This document supports the development of the Auckland Regional Land Transport Strategy 2010.

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## Contents

1. Purpose 1
   2. Introduction 2
      2.1 The process 2
      2.2 Accepting draft report for finalisation 3
      2.3 Funding of reports 3
      2.4 Acknowledgements 3

3. Attachment 1: Health Impact Assessment Appraisal report 4 - 94
5. Attachment 3: Health Impact Assessment Literature review 109 - 126
6. Attachment 4: Health Impact Assessment Profile report 127 - 155
1 Purpose

The following four reports have been prepared to assist the Auckland Regional Transport Committee with preparation of the Auckland Regional Land Transport Strategy 2010 the reports include:

- Auckland Regional Land Transport Strategy Health and Wellbeing Impact Assessment – Appraisal Report
- Auckland Regional Land Transport Strategy Health Impact Assessment – Scoping Workshop Report
- Auckland Regional Land Transport Strategy Health Impact Assessment – Literature Review
- Auckland Regional Land Transport Strategy Health Impact Assessment – Area Profile Report
2 Introduction

At the Regional Transport Committee (RTC) meeting on 17 September 2008 the committee expressed an interest in addressing transport equity issues, and mention was made of a health impact assessment (HIA).

The Regional Transport Committee at its meeting in October 2008 received an information item (Item C.3) on Health Impact Assessments and a presentation was provided by Jennifer Lamb from the Auckland Regional Public Health Service (ARPHS). The Auckland Regional Health Service provided copies to the committee of the document ‘An idea whose time has come – new opportunities for Health Impact Assessment in New Zealand public policy’. The presentation highlighted that public health is not just about the absence of physical injury or disease. The “Whare Tapa Wha” model was also presented to highlighted how scope of public health as takes a broad view of health to include physical, mental, emotional, social and spiritual well being and it is consistent with international definitions of public health.

It was explained that a Health Impact Assessment identifies the potential impacts and distribution of those impacts on the health of the population of proposed policy, strategy, plan or project. A variety of participants are involved in the process from a range of organisations and groups, including health, social services, education, iwi, police and local and regional government.

The October 2008 discussion highlighted that development of the next RLTS could be supported by an HIA as it would provide an understanding of how health inequalities can be addressed, or made worse as a result of policy decisions. This would ensure that development of the region’s future transport system takes into account the needs of, and impact on all users, including those in deprived neighbourhoods, vulnerable population groups (such as children and the elderly), the transport disadvantaged and those with disabilities or without access to private vehicles.

2.1 The process

The HIA process is documented in the attached four reports:

- Appendix 1 – Appraisal report
  
  This report explores the issues raised through the course of the HIA, involving stakeholder consultation, literature analysis and impact modelling, and provides recommendations for the development and implementation of the ARLTS from a perspective of health and well-being.

- Appendix 2 - Scoping report
This document reports on the scoping phase of the HIA process, to identify the parameters of the HIA. This report informed the appraisal phases of the HIA beginning in January 2009.

- Appendix 3 – Literature review

The literature review examines the effects of transport on health to support a health impact assessment of the ARTLS. This review focuses on the effects of transport on the following four areas: safety, emissions, access/mobility and active transport, and the support that policies and planning provide in reducing the harmful impacts of transport on health and maximising the beneficial impacts.

- Appendix 4 – Profile report

This report profiles aspects of the health of the people of the Auckland region. Its purpose is to inform a HIA process focusing on the ARLTS.

2.2 Accepting draft report for finalisation

The Committee agreed to support undertaking the HIA and the various reports were received by the Committee throughout the first half of 2009.

The draft appraisal report was presented to the Committee in May 2009 for feedback and input. The Committee at this meeting approved the finalisation of the report incorporating their feedback.

2.3 Funding of reports

The development and preparation of the HIA for the draft RLTS 2009 was jointly funded by the Auckland Public Health Service and the Auckland Regional Council.

2.4 Acknowledgements

- Health Impact Assessment Appraisal Report by Adrian Field, Kim Arcus and Nishadie Jayasekera, Synergia Ltd, Megan Tunks, Hapai te Hauora Tapui Ltd and Alexandra Macmillan, Graeme Lindsay, University of Auckland.

- Health Impact Assessment Scoping Report by Adrian Field and Nishadie Jayasekera, Synergia Ltd.

- Health Impact Assessment Literature Review by Adrian Field and Nishadie Jayasekera, Synergia Ltd.

