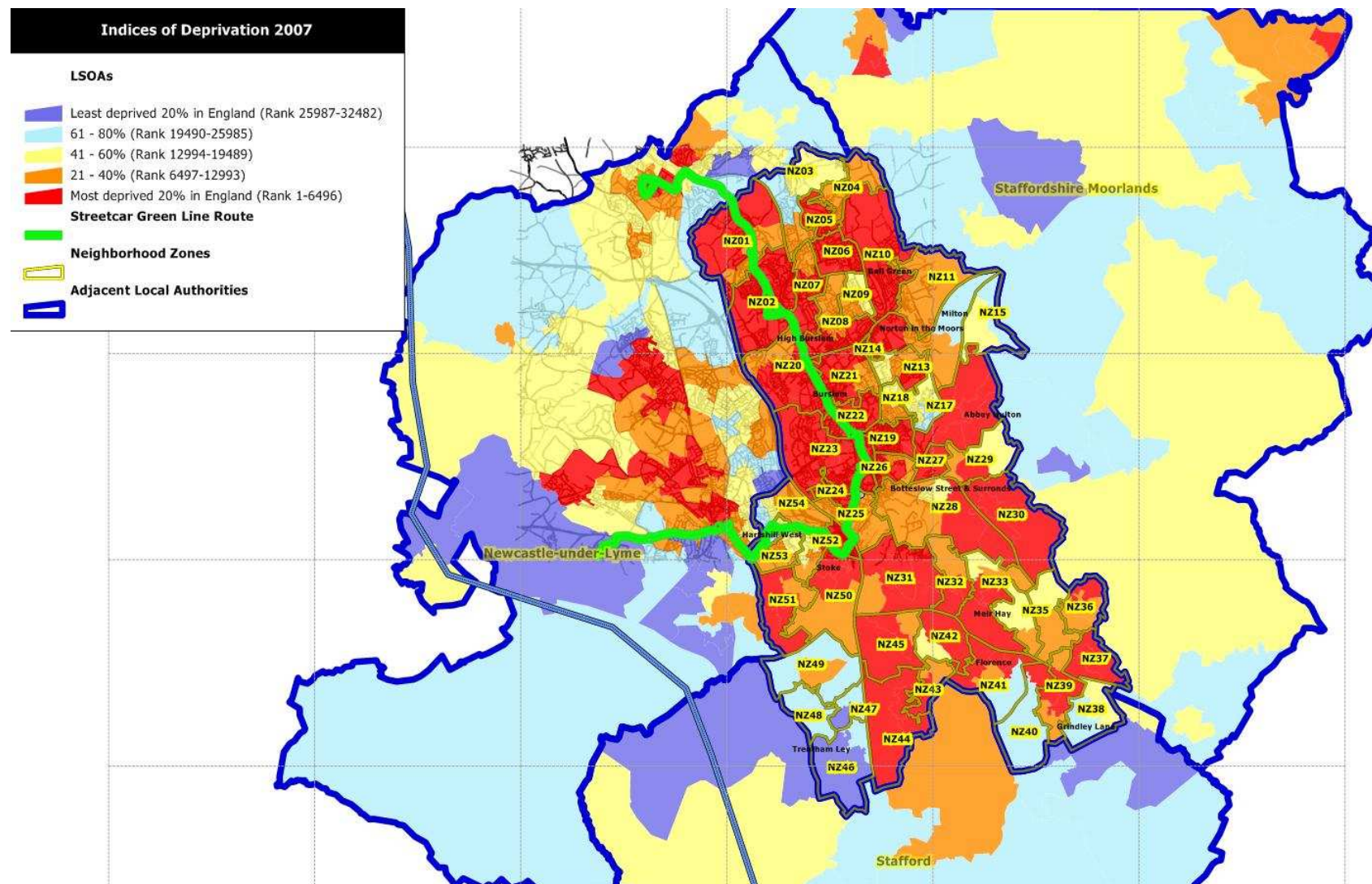
6.6   NZ01 Goldenhill

6.6.1   Goldenhill is a very stable, working-class neighbourhood that faces the town of Kidsgrove, in Newcastle Borough, as much as it does Tunstall to the south. Many residents are employed or educated outside the city boundary.

6.6.2   Recent increases in unemployment have affected the area disproportionately, with many workers engaged in traditional manufacturing industries.

6.6.3   The area contains a very small Black and Minority Ethnic (BME) community and has not experienced the influx of migrants seen elsewhere across the city.

6.6.4   Given its peripheral position and separation from the rest of the city since the completion of the Tunstall Northern Bypass, it is unclear what level of attachment / belonging the residents of the area have to the rest of the city.

6.7   NZ02 Tunstall

6.7.1   Tunstall is the largest of the city's 54 neighbourhood zones. It is home to the second largest BME community in the city, made-up of predominantly residents of Pakistani origin but with an increasing cohort of other BME groups (Black-African and well as other Arabic groups).

6.7.2   The area has undergone significant residential and retail development since 2001, with many of the properties built since that date constructed adjacent to the bypass in the North-East of the zone.

6.7.3   High levels of benefit dependency, single parent families and private-rented accommodation run counter to the level of private investment the area has received in recent years.

6.8   NZ21 Burslem & Sneyd Green West

6.8.1   Parts of the southern end of the Burslem and Sneyd Green West zone (known as Cobridge) are amongst the most ethnically diverse areas in the city. Large numbers of Pakistani and Bangladeshi residents, the remnants of an ageing Black-Caribbean community, and recent waves of migration from sub-Saharan Africa,

middle-East; and (since 2003/04) the extended European Union make for a unique but volatile combination. [This zone includes an area adjacent to Cobridge Park renowned for prostitution].

6.8.2 High levels of crime, poor health (mental as well as physical), poverty, benefit dependency and private rented accommodation make for an area with very high levels of population turnover.

6.8.3 Burslem town centre (the mother-town of the Potteries) has 'lost-out' in-relation to Tunstall town centre to the north and Hanley City Centre to the South, with much footfall being lost following the demise of local pottery manufacturers.

6.9   NZ22 Forest Park

6.9.1 Arguably the City's most deprived area with levels of crime, poor housing, and health significantly worse than the city average. The area is typified by large numbers of void properties, immigrants, refugees, and single parent households, coupled with poor access to services and limited local services

6.9.2 Despite its proximity to the City Centre access is poor, with Waterloo Road dissecting the zone into two distinct residential areas.

6.9.3 With many households not owning a car, pedestrian access to the city centre via Century Street is a key linkage. This is currently an area of major clearance in anticipation of the completion of the Hanley ring road, which will further isolate the residents of the area.

6.10   NZ24 Shelton North, Etruria and Snow Hill

6.10.1 Home to a large and dynamic Pakistani community, this area is also home to significant numbers of new migrants from Africa, the Middle East, Eastern Europe and beyond. Traditionally a popular student area adjacent to the City centre, student numbers have fallen as Staffordshire University developed more halls of residence on-site in South Shelton. This has been further exacerbated by a fall in student numbers and an increasing number of students who 'commute' to their studies from their normal place of residence with their parents).

6.10.2 Part of the Hanley South Area of Major Intervention (North Staffordshire Regeneration Partnership), the area is typified by large numbers of void properties, a very young and increasingly diverse population, and high levels of crime and disorder.

6.10.3 Despite investment in new health and education facilities in the area, a fragmented infrastructure still predominates.

6.10.4 Several hundred new properties have been completed at the western edge of the area near Cavour Street and Lanehead Road.

6.11   NZ25 Shelton South

6.11.1 The home to the Stoke campuses of Staffordshire University and Stoke-on-Trent College, the area is now designated as the University Quarter. The City's Sixth Form college is to relocate to the area in 2011. Despite the presence of these establishments, the student housing market almost collapsed 4 years ago as the number of students seeking private rented accommodation declined. The void was filled by the large-scale placement of refugees and new migrants by NASS. This led to significant conflict with the existing local BME community.

6.11.2 The presence of Stoke Railway station means that the area is a key gateway in and out of the city.

6.11.3 The main Royal Mail sorting office on Leek Road is likely to close as part of a centralisation programme focusing the company's operations in Wolverhampton.

7 Evidence on the Health Impacts of Bus Rapid Transport Schemes

7.1 Introduction

7.1.1 This chapter provides a summary of the key evidence on the health impacts of Bus Rapid Transport (BRT) Scheme.

7.1.2 There is no direct research on BRT schemes and their health effects. However, the general findings on active travel and public transport can be applied to BRT.

7.1.3 The general health impacts of transport are through:

- Physical activity
- Access to services and amenities
- Emissions and air pollution
- Injuries and deaths
- Noise pollution
- Safety and perceptions of safety
- Community severance
- Social inclusion
- Equity/ inequality

7.1.4 These are all potential health impacts of BRT.

7.1.5 There are no published causal pathway diagrams for BRT or bus use. Figure 7.1 shows a causal pathway diagram with the likely pathways of health impact for a BRT scheme which has been developed as part of this HIA project.

7.1.6 This chapter starts by examining the current research on how people across the life course and different social groups use public transport. It then goes on to explore current public transport travel patterns and current public perceptions of bus travel. It then moves on to consider the evidence for the health impacts of BRT bus travel.

Figure 7.1 Causal pathway diagram for the potential health impacts of the Green Line Streetcar bus rapid transport scheme
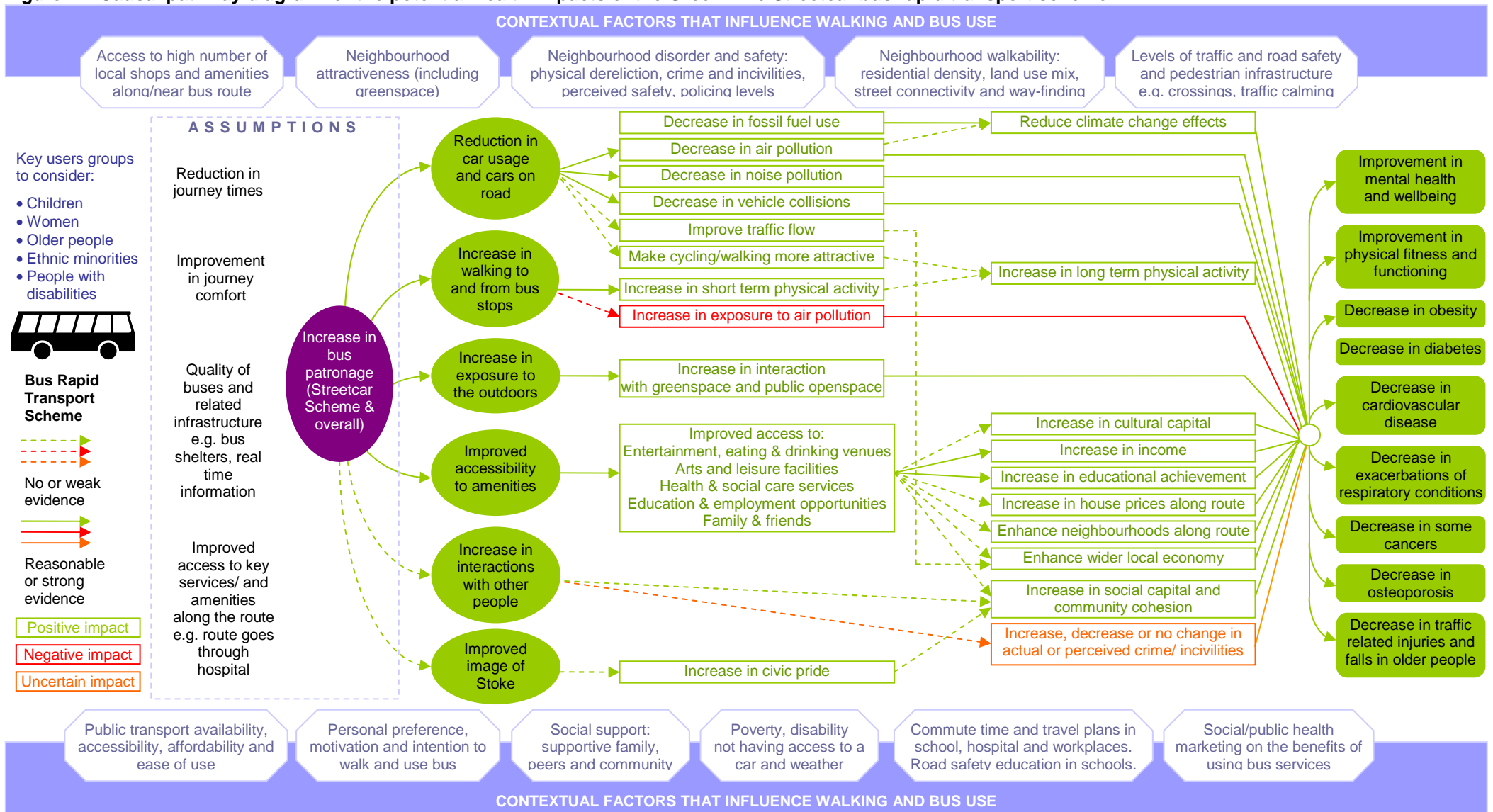
7.1.7   The review of the literature was not comprehensive but did cover the key areas of relevance to this HIA. Appendix B provides more details on the search strategy used.

7.2   Mobility across the life course and among different social groups[19]

7.2.1   People's **relationship with transport is dynamic and changes across the life course** from child, young adult, adult and older person because of changes in lifestyle.

7.2.2   **Primary school children's travel is supervised and constrained by their parents/caregivers concerns about safety**. They most likely get to school or other amenities by walking or by car. Parent's use of a car generally reflects the time pressures they have in taking their children to school before heading off for work.

7.2.3   **Older primary and secondary school children become more independent and can use local buses independently**. The younger age groups tend to find bus journeys positive, exciting and adventurous. The older age groups as their travel experiences and transport needs develop tend to become dissatisfied with the quality and provision of public transport services. This marks an important shift in perceptions towards public transport.

7.2.4   **In their late teens (16 years and above) young people's transport needs expand to encompass work, training, further education, leisure, social and other activities**. Their needs become more complex. And they are likely to travel further and at night. It is at this time that they begin to see car driving as the optimum mode of travel. Key barriers for young people were personal safety, school policies and the availability, reliability and cost of public transport.

7.2.5   **In adulthood, travel is largely focused around responsibilities such as the need to travel to work, escort children, do the shopping and other household chores**. There is a decline in younger adults (20s – 50s) making trips to visit friends and a greater use of the car while there is an increase in visits to friends and a reduction in the use of the car in older adults over the age of 50. However,

---

[19] Department for Transport. 2006. Evidence base review on mobility: choices and barriers for different social groups. Centre for Research in Social Policy.

there are important differences across different social groups as described in the following paragraphs 7.2.6-7.2.10. There is strong support for public transport with 17% of people feeling that better public transport would improve their job prospects and 29% that it would positively impact on their social life. However there is also some resistance to public transport use among some adults. Key mediating factors include range of services, journey times, quality and perceived safety of facilities and cost. 20% of households without access to a car reported some difficulty in accessing medical care and supermarkets.

7.2.6 **Adults on low incomes are more likely to be dependent on public transport and hence more vulnerable to public transport problems particularly the lack of availability of public transport services** (this tends to be rated as more important than the cost of public transport). 13% of people of working age said that they had decided not to apply for a particular job in the last 12 months because of transport problems.

7.2.7 **Adults from black and minority ethnic (BME) groups are more likely to be dependent on public transport and less likely to find that bus services fit into their daily and yearly activity patterns**. Older people from BME groups may also have additional information and language needs. Fear of racial violence can be a key barrier to access.

7.2.8 **Women are more likely to travel for social, family and personal reasons**. Women are less likely to have access to a car and more likely to travel by bus than men. Key barriers to the use of public transport are the difficulties of getting on and off public transport with children and the unreliability of bus services. Women are also more likely to be concerned about personal safety. Public transport is often seen as a last resort and not convenient. One key barrier identified was the unhelpful attitude of public transport staff alongside difficulties with getting on and off with children, unreliability and personal safety concerns. Lack of transport can be a major barrier for women to access healthcare services and leisure amenities e.g. missing appointments or prioritising children's healthcare needs and foregoing their own need for healthcare visits.

7.2.9 **Adults with disabilities are less likely to drive and more dependent on public or community transport and lifts from family and friends** (escorted travel). However, 43% travel by local bus. Disabled people often find public transport inaccessible and can find a lack of flexibility in services e.g. having to ring in

advance for assistance or negotiating with other passengers who take up the wheelchair space. There can also be concerns about being able to complete the whole journey safely and with good accessibility including through the wider street environment. As of 2003 only 29% of buses met disability standards and this is seen as an important structural barrier to the mobility of disabled people. In one recent survey, 50% of disabled people had turned down a job offer because of lack of accessible transport. Disabled entrepreneurs cited a similar barrier in relation to entering and sustaining self-employment. 21% stated that inaccessible transport had limit their educational and training opportunities.

7.2.10 **For older people travel needs focus on shopping, personal business (notably healthcare) and on visiting friends**. Older people become less likely to drive and more likely to use public transport. Maintaining independence and accessing essential services and social opportunities are crucial to older people's quality of life. A lack of transport can mean difficulty in accessing essential services and facilities, e.g. healthcare, and can lead to loneliness and social isolation. As people become elderly use of public transport and car driving becomes difficult due to declining physical fitness. They therefore become more dependent on assisted forms of transport e.g. special mobility schemes, regular visits from family and friends. They become even more vulnerable to social exclusion and have even greater difficulties access services and amenities independently. 39% of older people without a car and who have never used public transport experienced multiple social exclusion.

7.3 Public travel patterns in the UK relevant to the BRT Streetcar proposal[20] [21] [22] [23] [24] [25] [26]

WALKING

7.3.1 **Women make more 15% more walking trips on average than men, though the distance travelled is similar**. Except women in the 30-39 age group who make 86% more walking trips than men in the same age group.

[20] Department for Transport. 2007. Cycling Personal Travel Factsheet.
[21] Department for Transport. 2007. Health Related Difficulties Personal Travel Factsheet.
[22] Department for Transport. 2007. Shopping Personal Travel Factsheet.
[23] Department for Transport. 2007. Travel in Rural Areas Personal Travel Factsheet.
[24] Department for Transport. 2007. Travel to School Personal Travel Factsheet.
[25] Department for Transport. 2007. Travel to Work Personal Travel Factsheet.

7.3.2 **People living in poorer households do more walking on average**.

7.3.3 The **four main reasons people walk are: shopping (21%), education including escorting children (20%), leisure and social purposes (20%) and just to walk e.g. walking the dog (17%)**.

7.3.4 People generally have **positive attitudes to walking and agree that it has health benefits**. Most people also feel safe on their local streets (72%) and agree that their local area is a pleasant place to walk (74%).

7.3.5 However, **in the most deprived areas (such as Stoke) only 55% of people feel safe walking their local streets and only 57% consider their local streets a pleasant place to walk**. This compares to 79% and 88% of the residents of the least deprived areas.

CYCLING

7.3.6 In terms of cycling, the key concern is the danger of cycling on busy roads particularly for women.

PEOPLE WITH MOBILITY PROBLEMS

7.3.7 There is **a strong link between health-related mobility difficulties and household income with adults living in the poorest 20% of areas (such as Stoke) being five times more likely to have mobility difficulties than those in the wealthiest 20%**. This pattern broadly holds across all age groups. Similarly adults with mobility problems were more than twice as likely to live in a household with no car.

7.3.8 **Adults with mobility problems make 33% fewer trips on average** than those without with the greatest difference among those aged 70 and over.

7.3.9 **Almost 60% of adults with mobility problems go out on foot alone** with 20% only going out with assistance and the remaining 20% not going out on foot at all.

7.3.10 In terms of walking for 20 mins or more, 29% of adults with mobility problems but who do sometimes go out on foot and said they did so at least once a week. 61% said that they did so less than once a year or never.

---

[26] Department for Transport. 2007. Walking Personal Travel Factsheet.

7.3.11 Of those that did go out 69% said that they did not use local buses at all; 66% of adults with mobility difficulties have difficulty getting to a bus stop and/or getting on and off buses; and over 50% had difficulty waiting at a bus stop.

7.3.12 80% of adults with mobility problems are aware of at least one special mobility service.

PUBLIC TRANSPORT

7.3.13 In terms of **adults travelling to work the difficulties for existing public transport users are unreliable public transport (19%), traffic congestion/road works (7%) and public transport being 'unpleasant' (4%)**.

7.3.14 In terms of the **potential for modal shift from car to public transport the key barriers were: not believing it is possible to do a journey by public transport (47%), the distance being too far (30%), poor public transport connections (29%) and unreliable public transport (19%)**.

7.3.15 Only **8% of shopping journeys are made by bus with 25% made on foot. The major difficulties experienced when using public transport for shopping are difficulties in carrying the shopping (15%), personal disability (5%) and unreliable public transport (3%)**.

7.3.16 In terms of travel to school, 24% of secondary schoolchildren aged 11 to 16 travel by local buses with 41% walking. For primary school children the figures are 3% and 52% respectively.

7.3.17 In terms of the awareness and use of concessionary passes among older people, in 2008 83% of older people were aware of the concessionary scheme and 73% had received or requested a new pass. Overall passholders were using their passes more than in 2007.

7.4   Public attitudes to bus services

The Commission for Integrated Transport conducted a MORI study on public attitudes to transport in 2002.[27] This found that:

---

[27] Commission for Integrated Transport. 2002. Public attitudes to transport in England.

7.4.1   Satisfaction with bus services amongst users increased from 56% in 2001 to 64% in 2002.

7.4.2   6 in 10 (57%) respondents support having more bus lanes in town centres that give bus users quicker journey times, even though they leave less space for cars.

7.4.3   **If bus times were cut by a quarter, about a quarter of motorists may be encouraged out of their cars**.

7.4.4   82% are in support of park and ride schemes with more than 40% believing it will have most impact on improving the transport system.

7.4.5   **Over 7 in 10 (78%) of respondents want an increased frequency of bus services as well as increased peak / night buses (73%)**.

7.4.6   **32% believed more dedicated school bus services would make parents consider using their cars less for taking children to school**.

The National Centre for Social Research Omnibus Survey in 2008 examined experiences and perceptions of anti-social behaviour and crime on public transport.[28] The survey found that:

7.4.7   **Most respondents (84 per cent) said they would feel safe travelling on public transport, though respondents were more concerned after dark than during the day**.

7.4.8   **Only a small proportion said they did not make more use of public transport because of concerns about anti-social behaviour or crime (3 per cent did not use buses and 2 per cent did not use trains more often because of these concerns)**.

7.4.9   The most common reason for feeling unsafe on buses and trains was anti-social behaviour of young people. 32 per cent were concerned about this on buses and 20 per cent were concerned about this on trains.

7.4.10   **22 per cent said they had been a victim of one or more incident of anti-social behaviour or crime while on public transport in the preceding year, while 76 per cent had witnessed anti-social behaviour or crime**.

7.4.11 Experiences most often related to intimidating, insulting or disruptive behaviour or environmental anti-social behaviour, such as vandalism and littering. Less than 5 per cent said they had been the victim of a theft or a violent or sexual incident.

7.4.12 **43 per cent of public transport users said they had felt intimidated by the behaviour of other passengers in the last year. This suggests that witnessing certain behaviours even if not directly targeted at the individual, can lead to feelings of intimidation**.

7.4.13 Public transport users who travelled regularly and after 9pm were more likely to have experienced or witnessed anti-social behaviour or crime, as were younger, non-white and London respondents.

7.4.14 **Among bus or rail users, respondents considered a policy of refusing drunk or rowdy people to travel, the presence of staff other than the driver, and CCTV to be particularly effective safety measures**.

7.5   Physical activity

7.5.1 The main individual benefit of public transport comes from the increased physical activity of bus passengers to and from bus stops/halts.

7.5.2 There is no UK research on how much walking regular bus users do on average. One US paper examined walking to and from public transit and found that the mean total walking time was 24 minutes per day (median 19 minutes) with a single walking trip being on average 4 minutes long.[29]

7.5.3 In the UK walking times for those using public transport are likely to range from 10 to 60 minutes per day, with an average walking time per day of 20 to 30 minutes.[30]

7.5.4 Regular bus users are therefore likely to meet the minimum daily physical activity requirements for adults. The Chief Medical Officer established the following recommendations for health-enhancing physical activity in 2004: Children and young people should achieve a total of at least 60 minutes of at least moderate

---

[28] UK Department for Transport. 2008. Experiences and perceptions of anti-social behaviour and crime on public transport.

[29] Besser LM and Dannenberg AL. 2005. Walking to public transit: steps to help meet physical activity recommendations. Am J. of Prev Med.

intensity physical activity each day. Adults should achieve a total of at least 30 minutes a day of at least moderate intensity physical activity on five or more days of the week.[31] The recommendations for adults are also appropriate for older adults. The recommended levels of activity can be achieved either by doing all the daily activity in one session, or through several shorter bouts of activity of 10 minutes or more.

7.5.5   There is strong evidence for the short and long term benefits of long term increases in physical activity. A dose-response relationship exists between physical activity and all-cause mortality. From a public health perspective, helping people to move from an inactive level to low to moderate activity levels will produce the greatest reduction in risk.[32] One US study has shown that just under 30% of people walking to and from public transport can achieve 30 minutes of daily physical activity and another that a 5% increase in walkability of a neighbourhood was associated with a 32% increase in time spent in physical activity, a 0.23 point reduction in Body Mass Index (BMI) and 6.5% fewer vehicle miles travelled.[33]

7.5.6   Key positive health outcomes of physical activity include: [34]

- Reduces the risk of dying prematurely.
- Reduces the risk of dying from heart disease.
- Reduces the risk of developing diabetes.
- Reduces the risk of developing high blood pressure.
- Helps reduce blood pressure in people who already have high blood pressure.
- Reduces the risk of developing colon cancer.
- Reduces feelings of depression and anxiety.
- Helps control weight.
- Helps build and maintain healthy bones, muscles, and joints.
- Helps older adults become stronger and better able to move about without falling.
- Promotes psychological well-being.

---

[30] Authors personal judgement.
[31] Department of Health. 2004. At least five a week: Evidence on the impact of physical activity and its relationship to health'. Report from the Chief Medical Officer. England.
[32] HM Government. 2009. Be active be healthy: a plan for getting the nation moving.
[33] Frank L, Sallis JF et al. 2006. Many pathways from land use to health. J of the Am Planning Assoc.
[34] US Department of Health and Human Services. 1996. Physical activity and health a report of Surgeon General.

7.6 Access to services and amenities and social inclusion

7.6.1 There is no direct research on the health benefits derived from public transport improving access to services and amenities.

7.6.2 There is however survey and research evidence as in Section 7.2 which demonstrates that the lack of reliable, accessible and frequent public transport can limit employment and educational opportunities.

7.6.3 Poor public transport is an additional burden that is likely to widen inequalities for those already suffering others forms of disadvantage. Two Joseph Rowntree Foundation (JRF) research studies identified that poor public transport affected the following and new public transport initiatives improved the following[35]

- access to high quality education
- public order, particularly in relation to youth disaffection
- the social integration of older people
- access to adequate health care facilities
- the take-up of employment.

7.6.4 Another JRF study focused on subsidised transport in deprived areas demonstrated that there are indeed benefits of new bus services in terms of: a) supporting people to take up new jobs and maintain existing jobs; b) accessing health and social care services; and c) wider quality of life benefits enabling them to access leisure facilities and do more with their leisure time.[36]

7.7 Air pollution

7.7.1 There is a substantial body of evidence on the adverse health effects of air pollution from motor vehicles.[37] [38] There are small but measurable increases in:

- Premature deaths from cardiorespiratory disease

---

[35] Joseph Rowntree Foundation. 2001. Transport, the environment and social exclusion.
[36] Joseph Rowntree Foundation. 2008. Value of transport in deprived areas.
[37] Health Scotland, MRC SPHSU and IOM. 2007. Health impact assessment of transport initiatives: a guide.
[38] World Health Organization. 2005. Health effects of transport related air pollution.