- Health Impact Assessment Profile Report by Adrian Field and Nishadie Jayasekera, Synergia Ltd.
Attachment 1: Health Impact Assessment Appraisal report

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AUCKLAND REGIONAL LAND TRANSPORT STRATEGY
HEALTH AND WELL-BEING
IMPACT ASSESSMENT

APPRAISAL REPORT

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31 October 2009

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# CONTENTS

**ACKNOWLEDGEMENTS** ........................................................................................................... 5  
**EXECUTIVE SUMMARY** ........................................................................................................... 6  

1. **INTRODUCTION** .................................................................................................................. 13  
   1.1 Focus of the Health and well-being Impact Assessment ..................................................... 13  
   1.2 Health and Well-being Impact Assessment: Background and Purpose .............................. 14  

2. **STRATEGIC CONTEXT** ......................................................................................................... 15  
   2.1 Background to ARLTs ........................................................................................................ 15  
   2.2 Implications of Changes in Auckland Governance ............................................................. 15  
   2.3 NZ Transport Strategy Targets .......................................................................................... 16  
   2.4 Strategic Options ................................................................................................................ 16  

3. **DEVELOPMENT OF THIS HEALTH AND WELL-BEING IMPACT ASSESSMENT** ............. 18  
   3.1 Scoping ................................................................................................................................ 18  
   3.2 Appraisal .............................................................................................................................. 19  
   3.3 Application of systems thinking approaches ....................................................................... 20  

4. **TRANSPORT, HEALTH AND WELL-BEING** ..................................................................... 22  
   4.1 Framing considerations for transport and health ................................................................. 22  
   4.2 Physical, Mental and Spiritual Health: Te Taha Tinana, Te Taha Wairua and Te Taha Hinengaro .................................................................................................................................................... 23  
   4.3 Whānau, families, and their psycho-socio-economic context ............................................. 24  
   4.4 Local physical environment and nature: Waiora .................................................................. 25  
   4.5 Community .......................................................................................................................... 26  
   4.6 Work .................................................................................................................................... 26  
   4.7 Human Biology ..................................................................................................................... 26  
   4.8 Human-made environment ................................................................................................. 26  
   4.9 Culture .................................................................................................................................. 26  
   4.10 Biosphere ............................................................................................................................ 27  

5. **POTENTIAL IMPACTS AND ENABLERS FOR KEY FOCUS AREAS** ............................. 28  
   5.1 Active Transport .................................................................................................................. 29  
   5.2 Access and Mobility ............................................................................................................. 32  
   5.3 Emissions ............................................................................................................................. 35  
   5.4 Safety .................................................................................................................................... 39
6. WHĀNAU ORA CONSULTATION: KEY THEMES FOR CONSIDERATION .......... 42
   6.1 Māori concepts of health and well-being ........................................ 42
   6.2 Concerns raised by Māori stakeholders ........................................... 42
   6.3 Potentially positive strategic directions or actions for Māori .......... 44
7. STAKEHOLDER FEEDBACK ON STRATEGIC DIRECTIONS ................. 47
8. HEALTH IMPACT MODELLING FINDINGS ........................................... 49
   8.1 General comments ........................................................................... 49
   8.2 Active transport impacts ................................................................. 50
   8.3 Access and mobility impacts ............................................................ 50
   8.4 Emissions impacts .......................................................................... 53
   8.5 Safety impacts ................................................................................ 60
   8.6 Technical recommendations for future ARLTS transport modelling .. 62
9. KEY RECOMMENDATIONS FOR ARLTS ........................................... 65
   9.1 Strategic foundations for ARLTS to promote health and well-being .... 65
   9.2 Strategy-led actions to take strategy forward .................................... 67
10. REFLECTIONS ON THE HIA PROCESS ............................................ 72
    10.1 Benefits and successes of the HIA .................................................. 72
    10.2 Challenges and weaknesses of the HIA ........................................... 72
    10.3 Key learnings ................................................................................ 73
    10.4 Future opportunities and challenges presented by the HIA .......... 74
APPENDIX 1: HIA PARTICIPANTS .......................................................... 75
APPENDIX 2: APPRAISAL WORKSHOP SESSIONS ............................... 77
APPENDIX 3: HIA BACKGROUND .......................................................... 82
APPENDIX 4: AUCKLAND REGION PROFILE ........................................ 84
    Population and area features ............................................................... 84
    Transport in the Auckland region ....................................................... 84
    Health status of Aucklanders ............................................................. 85
REFERENCES ......................................................................................... 88
ACKNOWLEDGEMENTS

Synergia and its research partners wish to thank the Auckland Regional Council and the Auckland Regional Public Health Service, which commissioned and project managed this Health and well-being Impact Assessment.