- Exacerbations of existing respiratory illness and any increase in hospital admissions because of it.
- Increase in respiratory symptoms
- Reductions in lung function

7.7.2   There is conflicting evidence on whether in car levels of air pollution are higher or lower than background and pedestrian levels. Contextual factors e.g. urban/traffic density, climatic factors, barriers between roads and proximity to the road when walking, are likely to be an important factor in exposure. Some studies have identified in-vehicle concentrations of air pollution can be 1.5 to 5 times higher than general background levels.[37] [39] Others have observed and modelled that pedestrians are exposed to higher concentrations than those in cars. [40] [41] [42]

7.7.3   Congestion and low average vehicle speeds generally increases the emission of air pollutants. Hence initiatives that reduce congestion and increase average vehicle speeds can reduce local air pollution levels.[43]

7.8   Road traffic injuries and deaths

7.8.1   Rates of bus passenger fatalities and injuries are low. The road users with the highest risk of being killed or seriously injured are cyclists and pedestrians.[37] It is currently unclear whether roads with a higher modal share of buses lead to greater or lesser risks for pedestrians and cyclists.

7.8.2   The areas of highest risk for cyclists and pedestrians generally are where minor roads meet arterial roads. For children, roads near houses and schools are also areas of high risk.

---

[39] Gulliver J and Brigg D. 2004. Personal exposure to particulate air pollution in transport microenvironments. Atmospheric Environment.

[40] Briggs DJ et al. 2008. Effects of travel mode on exposures to particulate air pollution. Environment International.

[41] De Nazelle A et al. 2009. The built environment and health: impacts of pedestrian-friendly designs on air pollution exposure. Science & Total Environment.

[42] Sharman J. 2005. Clinicians prescribing exercise: is air pollution a hazard? Med. J. Aus.

[43] Institute of Public Health in Ireland. 2005. Health impacts of transport: a review.

7.9   Noise pollution

7.9.1   Road traffic noise generally ranges between 50 – 80 decibels. This is enough to cause annoyance, interference with speech and sleep disturbance in some people.[37] These affects are thought to occur as physiological and cognitive responses to the stress cause by hearing road the noise from the cars on the road.

7.9.2   Noise may also deter some people from walking or cycling on busy roads.

7.10   Safety and perceptions of safety

7.10.1   There is no direct research on bus usage and an increase or decrease in being victims of, or observing, crime and anti-social behaviour than people walking or using other modes of transport.

7.11   Community severance

7.11.1   This generally applies to new roads or to increases in traffic on existing roads where the road becomes an actual or perceived barrier to movement across the road. There is currently little evidence on the health impacts of community severance.[37] However there is evidence to suggest that busy roads can reduce the number social interactions and social relationships across it.[44] This in turn is likely to have some potential adverse effects on wellbeing or opportunities for the enhancement of wellbeing.

7.12   Equity/ inequalities

7.12.1   Lack of access to public and private transport is an equity issue, and can widen and exacerbate health inequalities. It can become an additional burden on already disadvantaged and deprived communities as described in Section 7.6.

---

[44] Appleyard D. 1981. Livable Streets. University of California Press.

7.13   Factors that influence physical activity and possibly bus use

7.13.1 High urban housing densities with a dependence on cars for transportation are associated with low levels of physical activity.[45] [46]

7.13.2 Personal preference and motivation for walking, time as well as preference for living in walkable neighbourhoods are important individual level factors in determining levels of physical activity.[47] [48] [49]

7.13.3 Social support, e.g. people to exercise with, is an important factor in increasing the levels of physical activity.[48] [50]

7.13.4 Attractive neighbourhoods with mixed land uses (e.g. with greenery, greenspace and low levels of traffic), with access to local shops and amenities and access to public transport, increase the likelihood of walking and are associated with lower levels of obesity. This is the case for utilitarian (travel to work and shops) but not for recreational/leisure time physical activity.[47] [48] [51] [52] [53] [54] [55] [56] [57] [58] [59]

---

[45] Lopez R. 2004. Urban sprawl and risk of being overweight or obese. Am. J. Public Health.

[46] Lopez-Zetina J, Lee H and Friis R. 2006. The link between obesity and the built environment. Evidence from an ecological analysis of obesity and vehicle miles of travel in California. Health & Place.

[47] Frank LD, Saelens BE et al. 2007. Stepping towards causation: Do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity?. Social Science & Medicine.

[48] Giles-Corti B and Donovan RJ. 2003. Relative influences of individual, social environmental and physical environmental correlates of walking. Am. J. Public Health.

[49] Miles R, Panton LB et al. 2008. Residential context, walking and obesity: two African-American neighbourhoods compared. Health & Place.

[50] Poortinga W. 2006. Perceptions of the environment, physical activity and obesity. Social Science & Medicine.

[51] Brennan Ramirez LK, Hoehner CM et al. 2006. Indicators of activity friendly communities. AJPM.

[52] Stafford M, Cummins S et al. 2007. pathways to obesity: identifying local modifiable determinants of physical activity and diet. Social Science & Medicine.

[53] Giles-Corti B, Macintyre S, et al. 2003. Environmental and lifestyle factors associated with overweight and obesity in Perth. Am. J. Public Health.

[54] McCormack GR, Giles-Corti B and Bulsara M. 2008. The relationship between destination proximity, destination mix and physical activity behaviors. Preventive Medicine.

[55] Hoehner CM, Brennan LK et al. 2005. Perceived and objective environmental measures and physical activity among urban adults. Am J. of Prev Med.

[56] Frank LD, Schmid TL et al. 2005. Linking objectively measured physical activity with objectively measured urban form: Findings from SMARTRAQ. Am. J. Prev. Med.

[57] Owen N, Cerin E et al. 2007. Neighbourhood walkability and the walking behaviour of Australian adults. Am. J. Prev. Med.

[58] Zlot Al and Schmid Tl. 2005. Relationships among community characteristics and walking and bicycling for transportation and recreation. Am. J. Health Promotion.

[59] Van Lenthe FJ, Brug J and Mackenbach JP. 2005. neighbourhood inequalities in physical activity: the role of neighbourhood attractiveness, proximity to local facilities and safety in The Netherlands. Social Science & Medicine.

7.13.5 Neighbourhood disorder (e.g. physical deterioration, incivilities, social nuisances) is associated with obesity and lower levels of physical activity.[51][52]

7.13.6 High street connectivity (i.e. pavements and few dead ends) is associated with higher levels of physical activity.[57][60]

7.13.7 Reduced commuting distance is also linked to the likelihood of increased physical activity during travel to work i.e. walking and cycling to work. [60]

7.13.8 Activity among older people is also influenced by the factors identified above.[61][62][63][64]

7.13.9 Activity among adolescents/teenagers also seems to be influenced by the factors identified above.[65][66] One of the most important factors is the presence of free or low cost neighbourhood recreational facilities.[67][68]

7.13.10 Though research in this area is sparse, personal and cultural factors modify and mediate how the environmental factors above are seen and their significance as barriers to physical activity.[69][70]

7.13.11 Motivational signage may also help to increase physical activity.[71]

7.13.12 A systematic review of 22 studies of the effectiveness of different interventions in promoting a population shift from using cars towards walking and cycling found

---

[60] Badland H, Schofield GM and Garrett N. 2008. Travel behaviour and objectively measured urban design variables: associations for adults travelling to work. Health & Place.

[61] Sugiyama T and Ward Thompson C. 2007. Older people's health, outdoor activity and supportiveness of neighbourhood environments. Landscape and Urban Planning.

[62] Michael Yl, Green MK and Farquhar SA. 2006. Neighbourhood design and active ageing. Health & Place.

[63] King WC, Belle SH et al. 2005. Objective measures of neighbourhood environment and physical activity in older women. Am. J. Prev. Med.

[64] Li F, Fisher F et al. 2005. Multilevel modelling of built environment characteristics related to neighbourhood walking activity in older adults. JECH.

[65] Mota J, Almeida M et al. 2005. Perceived neighbourhood environments and physical activity in adolescents. Preventive Medicine.

[66] Franzini L, Elliott MN, et al. 2009. Influences of physical and social neighbourhood environments on children's physical activity and obesity. Am. J. Public Health.

[67] Tucker P, Irwin JD et al. 2009. Environmental influences on physical activity in youth. Health & Place.

[68] Santos MP, Page AS et al. 2009. Perceptions of the built environment in relation to physical activity in Portuguese adolescents. Health & Place.

[69] Bird S, Kurowski W et al. 2009. The influence of the built environment and other factors on the physical activity of older women from different ethnic communities. J Women Aging.

[70] Sharpe PA, Granner et al. 2008. Correlates of physical activity among African American and white women. Am J Health Behav.

some evidence that targeted individual behaviour-change programmes can change the travel patterns of people who are the most sedentary or who are motivated to change, resulting in a shift of around 5% of all trips at a population level. Single studies of commuter subsidies and a new railway station also showed positive effects. The balance of best available evidence about publicity campaigns, engineering measures and other institutional, community or area-based interventions suggests that they have not been uniformly effective.[72]

7.13.13 There are important limitations and methodological variations in the studies conducted in this field which reduce the strength of evidence for the findings.[73] The majority of the studies have been conducted outside of the UK, however there are international studies with similar cultural contexts to the UK that have shown similar findings which provides some evidence for the transferability of these findings to a UK context.

7.14   Conclusions

7.14.1 Overall the BRT is very likely to have a positive and beneficial health impact on regular users of the service.

7.14.2 However, there are contextual factors that are likely to influence the use and take up of bus services and the physical activity associated with it as shown in Figure 7.1. These factors are likely to be critical in delivering the positive health benefits of the Streetcar BRT scheme.

---

[71] Ford MA and Torok D. 2008. Motivational signage increases physical activity on a college campus. J. Am Coll Health.

[72] Ogilvie D et al. 2007. Interventions to promote walking: systematic review. BMJ.

[73] Gebel K, Bauman AE and Petticrew M. 2007. The physical environment and physical activity: a critical appraisal of review articles. Am. J. Prev. Med.

8 Health Impacts of the Streetcar BRT Scheme

8.1 Introduction

8.1.1 The analysis of health impacts examined the likely effects during the implementation, operation (short term and long term) and scheme closure (it is envisaged that the scheme will continue indefinitely). The main areas of focus were:

- equity impacts;
- impacts on the health of older people, young people, those with reduced mobility, and those with no access to a car;
- effect on modal shift;
- effect on social inclusion and community cohesion; and
- effect on access to facilities.

8.1.2 Two summary health impact tables are provided at the end of this chapter (See Tables 8.1 and 8.2).

8.1.3 Appendix C provides detailed health impact tables.

8.2 Factors influencing the implementation phase

8.2.1 There is some construction work involved in placing new bus shelters and putting in place the real time passenger information systems. There will also be some work on modifying some junctions along the route including putting in place some safe pedestrian crossings.

8.2.2 The implementation of the roadworks will be phased.

8.3 Factors influencing the operation phase

8.3.1 There will need to be a certain number of bus passengers to make the service viable. Given that the BRT will replace some existing services the assumption of a large number of existing bus users moving to the BRT service is justified.

8.3.2 Awareness of the new service is likely to be important in increasing uptake.

8.3.3 Ensuring that the real time passenger service is accurate, reliable and operational 24 hours a day is likely to play an important part in the use of the BRT.

8.3.4 Long *term,* a deterioration in the local environment, infrastructure and the service is likely to reduce the magnitude of the positive health impacts and could potentially lead to negative health effects e.g. reduced community and civic pride, reduced usage of the service and reduced social capital/community cohesion.

8.4 Health impacts – implementation phase

8.4.1 Overall, the health impacts during this phase are of a minor to moderate nature both positive and negative. This is largely due to the fact that there is only a small amount of construction and building work involved.

8.4.2 There are <u>three potential positive health and wellbeing impacts of the implementation phase</u>.

8.4.2.1 In terms of *employment and economy*, the construction work and the purchase of new street furniture, bus shelters and purchase of a real time passenger information system as well as the greening of the route are likely to be **a minor positive health and wellbeing impact**.

8.4.2.2 In terms of *population demography*, the Green Line BRT route is likely to be an attractive addition to Stoke which is likely to draw new people in and increase the chance of existing residents staying, this is likely to be **a minor positive health and wellbeing impact**.

8.4.2.3 In terms of *education and learning*, if the small amount of construction and greening related jobs go to local people then this is likely to retain and enhance local skills sets, this is likely to be **a minor positive health and wellbeing impact**.

8.4.3 There are <u>three potential negative health and wellbeing impacts of the implementation phase</u>.

8.4.3.1 In terms of *land and spatial*, the construction and road works will make some areas unattractive and some visual and noise annoyance for some weeks or months. This is likely to be particularly annoying for residents living near these areas. **This is likely to be a minor negative health and wellbeing impact.**

8.4.3.2 In terms of *lifestyle and daily routines*, there is a strong potential for localised disruption near junctions that are being modified and on pavements where new bus shelters are being placed. **This is likely to be a minor health and wellbeing impact**. This may be a bigger nuisance for residents living near by, older people and those with disabilities. For this group it may be a minor to moderate negative health and wellbeing impact.

8.4.3.3 In terms of *transport and connectivity*, the disruption to junctions, some roads as bus priority marking are placed and where new bus shelters are placed are likely to be **a minor negative health and wellbeing impact**.

8.4.4 There are <u>no important uncertain health and wellbeing impacts of the implementation phase</u>.[74]

8.5 Health impacts – short term/long term operation phase

8.5.1 Overall, there are mostly minor to moderate positive health and wellbeing impacts from the operation phase.

8.5.2 There are <u>11 potential positive health and wellbeing impacts of the operation phase</u>.

8.5.2.1 In terms of *transport and connectivity*, the faster service with real time information will improve access to services and amenities generally. This is likely to be **a moderate positive health and wellbeing impact**.

---

[74] Uncertain in that they could be either positive or negative depending on local contextual factors and how the project is developed in detail.

8.5.2.2   In terms of *employment and economy*, the reduced journey and wait times is likely to increase the distance people can travel to take up work or remain in work if they move home. Some shops and retail amenities that are seen to be distant are likely to be more accessible, and the greening and better street furniture along the route may also increase and maintain existing businesses along the route. This is likely to be **a moderate positive health and wellbeing impact**.

8.5.2.3   In terms of *education and learning*, it is likely to make journeys shorter – reducing lateness and having time to meet with friends before and after class, expand the area where students can rent accommodation and expand the educational opportunities available for a given commuting time, this is likely to be **a minor to moderate positive health and wellbeing impact**.

8.5.2.4   In terms of *mental health and wellbeing*, the improved environment along the route and the improved service are likely to have **a minor to moderate positive health and wellbeing impact**. The positive mental wellbeing effects are likely to be greater for streetcar users and longstanding residents particularly those living near the Green Line Streetcar BRT route.

8.5.2.5   In terms of *land and spatial*, the modification of junctions, the improved pedestrian crossings, some cycle lanes, bus priority routing, improved bus shelters and the greening of the route are likely to have **a minor to moderate positive health and wellbeing impact**.

8.5.2.6   In terms of *chronic disease*, the increased physical activity of new bus users and maintenance of physical activity of existing bus users is likely to have **a minor to moderate positive health and wellbeing impact** through improved cardiovascular and respiratory function. This is likely to have greater positive effects for children and older people. However, there is a potential negative health impact in this category, see Point 8.5.3.1, in terms of increased exposure to air pollution.

8.5.2.7   In terms of *health and social care*, the new route goes through the hospital complex enhancing both accessibility as well as reducing journey times. This is likely to have **a minor to moderate positive health and wellbeing**

impact. This is likely to have greater positive effects for older people and those on low incomes/unemployed.

8.5.2.8   In terms of *social capital and community cohesion*, improved access to arts and leisure amenities, enhancement of travel opportunities and the increased number of people walking through neighbourhoods to get to and from bus stops is likely to enhance social capital and community cohesion in the neighbourhoods along the route. This is likely to be **a minor positive health and wellbeing impact**. This aspect also links to the uncertain impacts on crime and safety described in Point 8.5.4.2 which if increased would adversely affect social capital and community cohesion along the Streetcar route.

8.5.2.9   In terms of *population demography*, the Green Line BRT route is likely to be an attractive addition to Stoke which is likely to draw new people in and increase the chance of existing residents staying. This is likely to continue to be **a minor positive health and wellbeing impact**.

8.5.2.10   In terms of *housing and accommodation*, existing home-owning residents along the route are likely to find that their house or flat retains their monetary value and potentially increases in value. This is likely to be **a minor positive health and wellbeing impact**.

8.5.2.11   In terms of *physical injury*, there is a potential for reducing road traffic injuries because of a decrease in cars and an improvement in perceived safety along the Green Line route for adults and children. This is likely to be **a minor positive health and wellbeing impact**.

8.5.2.12   In terms of *ambient air quality*, there is potential for decreased private car use, decreased traffic congestion, and a Streetcar, which is likely to be a electric or hybrid electric design with a lower emission profile than existing buses, leading to reduced traffic emissions and improved local air quality along the route. This is likely to be **a minor positive health and wellbeing impact.**

8.5.3 There is <u>one important potential negative health and wellbeing impact of the operation phase</u>.

8.5.3.1 In terms of *chronic disease*, there is a potential for increased exposure to outdoor air pollution for new bus users because of the increased outdoor walking that they will undertake to and from bus stops. This is likely to be **a minor negative health and wellbeing impact**. This is likely to be outweighed by the positive health benefits of walking outdoors. As discussed above, air quality is likely to improve due to the Streetcar, and in addition, over the medium to long term, levels of air pollution are declining as tighter regulations on vehicle and other emissions are put in place.

8.5.4 There are <u>two uncertain health and wellbeing impacts of the operation phase</u>.

8.5.4.1 In terms of *housing and accommodation*, the improvement of the neighbourhood and the quality and speed of the Green Line Streetcar BRT route is likely to increase the desirability of property near the route which is likely to increase or maintain house prices and rents in these areas. This will be good for existing residents and new residents from outside of Stoke wishing to move into the area but less so for young people living in the area who are wishing to stay in the area. This may be **a minor to moderate positive impact** for existing home owners **and/or a minor to moderate negative health impact** for young people wanting to stay and buy a home in the area.

8.5.4.2 In terms of *crime and safety*, it is unlikely that there will be a change in crime and safety issues along the route however the increased number of people walking to and from bus stops may increase the pool of potential victims or create a greater sense of safety near and along the Green Line Streetcar BRT route and on the Streetcars themselves. The new street furniture may also be a target for graffiti and vandalism, or it may decrease vandalism and increase civic pride. This may be **a minor positive impact, no effect or a minor to moderate negative health impact**.

8.6   Health impacts on regular users of the Streetcar BRT scheme

8.6.1   Regular users include those of working age, older people and young people.

8.6.2   Over the short term, **the implementation phase**, there is likely to be one main minor negative health impact from:

- *All users:* disruption to daily routines because of disruption to junctions and access to buses and walking along the proposed Green Line Streetcar route and some visual and noise annoyance from the associated construction/roadworks.

8.6.3   Over the short to medium term, **the operation phase**, the main positive health impacts are from:

- *Employees:* the reduced journey and wait times which is likely to increase the distance users can travel to take up work or remain in work if they move home;

- *Carers & Families*: the faster service with real time information will improve access to services and amenities generally, some shops and retail amenities that are seen to be distant are likely to be more accessible;

- *Students:* improve educational access by reducing lateness and having the time to meet with friends before and after class, expand the area where students can rent and expand the educational opportunities available for a given commuting time;

- *All users:* the improved environment along the route, the modification of junctions, the improved pedestrian crossings, improved bus shelters, the greening of the route and greater exposure to the outdoors is likely to enhance mental wellbeing.

8.6.4   Over the short to medium term, **the operation phase**, the main negative health impact is from:

- *New bus users:* the increased exposure to air pollution. This has the potential to counteract the benefits of increased walking associated with going to and from bus stops. This is counteracted by the potential lower emissions from the Streetcar which is likely to be a hybrid design with a lower emission profile than existing busses. In addition, over the medium to long term levels of air pollution are declining as tighter regulations on vehicle and other emissions are put in place.

8.6.5   Over the long term:

- *New bus users:* the higher levels of walking going to and from bus stops is likely to improve general physical fitness and reduce the incidence and severity of chronic cardiovascular and respiratory diseases, diabetes, levels of obesity, cancer, and osteoporosis.

8.7 Health impacts on residents living near/along the proposed route

8.7.1 These impacts affect all residents but will have greater effects on older and younger residents, those with caring responsibilities and those on low incomes/unemployed.

8.7.2 Over the *short term*, **the implementation phase**, there are likely to be two main minor negative health impacts from:

- disruption to lifestyles and daily routines because of disruption to junctions and access to buses and walking along the proposed Green Line Streetcar route; and

- some adverse mental health and wellbeing effects through the visual and noise annoyance due to the associated construction/road works.

8.7.3 Over the *short to medium term*, **the operation phase**, the main positive health impacts are from:

- the improved environment along the route, the modification of junctions, the improved pedestrian crossings, improved bus shelters, and the greening of the route is likely to enhance mental wellbeing.

- the faster service with real time information will improve access to work, services and amenities generally, some shops and retail amenities that are seen to be distant are likely to be more accessible;

- there is a strong potential for greater social capital and community cohesion because of the improved environment and more people walking through the neighbourhoods along the Green Line Streetcar route, this may also increase other forms of walking. This links to the uncertain impacts on crime and safety which if increased would reduce adversely effect social capital and community cohesion along the Streetcar route;

- existing home-owning residents along the route are likely to find that their home retain, and potentially increase, their monetary value;

8.7.4 Over the short to medium term, **the operation phase**, the main uncertain health impacts are on crime and safety and housing and accommodation for those who are not existing home or flat owners:

- there is potential for increased vandalism, graffiti and incivilities linked to the new improved street furniture and the new buses;

- the desirability of property near the route which while maintaining or increasing house and flat prices and rents for existing home/property owners is likely to make it more difficult for young people to stay in the area.

8.7.5 Over the *long term*, **the operation phase**, the main health impacts are likely to continue to be positive:

- The Streetcar is likely to enhance the accessibility, opportunities and lifestyles of residents living near/along its route and their neighbourhoods.

8.8 Health impacts on children and young people

8.8.1 Some of the health impacts for children and young people have already been described in earlier sections on the health impacts of regular users and residents living/near and along the route (Point 8.6.2 and Points 8.7.1 – 8.7.4).

8.8.2 The main overall health impact on children is likely to be the reduction car traffic along residential roads which potentially reduces the risks of traffic injuries and more importantly increases the perception of safety that parents and children feel walking, playing and crossing roads in and around the Green Line route.

8.8.3 Children are more susceptible to the health effects of air pollution than adults, so any improvement in this domain as a result of the Streetcar is likely to be of relatively greater benefit to children.

8.8.4 By making bus travel more reliable and attractive, the Streetcar may help children to maintain positive attitudes towards public transport as they enter adolescence and early adulthood. Thus they may be more likely to use the bus, and gain health benefits of bus use, e.g. safety and physical activity.

8.8.5 Access to a car is relatively low amongst young people, so they may particularly benefit from the enhanced accessibility and opportunities that the Streetcar is likely to provide.

8.9 Health impacts on women

As discussed in 7.2.8, women are less likely to have access to a car, and more likely to use the bus than men.

8.9.1 The health impacts for women will be similar to those for regular users and residents living near/along the route, if they fall into either of these categories.

8.9.2 Women experience particular barriers to bus use (e.g. concerns about safety and reliability, ease of getting on and off with children and/or shopping). The extent to which these barriers are addressed in the Scheme is likely to influence women's use the service, and thereby the related health benefits they are likely to gain.

8.9.3 Because women are more likely to be dependant on public transport than men, they may particularly benefit from the enhanced accessibility and opportunities that the Streetcar is likely to provide.

8.10 Health impacts on older people

As discussed in 7.2.10, older people become less likely to drive and more likely to use public transport than other adults.

8.10.1 The health impacts for older people will be similar to regular users and residents living near/along the route.

8.10.2 Older people may also have safety concerns during the day, as well as evening, particular if they have a mobility problem.

8.10.3 Because car use is relatively low amongst older people, they may particularly benefit from the enhanced accessibility and social opportunities that the Streetcar is likely to provide. Quick reliable access to the hospital and other health care services may be an impact of the Streetcar that particularly benefits older people.

8.11 Health impacts on people with disabilities

As discussed in 7.2.9, transport is an equity issue for many adults with disabilities, and lack of accessible transport can limit employment, educational and social opportunities.

8.11.1 Depending on their disability, the health impacts for many people with disabilities is likely to be similar to women, regular users and residents living near/along the route.

8.11.2 However, the Streetcar is unlikely to increase the accessibility for those with significant mobility impairments as they will continue to find the Streetcar as difficult to use as other forms of public transport.

8.11.3 A visual only real-time passenger information system will not be useful for those with significant visual impairment.

8.11.4 Because car use is relatively low amongst people with disabilities, they may particularly benefit from the enhanced accessibility and social opportunities that the Streetcar is likely to provide. Quick reliable access to the hospital and other health and social services may be an impact of the Streetcar that particularly benefits people with disabilities.

8.12 Health impacts on black and minority ethnic groups

As discussed in 7.2.7, black and minority ethnic groups are more likely to be public transport users than white residents, and may have specific concerns regarding bus travel (e.g. fear of racial violence).

8.12.1 The health impacts for black and minority ethnic (BME) groups will be similar to those for regular users and residents living near/along the route, if they fall into either of these categories.

8.12.2 Use of the Streetcar by BME groups and related health benefits are likely to be enhanced if the specific needs and concerns of BME groups are addressed in the design and implementation of the scheme.

8.12.3 Because dependence on public transport is relatively high amongst black and minority ethnic groups, they may particularly benefit from the enhanced accessibility and opportunities that the Streetcar is likely to provide.

8.13 Health impacts on low income/unemployed people

As discussed in 7.2.6, people who are on low incomes are more likely to be dependant on public transport, and transport problems can limit employment and other opportunities.

8.13.1 The health impacts for low income/unemployed people will be similar to those for regular users and residents living near/along the route, if they fall into either of these categories.

8.13.2 The main overall health impact is linked to the potential to enhance their access to educational and employment opportunities that were seen to be inaccessible on existing bus services.

8.13.3 It is envisaged that the fares of the Streetcar will be the same as those for existing bus services, so it will be equally as affordable as current buses. .

8.14 Long term and cumulative impacts

8.14.1 The four main factors influencing the long term positive and negative health and wellbeing impacts are:

- Maintenance and ongoing enhancement of the environment along the Green Line Streetcar BRT route both in terms of street furniture, greening, bus priority routing markings and modified junctions.

- Maintenance and ongoing enhancement of the real time passenger information systems and the buses.

- Maintenance and enhancement of the neighbourhoods adjacent to the Green Line Streetcar BRT route.

- Maintenance of the scheme.

8.14.2 There are other BRT schemes proposed in Stoke. However, these will be phased in one at a time to give time for each route to bed in. This staged approach will also enable those developing subsequent routes to benefit from lessons learnt in the implementation and operation of earlier routes.

8.14.3 There is a wider regeneration occurring particularly in relation to new housing developments. The Green Line route has been developed to link strongly into these developments and ensure good public transport access. It therefore complements the wider regeneration.

8.15 Equity impacts

8.15.1 The Streetcar is targeted at local people who currently use a private car to get to and from their place of employment. Even so, as can be seen from the analysis of specific sub-groups above, it is unlikely that it will widen health inequalities and has strong potential to enhance equity and narrow health inequalities over the medium to long term.

8.15.2 Equity is likely to be enhanced because the Streetcar will:

- be the same price as existing services;

- accept existing discount passes;

- be accessible to able-bodied, those in wheelchairs, those with minor mobility problems and those who have pushchairs;

- improve access to the local hospital;

- improve the wider environment along the Green Line Street car route; and

- reduce the time people spend commuting to work and accessing other services and amenities, and make more distant services and opportunities accessible.

8.15.3 However, it is unlikely to increase the accessibility for those with significant mobility and sensory impairments as they will continue to find the Streetcar as difficult to use as other forms of public transport.