We are grateful to the support provided by Auckland Regional Public Health Service and Auckland Regional Council for providing area, health and demographic information to inform the wide-ranging discussions and analysis that took place.

Finally, our sincere thanks to the significant number of stakeholders that actively participated in the workshops and interviews and provided information, advice and feedback throughout the process.
EXECUTIVE SUMMARY

INTRODUCTION

In late 2008, the Auckland Regional Council and the Auckland Regional Public Health Service jointly commissioned a Health Impact Assessment (HIA) of the 2009 Auckland Regional Land Transport Strategy (ARLTS), and the potential directions that could create a transport system that better protects and promotes the health of Aucklanders.

This report explores the issues raised through the course of the HIA, involving stakeholder consultation, literature analysis and impact modelling, and provides recommendations for the development and implementation of the ARLTS from a perspective of health and well-being.

Health Impact Assessment (HIA) is a formal process through which policy and planning are able to maximise their beneficial effects on health and well-being, and minimise or eliminate their potential harms through innovative solutions.

Synergia Ltd was contracted to lead the HIA. Dr Adrian Field and Kim Arcus led the process from Synergia, partnering with Dr Alexandra Macmillan and Dr Graeme Lindsay of the School of Population Health, University of Auckland, and Megan Tunks of Hapai te Hauora Tapui Ltd, a Māori public health provider. The HIA was conducted from November 2008 to June 2009.

There are five elements to this project:

- A profile of the people of Auckland, the transport dynamics and the health status of Aucklanders
- A literature review on the links between transport and health and well-being
- Two scoping workshops with stakeholders to explore the potential scope of the HIA
- Two consultative workshops on directions for the ARLTS; one with a ‘mainstream’ audience, and the other with Māori stakeholders to explore Māori health perspectives in transport
- High-level health impact modelling of potential health impacts of the different scenarios being tested for the ARLTS.

SCOPE OF THIS HIA

In the scoping phase of this HIA, four overarching themes were identified. These were:

- **Safety**: Opportunities to ensure optimal safety for all users of the different modes of transport.
- **Access and Mobility**: Opportunities to increase access and mobility, particularly for disadvantaged groups, to be able to reach services, amenities and facilities that support healthy living.
- **Increasing active modes of transport**: Opportunities for embedding active modes of transport across the region.
- **Emissions and noise**: Opportunities to reduce air and noise pollution and to enhance the positive health impacts of improving environmental sustainability in this area.
In addition, consultation with Māori stakeholders raised issues of kaitiakitanga (guardianship). This included such issues as run-off from road development, pollution into the sea affecting the supply of kaimoana (traditional sea food beds), old urupa (or burial sites) and other forms of wahi tapu that are relocated due to roading projects (such as airport roading developments); all of which were seen as elements which impact on kaitiakitanga and consequently the well-being of whānau and hapū of the region.

**TRANSPORT, HEALTH AND WELL-BEING**

Transport is a key public policy and planning issue that affects the shape of the urban environment of Aucklanders and their health and well-being.

Links between transport and health and well-being include exposure to emissions; the extent to which it encourages or discourages active transport modes; the mental health of individuals (such as the stress encountered in using the system or as a result of noise); the safety of the transport network; and the ability of the transport network to support access to the services, amenities and facilities that support daily life.

Equity in well-being outcomes is also of importance to transport planning. Issues that require consideration include unequal exposure to emissions, unequal provision of public transport, uneven distribution of walking and cycling infrastructure, inequalities in access to appropriate goods and services, and inequalities in exposure to stress and time pressures. These inequalities lead to inequitable outcomes by socioeconomic status, ethnicity and gender.

Transport is also a significant contributor to New Zealand’s carbon emissions; and curbing the environmental impact of transport will play an important role of the health and well-being of future generations.

Because this HIA was initiated at a very early stage in the development of the ARLTS, it afforded an opportunity to engage with stakeholders on the directions of the strategy and the key elements that were needed in the strategy to support health and well-being.

Stakeholder feedback on potential health impacts is detailed in section 5 (page 28).