8.16 Quantification of health impacts of the operation phase

8.16.1 A quantification of the potential health impacts relation to air pollution effects was undertaken. The results showed that the reduced level of air pollution would increase life expectancy of local residents along the route by approximately 8 days

(i.e. 80 life years would be saved) assuming 3,500 residents are living along the route).[75]

8.17   Conclusion

8.17.1 Overall, the **Green Line Streetcar BRT scheme is likely to have moderate to major potential positive health and wellbeing impacts both at a local and global level and over the medium and long terms**.

8.17.2 It has few potential negative health impacts, and the majority of these are likely to be minor to moderate in nature and short term, temporary and localised.

---

[75] Separate draft background paper not published.

Table 8.1 Implementation phase (the majority of these health and wellbeing impacts are temporary and reversible)

red = negative impact , amber = uncertain impact (could be +ve or –ve) , green = positive impact , white = no impact or not identifiable

(This table summarises the detailed health impact tables and identifies the possible impacts and those groups that could be worst affected or could benefit the most)

People affected	Overall	Chronic diseases & pollution	Physical injury	Mental health & wellbeing	Jobs and economy	Housing & shelter	Transprt & connectvty	Education and learning	Crime & safety	Health and social care services	Shops and retail	Social capital and community cohesion	Arts and leisure	Lifestyle and daily routines	Energy and waste	Land and spatial
Residents living along/ near to the Greenline route	red	red		red			red							red		red
Regular users of the route							red							red		red
Employed in construction/road/greening work	green				green			green								
Gender — Women	red	red		red	green		red							red		
Gender — Men					green											
Ethnicity — Asian (Indian subcontinent)																
Ethnicity — Black																
Ethnicity — East Asian (Chinese etc)																
Ethnicity — Mixed ethnicity																
Ethnicity — White (incl. Irish and European)																

IOM

People affected		Overall	Chronic diseases & pollution	Physical injury	Mental health & wellbeing	Jobs and economy	Housing & shelter	Transprt & connectvty	Education and learning	Crime & safety	Health and social care services	Shops and retail	Social capital and community cohesion	Arts and leisure	Lifestyle and daily routines	Energy and waste	Land and spatial
Age	Older people	RED	RED		RED			RED							RED		
Age	Children and young people	RED	RED		RED			RED							RED		
Disability	Physical														RED		
Disability	Sensory														RED		
Disability	Learning														RED		
Disability	Mental health														RED		
Faith	Christian																
Faith	Muslim																
Faith	Other																
Other	Unemployd people					GREEN											
Other	Those with respiratory problems		RED														
Other																	

Table 8.2 Operation phase (when the Green Line Streetcar BRT route is operational)

red = negative impact , amber = uncertain impact (could be +ve or –ve) , green = positive impact , white = no impact or not identifiable

(This table summarises the detailed health impact tables and identifies the possible impacts and those groups that could be worst affected or could benefit the most,)

People affected	Overall	Chronic diseases & pollution	Physical injury	Mental health & wellbeing	Jobs and economy	Housing & shelter	Transport & connectvty	Education and learning	Crime & safety	Health and social care services	Shops and retail	Social capital and community cohesion	Arts and leisure	Lifestyle and daily routines	Energy and waste	Land and spatial
Residents living along/ near to the Greenline route				green					amber			green		green		green
Regular users of the new Streetcar											green	green		green	green	
New residents moving into the area									amber			green		green		green
Gender Women				green	green		green			green	green	green		green		
Gender Men	green															
Ethnicity Asian (Indian subcontinent)	green															
Ethnicity Black	green															
Ethnicity East Asian (Chinese etc)	green															
Ethnicity Mixed ethnicity	green															
Ethnicity White (incl. Irish and European)	green															

IOM

Group	People affected	Overall	Chronic diseases & pollution	Physical injury	Mental health & wellbeing	Jobs and economy	Housing & shelter	Transport & connectvty	Education and learning	Crime & safety	Health and social care services	Shops and retail	Social capital and community cohesion	Arts and leisure	Lifestyle and daily routines	Energy and waste	Land and spatial
Age	Older people		█	█				█			█	█	█		█		
Age	Children and young people		█	█					█		█		█	█			
Disability	Physical																
Disability	Sensory																
Disability	Learning																
Disability	Mental health																
Faith	Christian																
Faith	Muslim																
Faith	Other																
Other	Users of amenities along the route	█			█			█			█			█	█		
Other	Unemployd people												█				
Other	Young people wishing to stay in the area					█		█					█		█		

Strategic Consulting Report: 644-00206d

9 Measures to Optimise the Potential Health Outcomes

9.1 Introduction

9.1.1 As shown in the Chapter 8, the Streetcar BRT Scheme is likely to have largely positive health and wellbeing impacts.

9.1.2 Therefore there are more opportunities for enhancement and fewer opportunities for mitigation.

9.2 Design aspects

9.2.1 Enhancing the environment of wider neighbourhoods along the Green Line route:

9.2.1.1 One of the important insights from the literature is the importance of attractive neighbourhoods for encouraging walking and other outdoor activities.

9.2.1.2 The implication of this is that BRT Scheme should consider a wider area than just the route when considering greening and other environmental enhancements.

9.2.2 Greening of the route:

9.2.2.1 Greenspace and flora and fauna have important benefits for mental health and wellbeing.

9.2.2.2 Biodiverse, drought resistant, hardy and easily maintained plantings would provide the greatest public health benefits.

9.2.2.3 One important aspect to consider is ensuring line of sight at junctions and near bus stops as clear lines of sight to enable people walking to see what is ahead can increase people's sense of safety and confidence especially when it is dark.

9.2.3   Quality and inclusive street furniture and lighting:

9.2.3.1   It would be worthwhile to ensure that the Streetcar street enhancements e.g. new bus shelters, etc. are part of a wider street furniture improvement programme that includes good lighting as well as litter and recycling bins.

9.2.3.2   Good quality, good looking (aesthetically pleasing) furniture that is resistant to vandalism and graffiti whilst also providing seating for older people and those with young children is also important and likely to be worth the additional costs.

9.2.3.3   Covered secure bicycle storage at major bus interchanges could potentially increase cycling to and from these interchanges.

9.2.3.4   Good lighting at the newly installed bus stops and reliable real-time passenger information (RTPI) may encourage women, older people and others with safety concerns to use the service. Having taxi information delivered alongside the RTPI information as well as on the static bus timetable information notice boards would enhance the choices that women and other users worried about their safety would have.

9.2.4   Junction modifications and bus prioritisation:

9.2.4.1   Enhancing pedestrian crossings and cycleways/cycle prioritisation within the design of the junction modifications and bus prioritisation is likely to maintain and enhance walking and cycling along the Streetcar route.

9.2.5   Real Time Passenger Information System:

9.2.5.1   The main issue is ensuring that the system works and is reliable in terms of accuracy of the information and working display units.

9.2.5.2   Having screens that are easily readable by those with some visual impairment e.g. large clearer writing that is visible in a variety of lighting conditions

9.2.5.3   In addition there should be voiced announcements for upcoming bus halts on the Streetcar buses themselves.

9.2.6   Vehicle type for Streetcar buses:

9.2.6.1   The biggest emissions reductions will come from having Streetcar buses that are all electric. Electric vehicles will help to mitigate the negative health impacts of greater exposure to vehicle exhaust fumes amongst new users. The other options are LPG or electric hybrid vehicles that use electricity as well as fossil fuels which will produce lower emissions than the existing bus services..

9.2.6.2   All electric or, to a lesser extent, hybrid vehicles will also reduce CO_2 emissions associated with climate change (though strictly speaking the emissions are occurring at the power station that generates the electricity unless renewal electricity is sourced specifically).

9.2.7   Bus Shelters:

9.2.7.1   Bus shelters that offer all round visibility, all weather protection from the wind and rain and seating will enhance the comfort and increase the use and accessibility of the Streetcar bus halts for all types of passengers.

9.2.8   Use of Universal Design and Active Design Principles in all aspects of the Scheme:

9.2.8.1   Universal Design is defined as the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.[76] There are seven principles of Universal Design and they apply to all types of design including transportation related design.[77]

- **Equitable Use** means that designs need to be useful and marketable to people with different levels of ability. The main goal is to provide one design to accommodate all users. It is crucial not to stigmatize individuals with specialized design that segregates or isolates them.

- **Flexibility In Use** recommends that products, buildings and environments should accommodate a wide range of individual preferences and abilities through various methods of use. Products and

---

[76] Center for Universal Design. 1997. The Principles of Universal Design. New York State University.
[77] City of Decatur. 2007. Decatur Community Transportation Plan HIA.

environments should be compatible with the user's pace to accommodate the use by various ability levels.

- **Simple and Intuitive Use** means that places should be simple enough to understand regardless of an individual's experiences, knowledge, language skills, or concentration level.

- **Perceptible Information** should be provided in diverse modes (e.g., auditory, visual, tactile) to match the skills of different users. For example, travelways should use varying texture and colour for pavement of streets, sidewalks, and bike paths to provide navigational guidance to older adults and others with vision loss, as well as provide additional locational information for the general public.

- **Tolerance for Error** requires designs that minimize hazards and accidents through warnings and the elimination, isolation, or shielding of hazardous elements. The design should seek to minimize unconscious actions for tasks requiring attention, and to encourage users to be aware of their environments.

- **Low Physical Effort** means products, buildings, and environments should be designed to be used efficiently and comfortably without the need of an extra operating force, awkward body position, unnecessary repetitive actions, or sustained physical effort. For example, the connectivity of neighbourhoods through a web of streets and trails will decrease the time and effort spent reaching destinations compared to conventional community development with dead-end streets and cul-de-sacs.

- **Size and Space for Approach and Use** states that a design should be an appropriate size for the intended use (i.e., sufficiently large or small) and provide enough space for approach and use by people with different body sizes, assistive devices, or personal assistants. Components should be reachable by all heights and can be operable by all hand and grip sizes.

9.2.8.2   Active Design integrates with a number of converging agendas: [78]

- Design Agenda – the promotion of high quality inclusive design of buildings and public spaces is a key principle of the planning system;

- Health Agenda – physical activity is fundamental to the overall health and wellbeing of the nation and is central to arresting increasing trends in obesity among adults and children;

- Transport Agenda – the promotion of active travel modes reflects Government transport policy seeking to promote more sustainable and environmentally friendly modes of transport.

The Active Design principles are relevant to the Streetcar Scheme and are related to Everyday Activity Destinations – accessibility, amenity and awareness (AC, AM, AW); the specific principles :

- AC5 Are Active Travel Routes to Everyday Activity Destinations prioritised ahead of car linkages in terms of distance and directness?

- AC6 Does the design and layout of Everyday Activity Destinations help prioritise pedestrian, cycle and public transport access through providing:

    ° Direct and welcoming pedestrian access from the street?

    ° Public transport stops?

    ° Well designed and conveniently located cycle parking?

    ° Controlled car parking?

- AC7 Is provision made for public conveniences, drinking fountains and changing facilities (for example at workplaces) at Everyday Activity Destinations?

- AC8 Is appropriate access provided for disabled users and those with impaired mobility?

---

[78] Sport England. 2007. Active Design: promoting opportunities for sport and physical activity through good design.

- AC9 Has cycle storage been integrated into the design of new homes, workplaces and Everyday Activity Destinations?

- AM1 Are Active Travel Routes between Everyday Activity Destinations:

  ° Direct and well-lit without blind corners?

  ° Fronted and overlooked by development and/or other road-users to create natural surveillance?

  ° Integrated with open spaces and accessible play spaces to create a variety of experiences along a route?

- AM4 Are high quality durable materials and street furniture employed throughout to define a strong identity for Active Travel Routes?

- AW2 Are Active Travel Routes to and between Everyday Activity Destinations:

  ° Direct, unobstructed and legible as to their function and destination?

  ° Offer a more direct route than car routes?

  ° Clearly signed to communicate the potential for day to day trips to achieve physical activity targets?

- AW3 Are developers/occupiers of buildings using health promotion measures to inform residents, staff, pupils, customers of the opportunities that exist for physical activity?

- AW4 Has cycle storage been integrated into the design of new homes, work places and Everyday Activity Destinations, and has this been advertised and highlighted as a feature of the development?

9.3   Implementation phase

9.3.1   Developing a construction/road works residents' communication plan:

9.3.1.1   Developing a communication plan informing local residents, pedestrians, cyclists, public transport users and other road users of the upcoming construction works is likely to reduce the likelihood of nuisance and annoyance. Consideration should be given to reaching BME groups as well as mainstream audiences e.g. through a well designed leaflet in plain English, local radio (including ethnic radio) and local TV. Residents and users will be prepared for some disruption and make arrangements accordingly.

9.3.2   Managing construction/road work:

9.3.2.1   Appoint a Main Contractor and Sub-Contractors, if necessary, with excellent safety records, low complaints record and a good history of working with residents living nearby.

9.3.2.2   Ensure that the Main Contractor and Sub-Contractors are part of the Considerate Constructors Scheme and the project is registered with the Scheme (www.considerateconstructorsscheme.org.uk).

9.3.2.3   Develop and agree on a site specific Code of Construction Practice (CoCP) to deal with potential nuisance issues resulting from the construction site and its operation. This should include a clear line of communication, for example a dedicated helpline phone number, to enable local people to report issues and clear responsibilities for how the main construction contractor will respond to these issues.

9.3.2.4   Ensure adherence to the new Construction (Design & Management) Regulations 2007 (CDM 2007) that has come into force and aim to integrate health and safety into project management process. The Health and Safety Executive has produced an accompanying Approved Code of Practice document *'Managing Health and Safety in Construction'* which sets out the implications of the new legislation for developers, contractors, designers and workers.

9.3.3   Promoting workplace travel plans:

9.3.3.1   It will be crucial to develop a programme of work on workplace travel plans with the main employers along the Green Line route to ensure that these employers promote and make a commitment to raising awareness and encouraging more employees to use the Streetcar.

9.3.3.2   The above could be linked to a series of awareness raising initiatives, about the Streetcar project in key workplaces that are open to employees working in other workplaces nearby e.g. 'look and sit' shows of the Streetcar buses.

9.3.3.3   Key employers are the University Hospital of North Staffordshire (UHNS) and the Universities of Keele and North Staffordshire. However, both large and small employers should be targeted.