**TRANSPORT AND MĀORI WELL-BEING**

From a Māori perspective, hauora or health, is an all embracing concept which embodies the importance of wairua (spiritual), whānau (family), hinengaro (mental) and tinana (physical aspects). This HIA process drew on elements of whānau ora health impact assessment (WOHIA) processes to explore how the transport strategy can improve Māori health and well-being and reduce health inequities between Māori and non-Māori.

Suggestions put forward by Māori participants included:

- Making public transport affordable to whānau, and providing safe, clean, weather proof and accessible public transport shelters/sites with regular services on routes which whānau access; and supporting caregivers of children by allowing for push chairs to be carried on the front of buses, and for buses that ‘kneel’ to allow those with a disability to use.

- Working with the organisers of large Māori hui to provide public transport options, for example the ASB festival.
• Providing public transport to areas where whānau have chosen to live close to papakainga housing (housing on iwi land), and which are currently not serviced by public transport.

The impact of road pricing on people with low income and large family sizes (of which Māori are strongly represented) was a significant concern. These groups are often required to travel extensively on a daily basis to work, school, whānau and other settings, and road pricing regimes may hit these groups hardest. If road pricing is introduced, it is recommended that steps are taken to ensure low-income families with many family members (common among Māori and Pacific families) do not bear an inequitable burden of the costs, and that innovative means of ensuring this are developed.

Māori participants in the consultation were concerned that the regional transport committee has minimal Māori representation, with no participation from mana whenua (iwi from the Auckland region, such as Tainui or Ngati Whatua). Transport was seen by Māori as an important determinant of well-being, and the relative lack of representation carries the potential to ignore or overlook issues of Māori and mana whenua well-being.

**STAKEHOLDER FEEDBACK ON PROPOSED STRATEGIC DIRECTIONS OF ARLTS**

There was a general view among stakeholders that a significant change in transport strategy was needed above and beyond that which had gone before, if the strategy is to make a meaningful contribution towards national policy targets, significantly increase active transport and achieve improved health and well-being outcomes.

Some participants suggested this was potentially best captured by the ‘quantum shift’ scenario, although the label appeared to communicate a level of change that many interpreted as unrealistic. There was a general agreement that the quantum shift scenario should be re-named to communicate a scale of development well above current aspirations, but which would only be achievable with extensive policy interventions.

There was also a general sense that this significantly increased scale of change needed to have, at its heart, a focus on demand management and public transport investment.

**IMPLICATIONS OF HEALTH-RELATED IMPACT MODELLING**

A further strand in this HIA was the use of modelling to explore potential health impacts, drawing from and adding to the modelling undertaken by the ARC to support development of the ARLTS.

All ARLTS 2041 scenarios developed by the ARC, and developed further for this HIA, fall short of meeting the objectives of the New Zealand Transport Strategy regarding environmental sustainability and protecting and promoting public health.

In general, there is relatively little difference between the different ARLTS scenarios, in terms of their projected 2041 impacts. The fourth or “quantum” shift strategic option, although more
aggressive than the other strategic options, is unambitious when compared to what has been achieved elsewhere in the world and does not meet most targets.

Under all scenarios, road vehicle use is projected to remain very high (73 percent to 78 percent of 2041 trip mode share, compared to 87 percent in 2006). Active transport mode share is not as high as what it could be based on cities elsewhere in the world. The modelling indicates that public transport will achieve a low seven percent to nine percent of mode share in 2041 compared to three percent in 2006.

The modelling indicates that the ARLTS does not currently meet the goals of improving public health – public health actually worsens under each of the scenarios. Approximately 240-270 adult deaths are projected to occur in 2041 due to vehicle air pollution compared to 236 in 2006. In addition, under all ARLTS scenarios – bronchitis and related illness, hospital admissions, and restricted-activity days in adults – increase compared to 2006.

The annual costs to the health sector and the economy from vehicle air pollution are estimated at approximately $254-302m in 2041.

The health events and costs are estimates only, but they are likely to be conservative estimates. In particular, health events in children and people aged under 30 years are not covered.

Road safety is a positive area in the ARLTS modelling with crashes, injuries and death projected to greatly decrease by 2041.

The modelling could be improved by taking a "backcasting approach", whereby relevant targets are used as the starting point, and modelling is undertaken to identify what is needed to achieve these targets and where the key leverage points are.