9.3.4   <u>Local recruitment of road construction and other workers</u>

9.3.4.1   Ensure any recruitment for the construction and other jobs, e.g. installation of bus shelters, starts locally through local job centres before being advertised more widely. This will also reduce the potential pressures on local housing and be more sustainable in transport terms.

9.3.5   <u>Linking into local road construction and other skills training and apprenticeship programmes</u>

9.3.5.1   Establish links to colleges and other institutions involved with training local people in road construction and other relevant skills/apprenticeship programmes.

9.3.5.2   Have a local firm that maintains and repairs the real-time passenger information system.

9.4   Operation phase

9.4.1   Long term maintenance and refurbishment plan:

9.4.1.1   The long term success of the Streetcar project depends on planning for and having funds available for ongoing maintenance, repair and

refurbishment of the physical environment and infrastructure of the Streetcar Scheme.

9.4.1.2   This includes how graffiti and vandalism will be dealt with as well as repairing RTPI displays and lighting that are not working.

9.4.1.3   A hotline approach to reporting RTPI, lighting and other elements that need repair e.g. a freephone or low-cost number may encourage Streetcar users to report faults.

9.4.2   Inclusive marketing:

9.4.2.1   While the target market for the Streetcar are workers who currently use a private car to travel to and from work, particularly those from higher socio-economic groups, it is important for marketing materials and placement to reflect the diversity of potential users in terms of age, gender, disability and ethnicity. Inclusive marketing is important for equity reasons and to enhance use and financial viability of the Streetcar. Promoting a sense of local ownership of the Streetcar may also help to reduce vandalism.

9.4.2.2   The marketing also needs to link with other public health and sustainability marketing programmes that may be running at the same time to enhance the brand and value of the Streetcar Scheme.

9.4.3   Setting up a Streetcar Transport User Group:

9.4.3.1   Having a diverse Streetcar User Group will ensure that the Scheme meets the needs of users from all backgrounds and disabilities and ensure that complaints and problems that emerge particularly during the early operation phase.

9.5   Health activities allied to the operation phase

9.5.1   Promoting workplace and personal travel plans:

9.5.1.1   Enabling local residents, local groups and organisations to increase their physical activity through the development of individually tailored plans that include public transport and Streetcar use..

9.5.2   Public health and social marketing on benefits of public transport use and related walking:

    9.5.2.1   The general marketing is likely to focus on making the Streetcar an appealing mode of transport. There is therefore strong potential for this to be allied to public health and social marketing on active transport and the health benefits of public transport related walking and cycling.

9.5.3   Marketing the sustainability benefits of Streetcar:

    9.5.3.1   A similar approach to the public health marketing can be used to emphasise the sustainability and environmental friendliness of Streetcar travel particularly if it is an all electric or hybrid vehicle.

9.5.4   Linking into physical activity programmes, arts, leisure and community development activities:

    9.5.4.1   Given the community development and public health programmes linked to physical activity that are currently being implemented there is a strong potential of linking the use of the Streetcar during off peak times to take walking groups and groups going to the local arts and leisure facilities on the new Streetcar.

10 Recommendations

10.1 Introduction

10.1.1 This Chapter builds on the measures developed in Chapter 9 and places them in the context of the overall timeline and the key agencies that could take the measures forward. This will only be possible however once the current bid for funding is successful.

10.2 Business Case development phase

10.2.1 This **HIA should form part of the Business Case for the funding** of the Green Line and other Streetcar projects in Stoke-on-Trent.

10.2.2 There should be **explicit in principle support and commitment within the Business Case to implement the measures and recommendations identified by the HIA** within cost constraints.

> Agencies that should be involved in the Business Case development phase:
>
> Streetcar Project Team
> North Staffordshire RENEW
> Stoke-on-Trent City Council Transport Planning Group
> Stoke-on-Trent City Council Streetscene Division
> Stoke-on-Trent City Council Environmental Health
> Stoke-on-Trent Primary Care Trust

10.3 Detailed design phase once funding in place

10.3.1 Streetcars that are **all electric or at least a hybrid vehicle with low emissions should be purchased**. They should be **accessible vehicles with ramps** with the ability to be lowered for easier access for those with disabilities, in a wheelchair or with pushchairs. There should be provision for one wheelchair or two pushchairs.

10.3.2 One set back with hybrid vehicles is that they are very silent especially at low speeds. This poses a problem particularly to the visually impaired and blind within the community but there is currently no high-tech solution. According to Charities Aid Foundation (CAF) article "Hybrid cars a danger to the blind", Royal National Institute of the Blind (RNIB) in UK and equivalent body in the US, National Federation of the Blind (NFB) are working together to come up with a solution for the problem. In the meantime drivers of hybrid vehicles should be provided with enhanced training in paying closer attention to pedestrians.

10.3.3 The **Real Time Display Systems** manufacturer should provide **guarantees on reliability, accuracy and robustness and the chosen system should be designed for easy readability for those with minor/moderate visual impairments**.

10.3.4 **Automated audio bus stop indicators** should be implemented on board the streetcars. This will discourage passengers from distracting bus drivers with questions relating to their stops and also provide passengers especially the visually impaired with a sense of their location throughout their journeys.

10.3.5 The **Greening Plan developed should be worked out in partnership with the Environment Department and the teams undertaking other local environmental improvement projects along the proposed route**. This will ensure there is a consistent and complementary approach to the landscaping and greenery that is put in place.

10.3.6 The **Greening Plan should also ensure that it consider the feasibility of improving the wider neighbourhood** to ensure that the wider neighbourhood is attractive and safe as this will increase walking to and from the bus stop as well as other walking, cycling and activities outdoors.

10.3.7 The **Street Furniture Plan should be developed in conjunction with the other street furniture replacement programmes and provide bicycle storage at interchanges as well as litter and recycling bins**.

10.3.8 Bus stop shelter design should also be taken into account during the design phase and involve Neighbourhood Managers. Partly enclosed shelters will provide a sense of safety and protection from harsh weather conditions particularly in the winter whilst waiting at the bus stop.

10.3.9 The Streetcar Project Team should engage with the main employers along the route to support them in the development of **Workplace Green Travel Plans**. This would include workplace exhibitions and 'look and sit' shows of the Streetcar buses.

10.3.10 The Streetcar Project Team should ensure that the Streetcar, Street Furniture and Real Time Passenger Information Displays and Greening Plans adhere to **Universal Design and Active Design Principles**.

Agencies that should be involved in the design phase:

Streetcar Project Team
North Staffordshire RENEW
Stoke-on-Trent City Council Transport Planning Group
Stoke-on-Trent City Council Streetscene Division
Stoke-on-Trent City Council Environmental Health
Stoke-on-Trent Primary Care Trust
Neighbourhood Managers & Neighbourhood/Area Management Committees
Environmental Improvement Scheme Leads

10.4 Implementation phase

10.4.1 The Streetcar Project Team should develop a **Construction/Road Works Residents Communication Plan**. This should be developed in consultation with key community representatives.

10.4.2 The tender process should include criteria that assess the **site safety and community complaints record of main and sub-contractors** and these criteria should have significant weighting.

10.4.3 The **Streetcar Project Team should develop a sites specific Code of Construction Practice in consultation with local residents**.

10.4.4 The Streetcar Project Team should ensure that any **recruitment for the road construction and other jobs is local through local job centres and newspapers** before being advertised more widely. They should also make links with colleges and other institutions that have courses and apprenticeship schemes around road construction and other related skills to ensure that there are local

people that can take up the potential jobs emerging from the project over the life of the project.

10.4.5 **Enhanced training of Streetcar drivers** in dealing with non driving issues such as assisting the vulnerable and people with disabilities will encourage and make people in these groups confident about using the public transportation networks.

Agencies that should be involved in the implementation phase:

Streetcar Project Team
North Staffordshire RENEW
Stoke-on-Trent City Council Transport Planning Group
Stoke-on-Trent City Council Streetscene Division
Stoke-on-Trent City Council Environmental Health
Stoke-on-Trent Primary Care Trust
Neighbourhood Managers & Neighbourhood/Area Management Committees
Environmental Improvement Scheme Leads

Streetcar Private Sector Operator

Job Centre Plus
Stoke on Trent College

10.5   Operation and Maintenance phase

10.5.1 A **Long Term Maintenance and Refurbishment Plan should be developed** by the Streetcar Project Team in partnership with the private sector bus operator running the Streetcar Scheme and should include sourcing and putting in place funds for doing this.

10.5.2 An **appropriate budget should be earmarked for maintenance and refurbishment** both of the Streetcars and the environmental improvements and new street furniture.

10.5.3 A **Streetcar Marketing Plan that is inclusive and reflect the diversity of potential users of the Streetcar** should be developed by the Streetcar Project Team.

10.5.4 The **Streetcar Project Team should work in partnership with Stoke PCT to ensure that there is a long term programme of joint marketing campaigns and initiatives linked to the Streetcar project**.

10.5.5 Another effective way of managing the operation phase is to set up a transport user group. This group will work to promote the public transport needs of the community and act as a channel between the local transport users, the council and other transport bodies. Through this group, day to day problems and other issues that might arise could be resolved.

10.5.6 **Part of the marketing budget should be spent on public health/ social marketing approaches to help changes behaviours and increase Streetcar use as well as other forms of Active Travel**.

10.5.7 Finally, there are **important synergies between the Floor Target Action Plan for Physical Activity and the Streetcar Project** and there are common themes that can be pursued jointly which can lead to more cost-effective campaigns and behavioural change.

10.5.8 Creation of a **Streetcar User Group** to help monitor the operation of the project.

10.5.9 Links should be made with work programmes to develop **Green Travel Plans** for local employers and for individual level **Personal Travel Plans**.

10.5.10 It is worth suggesting that before the implementation of each of the management plans (10.5.1 and 10.5.2), that workshops are held with key stakeholders in order to gain their views and comment on the plans.

10.5.11 All plans along with suggestion and comments can then be fed into the Regional Transport Plan.

10.5.12 There should also be regular annual or biannual user surveys to monitor the health impacts and the Streetcar implementation of the recommendations of the HIA.

Agencies that should be involved in the operation and maintenance phase:

Streetcar Project Team
North Staffordshire RENEW
Stoke-on-Trent City Council Transport Planning Group
Stoke-on-Trent City Council Streetscene Division

Stoke-on-Trent City Council Environmental Health
Stoke-on-Trent Primary Care Trust
Neighbourhood Managers & Neighbourhood/Area Management Committees
Environmental Improvement Scheme Leads

Streetcar Private Sector Operator

Stoke-on-Trent City Council Leisure Services

Local newspapers, radio and TV

11 Monitoring and Evaluation of the Potential Health Impacts

11.1 Introduction

11.1.1 This Chapter identifies some useful indicators that could be used to monitor and evaluate the health impacts of the Green Line Streetcar BRT Scheme.

11.1.2 In general, it is difficult to identify routine monitoring indicators that are: a) sensitive enough to detect the localised changes due to the implementation and operations phases of the development and b) easy to collect.

11.1.3 This report therefore identifies some possible indirect as well as direct health indicators though some may not be sensitive enough to detect changes while others will require financial, time and staff resources to collect.

11.2 Monitoring and evaluation

Indicator	Phase	Data collected	Recommended Lead Agencies
Residents complaints about nuisance/annoyance and perceived danger from construction/road works	Implementation	Number, frequency and geographical distribution of complaints across the estate Number of satisfactory resolutions of complaints	Main Contractor Stoke City Council (SCC)
Residents complaints about disruption to access to bus services.	Implementation	Number, frequency and geographical distribution of complaints across the estate Number of satisfactory resolutions of complaints	Bus Service Operators SCC
Employment	Implementation	Number of local contractors/residents doing the construction/road works	Main Contractor SCC
Employment	Operation	Survey of Streetcar users, their destinations and the value of the Streetcar for work	SCC
Crime and anti-social behaviour statistics	Implementation Operation	Number of crime/graffiti/vandalism/incivilities/anti-social behaviour incidents in and around the Green Line route (neighbourhood zones)	Police SCC
Air pollution	Operation	Air monitoring near/along the Green Line route	SCC
Greenery and litter	Operation	Level of cleanliness and maintenance of greenspace along route	SCC

Indicator	Phase	Data collected	Recommended Lead Agencies
Streetcar usage figures	Operation	Numbers and types of users and destinations Satisfaction with service	Bus Operator
Real Time Passenger Information	Operation	Accuracy and number of operational bus stops	Bus Operator
Physical activity	Operation	Trends in physical activity	SPCT SCC
Chronic disease levels	Operation	Trends in cardiovascular and respiratory diseases and related hospital admissions	SPCT
House prices	Operation	House prices near/along Green Line route	SCC Local estate agents
Modal shift	Operation	Travel to workplaces – hospital, university, etc by bus	
Access to services	Operation	Travel to hospital and other services and amenities e.g. leisure centres by bus	SCC
Economy	Operation	Small businesses along the route particularly near Streetcar bus stops	SCC

12 Conclusion

12.1.1 Overall, the Green Line Streetcar BRT scheme is likely to have moderate to major potential positive health and wellbeing impacts both at a local and global level and over the medium and long terms.

12.1.2 It has a few potential negative health impacts the majority of which are likely to be minor to moderate in nature and short term, temporary and localised.

12.1.3 There are more opportunities for enhancement and fewer opportunities for mitigation.

12.1.4 These are linked to the detailed design and maintenance of the Scheme in terms of types of buses, street furniture, construction/road works and the enhancement of the physical environment along the route.

12.1.5 One important enhancement is to enable the Streetcar to link into and to allow other programmes to link into the Streetcar Scheme particularly during the operation phase and to involve employers – large and small – along/near the route to develop workplace travel plans and make a commitment to encourage their employees to use the Streetcar.

Strategic Consulting Report: 644-00206d

Appendix A:

HIA Project Steering Group Members

Strategic Consulting Report: 644-00206d

Members of the HIA project Steering Group

Tamsin Hartley (Chair)   Head of Strategy & Policy, NSRP/North Staffordshire RENEW

Judy Kurth (Project Coordinator)   LSP Strategic Coordinator, WHO Healthy City Partnership

Dr Zafar Iqbal   Deputy Director of Public Health, Stoke NHS

Harmesh Jassal   Development Manager, NSRP/North Staffordshire RENEW

John Nichol   Group Transport Manager, NSRP/North Staffordshire RENEW

Brian Davies   Planning Policy Manager, NSRP/North Staffordshire RENEW

Sarah Humphreys   Leek Town Centre Coordinator, Staffordshire Moorland Dist Council

Jacqueline Small   Head of Health Promotion, North Staffordshire NHS

Jacqui Ginnane   Interim Manager, NSRP/North Staffordshire RENEW

Appendix B:

Search Strategy for the Literature Review

Aims of review

The review was conducted to identify the positive and negative health impacts of bus rapid transport schemes and bus public transport in general.

Background

We identified no literature on bus rapid transport schemes or bus public transport in particular.

The research focused on physical activity related to travel to work or other amenities such as shops with a very few articles discussing public transit and physical activity or obesity.

Review methods

Different levels of search methods used were:

1. Identification of existing literature reviews on the built environment and physical activity – Sustrans the evidence

    http://www.sustrans.org.uk/default.asp?sID=1091694766555

2. Systematic search of Pubmed.

Key search terms

The following terms were used in various combinations in Pubmed:

Health

Public transit

Public transport

Mass transit

Bus

Physical activity

Search Years

Literature since 1980.

Language

Only English language documents were considered.

Inclusion or exclusion criteria

Given the lack of literature in the area we did not apply inclusion or exclusion criteria but reviewed the abstracts to identify relevant literature.

Evaluation of quality

We did not conduct a quality review of the studies and articles identified as this was beyond the scope of this rapid HIA.

The majority of studies were cross-sectional with few long term studies.

Appendix C:

Detailed Health Impact Tables

Health impact tables for the implementation and operation phases of the Streetcar scheme compared to no development taking place

(there is also a short discussion on the maintenance/refurbishment and closure scenarios)

Definition of the levels of potential impact

Significance Level	Criteria
Major +++/--- (positive or negative)	Health effects are categorised as major if the effects may lead directly to mortality/death or acute or chronic disease/illness. The exposures tend to be of high intensity and/or long duration and/or over a wide geographical area and/or likely to affect a large number of people e.g. over 500 or so and/or sensitive groups e.g. children/older people. They can affect either or both physical and mental health and either directly or through the wider determinants of health and wellbeing. They can be temporary or permanent in nature. These effects can be important local, district, regional and national considerations. Mitigation measures and detailed design work can reduce the level of negative effect though residual effects are likely to remain.
Moderate ++/-- (positive or negative)	Health effects are categorised as moderate if the effects are long term nuisance impacts from odour and noise, etc or may lead to exacerbations of existing illness. The exposures tend to be of moderate intensity and/or over a relatively localised area and/or of intermittent duration and/or likely to affect a moderate-large number of people e.g. between 100-500 or so and/or sensitive groups. The negative impacts may be nuisance/quality of life impacts which may affect physical and mental health either directly or through the wider determinants of health. The cumulative effect of a set of moderate effects can lead to a major effect. These effects can be important local, district and regional considerations. Mitigation measures and detailed design work can reduce and in some cases remove the negative and enhance the positive effects though residual effects are likely to remain.
Minor/Mild +/- (positive or negative)	Health effects are categorised as minor/mild if they are generally nuisance level/quality of life impacts e.g. noise, odour, visual amenity, etc. The exposures tend to be of low intensity and/or short/intermittent duration and/or over a small area and/or affect a small number of people e.g. less than 100 or so. They can be permanent or temporary in nature. These effects can be important local considerations. Mitigation measures and detailed design work can reduce the negative and enhance the positive effects such that there are only some residual effects remaining.
Neutral/No Effect ~	No effect or effects within the bounds of normal/accepted variation.

Implementation Phase (0-2 years)

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Overall	▪ There are existing services along the green line route so residents and visitors will continue to have bus access along the Green Line Route. ▪ They are slow because of the number of bus stops they stop at and the congestion on some roads particularly at peak times e.g. morning and evenings going to and from work and school. ▪ Without any improvements to local public transport services and the increase in new housing developments there is likely to be continued and potentially an increase in the use of private cars. This is likely to make the existing roads more congested and to cause further disruption and reliability problems to existing bus services along the proposed Green Line BRT Streetcar route. ▪ The above is likely to make bus journeys more unreliable, longer and more uncomfortable as there are likely to be longer waits at bus stops and more overcrowding when buses arrive during peak hours and their a 'bunching' of buses (a number of buses on the same route arriving at the same time)	Overall -/-- Older people, women with children, those with physical disabilities and those without access to a car --	▪ The assumption is that work will be undertaken using a phased approach that moves from one end of the proposed Green Line Route to the other. ▪ There is likely to be some potential disruption along the route associated with the infrastructure improvements, prioritising of parts of the road network and the changes to junctions, intersections and pedestrian crossings. This is likely to include some temporary cordoning off of pavements and crossings as well as noise related to the siting of street furniture such as bus stops and additional traffic lights. ▪ Given the use of the existing road network and smart prioritisation along parts of the route as well changes at only some key junctions and intersections the potential disruption is likely to be of a limited nature for residents and current road users. ▪ There will also be work undertaken to green the route and provide flowers, shrubs and other flora to enhance the visual aesthetics along the proposed route. ▪ There is likely to be a need to create temporary bus stops while work is undertaken on building new bus shelters along the route.	Overall +/~/-/-- Bus users - Pedestrians - Residents living along the route -/-- People in motorised transport -/-- People employed on the construction/ road works +

IOM

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
	▪ There will not be any potential disruption along the route associated with the infrastructure improvements, prioritising of parts of the road network and the changes to junctions, intersections and pedestrian crossings for residents and existing road users. However this is likely to be a minor positive compared to the negative impacts of poorer bus services.			
Infectious diseases	▪ Levels of infectious disease are low and likely to remain so.	~	▪ There is unlikely to be any increase in infectious diseases due to the potential construction/road works involved in setting up the proposed Green Line route.	~
Non-infectious/chronic diseases (including pollution effects)	Stoke on Trent ▪ Levels of heart disease and early deaths from heart disease, stoke and cancer are high/very high. The trends are that the rates are declining in line with national trends but there is no narrowing of the gap between local rates and the England average. Newcastle under Lyme ▪ Levels are generally in line with or slightly worse than the England average with some narrowing of the gap.	~	▪ There is unlikely to be any change in chronic disease rates during the implementation phase given the relatively low level of construction/road works required which is generally distributed along the whole route except at where work will be undertaken at the major bus interchanges. ▪ However there is likely to be some level of noise and air pollution from the construction/road works and associated vehicles.	~ Residents living along/near the route -/--

IOM

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Physical injury (including poisoning)	▪ Levels of road traffic injuries/deaths are low. ▪ There is likely to be increased congestion on the roads and more cars but it is unclear whether this would lead to an increase in traffic injuries and/or deaths. ▪ This trend is likely to continue.	~	▪ Given the levels of construction/road works the likelihood of physical injury linked to these is very low. ▪ There may be some disruption to traffic flow linked to some of the construction/road works however this is unlikely to increase the risk of road traffic collisions or injuries.	~
Mental health and wellbeing	▪ Mental health and wellbeing is poor in both Stoke on Trent and Newcastle under Lyme. ▪ Over the long term given the wider regeneration in the area there is a strong potential for this to improve though it is likely to continue being worse than the England average.	~/+	▪ There will be some disruption caused along the route both to physical access for pedestrians on foot and particularly residents living along/ near the propose Green Line route as well as through increased noise.	~/- Residents living near construction/ road works, older people, those with children or with disabilities (physical, sensory or mental health) using parts of the Green Line route -/--

IOM

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Population demography	▪ Given the wider regeneration and the development of new homes in and around Stoke on Trent. There is likely to be a change in the profile of the population and potential for inward migration of working adults and reduced outward migration from existing young adults residents. This is likely to be a positive benefit to the area economically and socially.	+/++	▪ The implementation phase of the Green Line route is unlikely to have a positive or negative effect on the wider trends. ▪ It may though make some areas that are close to Green Line route bus stops more desirable places to live if new residents have workplaces based along/near the proposed Green Line route. ▪ Given the loss of population particularly of skilled and working age residents this is likely to be a positive for the area.	+
Employment & economy	▪ There is a considerable amount of economic regeneration occurring in North Staffordshire and in and around Stoke on Trent in particular. ▪ There is therefore likely to be more and better employment opportunities and a more diverse economy over the medium to long terms.	++/+++	▪ The implementation phase of the Green Line route is likely to provide some temporary local jobs in relation to the construction/road works. This is likely to be small in number but will complement the wider economic regeneration.	+/++
Housing and shelter	▪ There are many housing schemes currently being planned and developed. ▪ This is likely to improve the number, quality and range of houses and flats available to local people and new people moving into Stoke on Trent and the surrounding area. ▪ Affordable and family friendly housing is an important aspects of the overall housing agenda in North Staffordshire.	++/+++	▪ The implementation phase is unlikely to have a positive or negative effect on wider housing trends. ▪ There may be some increase in the desirability and hence demand for housing along/near the Green Line route. This may lead to an increase/maintenance of house prices in those areas. However it is likely that this will only emerge after the Green Line route becomes operational.	~

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Transport and connectivity	▪ There are existing bus services along the route though none currently go through the hospital. ▪ There is likely to be an increase in the local population through inward migration and a strong potential for an increase in private car usage which will lead to increased congestion on local roads and along the proposed Green Line route. ▪ The potential increase in cars is likely to further disrupt existing bus services.	-/--	▪ There may be some localised disruption and congestion due to construction/road works.	-/--
Education and learning	▪ GCSE achievement and wider educational achievement in Stoke on Trent and Newcastle under Lyme is poor. ▪ This trend is likely to continue in the medium term.	~/-	▪ If the construction/road works are undertaken by local people there is a potential for the maintenance and enhancement of local people's skills.	~/+
Crime and safety	▪ Rates of violent crime are significantly worse in both Stoke on Trent ad Newcastle under Lyme. ▪ This trend is likely to continue in the medium term.	~/-	▪ There is a potential for some vandalism and graffiti on new bus shelters and other street furniture that is being installed.	~/-
Health & social care services	▪ Currently limited bus access to the local hospital complex and a shortage of car parking spaces which need to be paid for by patients and visitors. ▪ Over the medium term things are likely to remain the same.	~/-	▪ The implementation phase may cause some disruption to local people's access to some health and social care services. However the bus route does not currently go through the hospital complex..	~/-

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Shops and other retail amenities	▪ There is considerable regeneration and the development of new supermarket and other retail amenities. ▪ These are likely to improve local people's access to a range and quality of food and other goods and services.	+/++	▪ The implementation phases unlikely to have a positive or negative effect on access to and the business of local shops and retail amenities.	~
Social capital and community cohesion	▪ This is difficult to predict. ▪ There is likely to be new people moving into Stoke due to the regeneration and new housing development. ▪ This may mean some loss of existing social capital and community cohesion both in relation to existing residents who have moved to other areas and the lack of social capital between new residents and between new and existing residents. ▪ Over time though this is likely to improve.	~/-/+	▪ The implementation phases unlikely to have a positive or negative effect on social capital and community cohesion.	~/-/+
Culture, faith and spirituality	▪ Stoke will continue to have a diverse community with many faiths and cultures.	~	▪ The implementation phases unlikely to have a positive or negative effect on culture, faith and spirituality.	~
Arts and leisure	▪ There are no plans to reduce arts and leisure services.	~	▪ The implementation phases unlikely to have a positive or negative effect on access to and the business of local arts and leisure facilities.	~

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Lifestyle and daily routines	▪ Given the wider regeneration there will be some disruption to lifestyles and daily routines however this is likely to be minor.	~/-	▪ There may be some disruption to the lifestyles and daily routines of some local residents living near the construction/road works along the Green Line route.	- Residents living near construction/road works, older people, those with children or with disabilities (physical, sensory or mental health) using parts of the Green Line route -/--
Energy and waste	▪ There are plans and policies in place to reduce waste and energy use and increase recycling and the use of renewable energy.	+/++	▪ The implementation phases unlikely to have a positive or negative effect on energy and waste issues.	~

Implementation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Land and spatial	▪ The existing street furniture and junctions/intersections would remain.	~	▪ There will be constructions works during the implementation phase on the following which will reduce the attractiveness of areas temporarily: ▪ There will be some modification of some junctions and intersections. ▪ There will be new pedestrian crossing and some cycle paths/lanes as well as bus priority lanes on parts of the proposed Green Line route. ▪ There will also be new street furniture e.g. bus shelters, bus stops, etc. ▪ There will also be some greening along the route. ▪ All the above should help to improve access to public transport and access and mobility by foot and cycle. The new street furniture and infrastructure should also make the areas more attractive and walkable.	- Residents living near the construction/ road works -/--

Operation Phase (0-15 years after the implementation phase)

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Overall	▪ There are existing services along the green line route so residents and visitors will continue to have bus access along the Green Line Route. ▪ They are slow because of the number of bus stops they stop at and the congestion on some roads particularly at peak times e.g. morning and evenings going to and from work and school. ▪ Without any improvements to local public transport services and the increase in new housing developments there is likely to be continued and potentially an increase in the use of private cars. This is likely to make the existing roads more congested and to cause further disruption and reliability problems to existing bus services along the proposed Green Line BRT Streetcar route. ▪ The above is likely to make bus journeys more unreliable, longer and more uncomfortable as there are likely to be longer waits at bus stops and more overcrowding when buses arrive during peak hours and their a 'bunching' of buses (a number of buses on the same route arriving at the same time)	Overall -/-- Older people, women with children, those with physical disabilities and those without access to a car --	▪ The scheme will serve existing (34,000) and new users (2,000). ▪ It will provide greater comfort. ▪ It is likely to reduce journey times. ▪ It will improve access to the University Hospital complex by stopping in the hospital site. ▪ The scheme will connect major amenities such as Hanley Town Centre, Keele University and Stoke Railway Station.	++/+++

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
	▪ There will not be any potential disruption along the route associated with the infrastructure improvements, prioritising of parts of the road network and the changes to junctions, intersections and pedestrian crossings for residents and existing road users. However this is likely to be a minor positive compared to the negative impacts of poorer bus services.			
Infectious diseases	▪ Levels of infectious disease are low and likely to remain so. ▪ Rates of TB are low.	~	▪ Increased bus use/patronage has the potential increase the spread of flu and other infectious diseases particularly among older people and children because of the close proximity of other passengers particularly at peak times. However the likelihood of significant transmission is low as other factors are also important e.g. current immune status, length of time on the bus, social etiquette/hygiene practices.	~/-

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Non-infectious/chronic diseases (including pollution effects)	Stoke on Trent ▪ Levels of heart disease and early deaths from heart disease, stoke and cancer are high/very high. The trends are that the rates are declining in line with national trends but there is no narrowing of the gap between local rates and the England average. Newcastle under Lyme ▪ Levels are generally in line with or slightly worse than the England average with some narrowing of the gap.	~	▪ Increased physical activity through walking to and from bus stops over the long term has important benefits on physical fitness, muscle tone, bone density, cardiovascular and respiratory health as well as levels of obesity. There is a strong potential for reducing levels of chronic disease in users of the Green Line Streetcar BRT. ▪ There is also a potential for a maintenance/decrease of air and noise pollution from private cars either because people continue using buses, new residents decide to use the Streetcar and some existing residents decide to try and use the new Streetcar. ▪ is the effects of physical activity are particularly important for children/young people and older people. ▪ There will be some new users who are attracted by the quality and reduced journey times of the Streetcar service however many are likely to be users of existing bus services along the proposed Green Line route who have switched services.	+/++ Children/young people and older people ++
Physical injury and poisoning	▪ Levels of road traffic injuries/deaths are low. ▪ There is likely to be increased congestion on the roads and more cars but it is unclear whether this would lead to an increase in traffic injuries and/or deaths. ▪ This trend is likely to continue.	~	▪ There is a strong potential for the Streetcar scheme to attract new bus users both from new residents moving into the area as well as existing residents. ▪ This is likely to maintain/reduce existing levels of congestion along the Green Line route. ▪ It is unlikely that the Streetcar scheme would increase the risk of traffic injuries/deaths. ▪ The Streetcar scheme, particularly the associated modification to junctions and improvement of pedestrian crossing and cycle lanes may reduce the rate of traffic injuries/deaths along the route. However, given the already low levels of road traffic injuries this would be difficult to detect.	~/+

IOM

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Mental health and wellbeing	▪ Mental health and wellbeing is poor in both Stoke on Trent and Newcastle under Lyme. ▪ Over the long term given the wider regeneration in the area there is a strong potential for this to improve though it is likely to continue being worse than the England average.	~/+	▪ The Streetcar scheme is likely to provide improve comfort, reduce journey times and provide real time information on bus arrivals. This is likely to improve the mental health and wellbeing of Streetcar bus users through better reliability, better knowledge of delays and higher quality service/infrastructure. ▪ Seeing the new buses and the new associated infrastructure could make walking and potentially cycling (if there is reduced congestion along some/all parts of the Green Line route) more attractive. ▪ The Streetcar may also improve the image of Stoke on Trent and hence increase local pride/self esteem i.e. that Stoke is looking towards the future and not its pottery and mining past.	+/++ Streetcar users ++/+++ Longstanding residents ++
Nutrition	▪ Access to a range of high quality and nutritious food is changing to some extent as new supermarkets are built in and around Stoke.	+/++	▪ The Streetcar scheme may allow better access to the main city centre and this may improve access to a wider range of food shops along the proposed Green Line route. ▪ However, surveys suggest that carrying shopping on and off buses is seen as a major barrier to the use of buses.	~/+/++
Population demography	▪ Given the wider regeneration and the development of new homes in and around Stoke on Trent. There is likely to be a change in the profile of the population and potential for inward migration of working adults and reduced outward migration from existing young adults residents. This is likely to be a positive benefit to the area economically and socially.	+/++	▪ The operation phase of the Green Line route is likely to complement the trends that are likely to develop due to the wider regeneration taking place by making it key parts of Stoke on Trent more accessible and more attractive places to live. ▪ More people may wish to live in or around the proposed Green Line route.	+/++

Operation Phase	No development	Impact	**Green Line Streetcar BRT Scheme** (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Employment & economy	▪ There is a considerable amount of economic regeneration occurring in North Staffordshire and in and around Stoke on Trent in particular. ▪ There is therefore likely to be more and better employment opportunities and a more diverse economy over the medium to long terms.	++/+++	▪ The Streetcar is likely to reduce journey times by 50% (from 90 min to 45 min). This is likely to improve the distance that people with no access to a car particularly those residents who are unemployed or on low incomes to travel further and increase the job opportunities that they can take up. ▪ Residents working along/near the proposed Green Line route will have a reliable and fast form of public transport to use instead of going by private car. ▪ It is also likely to make some shopping and leisure trips that were perceived as too far away more practice and achievable for some residents. ▪ The Streetcar may also attract new business to move to areas close to the proposed Green Line route.	++ (this is in addition to the positive impact of the wider regeneration)
Housing and accommodation	▪ There are many housing schemes currently being planned and developed. ▪ This is likely to improve the number, quality and range of houses and flats available to local people and new people moving into Stoke on Trent and the surrounding area. ▪ Affordable and family friendly housing is an important aspects of the overall housing agenda in North Staffordshire.	++/+++	▪ There is likely to be some increase in the desirability, and hence demand, for housing along/near the Green Line route. This may lead to an increase/maintenance of house and flat prices and rent levels in those areas. ▪ The proposed Green Line route is linking into other regeneration projects including new housing developments. This is likely to make these developments more viable for those with no access to a car. ▪ There may be pressure on existing older housing stock along the route which may make it difficult for existing young people who want to stay in area afford a property. ▪ More private sector housing developments may take place along the route.	++/+/-/-- For existing homeowners in along/near the Green Line route ++ For young people wishing to stay in the area along/near the Green Line route -/--

IOM

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Transport and connectivity	▪ There are existing bus services along the route though none currently go through the hospital. ▪ There is likely to be an increase in the local population through inward migration and a strong potential for an increase in private car usage which will lead to increased congestion on local roads and along the proposed Green Line route. ▪ The potential increase in cars is likely to further disrupt existing bus services.	-/--	▪ The Streetcar will replace some existing services but improve access to some facilities e.g. hospital which are not currently directly served by local buses. ▪ Overall it will improve connectivity along the route by reducing journey times, providing real time passenger information, providing a higher comfort levels and improving reliability. ▪ Some parts of the route will have bus priority lanes which will improve Streetcar journey speeds but is likely to cause some disruption and potential resentment in existing private car/van/lorry drivers. ▪ Depending on how information about the service e.g. cost, route, etc. is conveyed some people from poorer backgrounds, ethnic minorities and older people may not use the service at least initially preferring to use existing services that they are familiar with.	++
Education and learning	▪ GCSE achievement and wider educational achievement in Stoke on Trent and Newcastle under Lyme is poor. ▪ This trend is likely to continue in the medium term. ▪ There is the possibility of increased congestion along the route due to congestion generated by the wider regeneration activities and inward migration of new residents.	~/-	▪ There will be faster and more reliable service to Keele University, Staffordshire University and Stoke-on-Trent College as well as other schools/educational establishments along/near the route. ▪ It will open up more educational and learning opportunities within the same commuting time. ▪ Students (including some school children) may benefit by reducing the risk of being late and getting to classes earlier and having time to meet up with friends before and after class. It will expand the area where they can live and still be able to get to class. This may reduce their rental costs.	+/++ Students +/++

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Crime and safety	▪ Rates of violent crime are significantly worse in both Stoke on Trent ad Newcastle under Lyme. ▪ This trend is likely to continue in the medium term.	~/-	▪ It is unlikely that the Streetcar scheme would increase the possibility of crime and anti-social behaviour however: ▪ the new street furniture may become a target for vandalism and graffiti. ▪ The increased number of people walking to and from bus stops may increase the pool of potential victims. ▪ The greater number of users may enhance the sense of safety near and along the Green Line Streetcar BRT route and on the Streetcars themselves.	+/~/-
Health & social care services	▪ Currently limited bus access to the local hospital complex and a shortage of car parking spaces which need to be paid for by patients and visitors. ▪ Over the medium term things are likely to remain the same.	~/-	▪ The proposed Green Line route will pass directly through the local hospital complex. This is likely to improve hospital access particularly for those without access to a car e.g. older people, those with disabilities and those on low incomes/unemployed. ▪ The Streetcar will also provide real time information on how long people will need to wait as well as reduce the journey time to the hospital. ▪ The Streetcar may also reduce the need for additional car parking space at the hospital. ▪ It may also enable more hospital staff to come to work by bus.	++ Older people, those with disabilities and those on low incomes/ unemployed ++/+++
Shops and other retail amenities	▪ There is considerable regeneration and the development of new supermarket and other retail amenities. ▪ These are likely to improve local people's access to a range and quality of food and other goods and services.	+/++	▪ The proposed Green Line route at some points may attract and improve the availability of local shops and retail amenities. ▪ It may also improve footfall at shops located near Streetcar bus stops. ▪ Shops that were seen to be too far to travel to on the bus are likely to become easier to reach and may see an increase in shoppers/business.	~/+

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Social capital and community cohesion	• This is difficult to predict. • There is likely to be new people moving into Stoke due to the regeneration and new housing development. • This may mean some loss of existing social capital and community cohesion both in relation to existing residents who have moved to other areas and the lack of social capital between new residents and between new and existing residents. • Over time though this is likely to improve.	~/-/+	• There is a strong potential for the Streetcar to connect people living along/near the route with family and friends living along/near the route. • Also being in a bus is more social and involves more interaction than does going by private car. • The increased number of people walking to and from bus stops will also improve the perceived sociability and safety on local streets.	+/++
Culture, faith and spirituality	• Stoke will continue to have a diverse community with many faiths and cultures.	~	• There is unlikely to be any positive or negative impact on culture, faith and spirituality. • The Streetcar may make it quicker to reach some places of worship than existing bus services.	~/+
Arts and leisure	• There are no plans to reduce arts and leisure services.	~	• There are a number of arts and leisure facilities along the route and a faster and more reliable service may increase the use of these facilities by residents living on or near the proposed Green Line route particularly among those who found it too far away/ too long a bus journey e.g. older people, young people and those with children.	+ Older people, young people and those with children +/++
Lifestyle and daily routines	• Given the wider regeneration there will be some disruption to lifestyles and daily routines however this is likely to be minor.	~/-	• The Streetcar for those using the service e.g. living near/along it as well as potentially those living further away is likely to make shopping and other daily activities easier and quicker.	+ Streetcar users ++/+++

Operation Phase	No development	Impact	Green Line Streetcar BRT Scheme (Positives and negative impacts are for the scheme only and exclude impacts of the wider regeneration which may be greater)	Direction, Magnitude and Likelihood of Impact without mitigation
Energy and waste	▪ There are plans and policies in place to reduce waste and energy use and increase recycling and the use of renewable energy.	+/++	▪ The Streetcar buses are likely to displace at some private car use and is also likely to have a hybrid fuel efficient engine which should overall reduce carbon emissions and the use of fossil fuels. The Streetcar is unlikely to generate a lot of waste through its operation e.g. waste oils, defective parts, etc.). ▪ The Streetcar will replace some of the existing Bus services along the proposed Green Line route. ▪ The bus interchange and improved bus shelters can also serve as points for waste bins and potentially recycle bins.	+
Land and spatial	▪ The existing street furniture and junctions/intersections would remain.	~	▪ The Streetcar has the potential to replace some use of the private car and reduce the need for some existing and new bus users to invest in a new or existing car. ▪ It could also reduce the need for car parking spaces along the proposed Green Line route. ▪ There will be improved bus shelters as well as junction, intersections, cycle paths and pedestrian crossings. The new street furniture and infrastructure should also make the areas more attractive and walkable. ▪ There will also be some greening of the proposed route. ▪ Overall there is likely to be an improvement in the design and aesthetics of the built environment along the route.	+/++

Maintenance/Refurbishment Phase (10-15 years after the implementation phase)

Refurbishment/Re Phase	No development	Impact	Green Line Streetcar BRT Scheme	Direction, Magnitude and Likelihood of Impact without mitigation
Overall	▪ NA.		▪ It is likely that over time buses will be replaced and better more fuel efficient and renewable energy using buses will be used. ▪ It is also likely that issues relating to the real time passenger information system, the bus shelters/interchange and modifications to junctions will need to be evaluated in the light of what has been found during the operation phase. ▪ The scheme will also need to be properly maintained if it is to have the best possible positive health and wellbeing impacts. ▪ Capital funding may be needed to replace buses and bus shelters.	--/-/+/++

Closure Phase (not envisaged)

Closure Phase	No development	Impact	Green Line Streetcar BRT Scheme	Direction, Magnitude and Likelihood of Impact without mitigation
Overall	▪ NA.		▪ There are important benefits arising from the introduction of the scheme and all of these would be lost if the scheme is closed.	-/--
			▪ It is likely that Streetcar users are likely to become more dependent and used the Streetcar service than users of other bus routes. Given the difference in speed it may also have implications for people in work and those travelling for education as well as in relation to domestic routines, e.g. shopping, and access to leisure and recreation amenities.	Streetcar users --/---
			▪ The failure of such a flagship project would also have negative impacts on people's image of Stoke and their sense of civic/local pride.	

**EDINBURGH
HEAD OFFICE**

Research Avenue North
Riccarton
Edinburgh, EH14 4AP
United Kingdom
Telephone: +44 (0)131 449 8000
Facsimile: +44 (0)131 449 8084

Email: iom@iom-world.org

**LONDON
CENTRE FOR HIA**

Research House Business Centre
Fraser Road
Perivale, Middlesex, UB6 7AQ
United Kingdom
Telephone: +44 (0)208 57 3494
Facsimile: +44 (0)208 537 3493

CHESTERFIELD

Taptom Park Innovation Centre
Brimington Road, Tapton
Chesterfield, Derbyshire, S41 0TZ
United Kingdom
Telephone: +44 (0)1246 557866
Facsimile: +44 (0)1246 551212

STAFFORD

Brookside Business Park
Cold Meece
Stone, Staffs, ST15 0RZ
United Kingdom
Telephone: +44 (0)1785 764810
Facsimile: +44 (0)1785 764811