Modelling could draw on many success stories elsewhere in the world to demonstrate what could be potentially achievable for Auckland. For example, Curitiba, a large city in Brazil, is widely considered one of the best examples of urban planning worldwide. It was once a car dominated city like Auckland but now approximately 60 percent of trips to work are by an extensive bus rapid transit system. Another example is the Netherlands, which reversed their marked decline in cycling.

**KEY RECOMMENDATIONS FOR ARLTS**

The recommendations reported here focus on the key directions highlighted by stakeholders for the transport strategy, and are given further impetus by the implications of the modelling; attention is also given to actions to implement the strategy. Detailed recommendations are discussed in section 8 (page 49).

An important issue to note is that, for the most part, the solutions proposed already exist in the Auckland region; the issue is how these solutions can be implemented at a scale and level of distribution that is well beyond that which is currently provided.

**Integrated Planning:** There was a strong signal from the consultation that transport is not a discrete element of policy and/or strategy, but is intimately linked with land use strategies, together with strategies for regional economic development and social and health services. Stakeholders expressed the view that the strategy actively questions the assumptions of land
use development and charts a joint path forward for the development of the region to ensure the strongest possible health and well-being outcomes. Furthermore, the strategy should actively link with regional economic strategies, and with plans for social and health services in the region, to ensure alignment of long-term planning.

**Identifying leverage points for change:** For future policy and strategic development, modelling scenarios should be developed that focus on achieving overarching strategic goals or targets, and the key leverage points for change that are required. This will enable greater confidence in the ability of strategies to protect and promote public health and well-being. This is consistent with the general direction of feedback and recommendations from the HIA that a scale of change is needed that is greater than what has gone before.

**Investment path for active and public transport:** If the long-term goals of the strategy are to be achieved, there needs to be a path for investment in active and public transport.

Examples of an active transport infrastructure include:

- racks on buses (as are now used in Los Angeles and Canberra) and storage on trains;
- cycle lanes;
- walking links to PT routes, with resting places along pedestrian routes and effective transport shelters;
- adaptable spaces on buses and trains for wheelchairs, prams and children.

Key issues for public transport included:

- improving the spread and distribution across the region, including building linkages within and between Auckland sub-centres, in addition to the flows through the Auckland CBD;
- ensuring that public transport is equitably distributed by socioeconomic status throughout the region;
- ensuring the public transport is attractive in both its cleanliness and styling, and in terms of its perceived safety for users and drivers;
- affordability for all Aucklanders, with consideration of how low-income people can access cheaper fares (in the same way that students currently do so).

**Access for vulnerable population groups:** Stakeholders proposed that if the transport system in Auckland works effectively for the most vulnerable populations, particularly families, older people, children, people on low incomes and people with disabilities, then the system will work for all Aucklanders. It is recommended that the strategy prioritises interventions for these population groups.
**Demand management:** This as seen to be a key strategic lever for the ARLTS. Proposed demand management approaches included:

- integrated and affordable ticketing;
- family public transport passes;
- reducing parking;
- incentives to active transport and public transport modes;
- expansion of school and workplace travel planning programmes;
- well-connected, attractive and comprehensive active transport infrastructure.

**Advocacy for national regulatory change:** There are many issues that are subject to national policy guidance, and the RTC/ARC has an important advocacy role to central government, such as on the following issues:

- fringe benefit tax incentives for private transport that currently favour car use over active or public transport;
- rigorous emissions policies that will reduce the impact of motorised transport on air and noise pollution, and greenhouse gas emissions;
- ensuring that national transport policy continues to maintain its core objective to protect and promote the public health, and that these are not undermined by contradictory policy signals.

**Information and communications:** There are many ways in which information and communications could be used to support improved health and well-being outcomes through implementing the transport strategy. These included:

- promoting workplace travel plans (including active transport and car pooling);
- promoting driver/motor cyclist safety and education, as well as pedestrians and cyclists;
- marketing to improve perceptions of public transport;
- financial costs of different trip choices as part of web-based information about transport choices;
- awareness of options for people with disabilities and temporary disabilities;
- integrated information services that provide not just transport information and comparisons of distance and time by different modes, but also contributions to emissions, physical activity and financial costs for a particular journey by available mode choices, including walking options.
LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ACC</td>
<td>Accident Compensation Corporation</td>
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<td>ARC</td>
<td>Auckland Regional Council</td>
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<td>ARLTS</td>
<td>Auckland Regional Land Transport Strategy</td>
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<td>ARPHS</td>
<td>Auckland Regional Public Health Service</td>
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<td>ARTA</td>
<td>Auckland Regional Transport Authority</td>
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<tr>
<td>ART3</td>
<td>Auckland Regional Transport Model Version 3</td>
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<tr>
<td>AT</td>
<td>Active Transport</td>
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<tr>
<td>CMDHB</td>
<td>Counties Manukau District Health Board</td>
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<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
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<tr>
<td>CO</td>
<td>Carbon monoxide</td>
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<tr>
<td>CPTED</td>
<td>Crime Prevention Through Environmental Design</td>
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<tr>
<td>DHB</td>
<td>District Health Board</td>
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<tr>
<td>HAPiNZ</td>
<td>Health and Air Pollution in New Zealand study</td>
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<tr>
<td>HIA</td>
<td>Health Impact Assessment</td>
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<tr>
<td>LTCCP</td>
<td>Long Term Council Community Plan</td>
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<td>LTMA</td>
<td>Land Transport Management Act</td>
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<td>NOₓ</td>
<td>Oxides of nitrogen</td>
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<tr>
<td>NZTS</td>
<td>New Zealand Transport Strategy</td>
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<td>PM₁₀</td>
<td>Particulate Matter 10 Microns or Less</td>
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<td>PT</td>
<td>Public Transport</td>
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<tr>
<td>QTN</td>
<td>Quality Transit Network</td>
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<tr>
<td>RLTS</td>
<td>Regional Land Transport Strategy</td>
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<td>RTC</td>
<td>Regional Transport Committee</td>
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<td>RTN</td>
<td>Rapid Transport Network</td>
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<tr>
<td>TDM</td>
<td>Travel Demand Management</td>
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<td>TLA</td>
<td>Territorial Land Authority</td>
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<tr>
<td>VEPM</td>
<td>Vehicle Emissions Prediction Model</td>
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<tr>
<td>VKT</td>
<td>Vehicle Kilometres Travelled</td>
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<tr>
<td>VOC</td>
<td>Volatile Organic Chemicals</td>
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<td>WOHIA</td>
<td>Whānau Ora Health Impact Assessment</td>
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<td>WSB</td>
<td>Walking School Bus</td>
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1. INTRODUCTION

1.1 FOCUS OF THE HEALTH AND WELL-BEING IMPACT ASSESSMENT

This report focuses on the outcomes of a health and well-being impact assessment (HIA) process to identify the potential impacts of the 2009 Auckland Regional Land Transport Strategy (ARLTS), and the potential directions that could create a transport system that better promotes and protects the health of Aucklanders.

This report has the following areas of focus:

- A brief introduction to the project
- Strategic directions of the ARLTS
- Process through which this HIA was undertaken
- Feedback from consultation workshops (these are detailed in sections 5 to 7)
- Analyses of impact modelling exploring potential and quantifiable impacts on population health, as well emissions, safety, service access and active transport (section 8)
- Recommendations for the strategy through this health and well-being impact assessment (section 9)
- Reflections on the HIA process (section 10).

Appendices to this document cover:

- Participants in the HIA process
- Summarised transcripts from workshop sessions
- Background to the practice of HIA
- Profile of the Auckland region's people and transport, and the health status of Aucklanders.

Companion documents are also available which separately explore:

- A profile of the people of Auckland, the transport dynamics and the health status of Aucklanders
- A literature review on the linkages between transport and health and well-being
- Detailed discussion of the scoping phase.

This health and well-being impact assessment was initiated focusing on the Auckland Regional Land Transport Strategy (ARLTS). The ARLTS outlines the region's land transport system requirements to ensure an integrated, safe, responsive and sustainable transport system for the next 30 years. The ARLTS articulates the regional strategy to achieve the region's transport objectives and can also include regionally significant projects. The ARLTS provides the framework within which the funding for the region's transport is invested.

The Auckland Regional Council (ARC) and the Auckland Regional Public Health Service (ARPHS) jointly commissioned the HIA to assess the potential health and well-being impacts of the ARLTS and to influence its strategic options so that positive health and well-being outcomes can be maximised and potential negative impacts are reduced or eliminated.
In December 2008, the ARLTS was in its early phases of being drafted, with a series of strategic options for the strategy identified. These will be the subject of the public consultation in 2009. The HIA was initiated early so that health and well-being issues can be woven within and can influence the strategic options and the subsequent stages of the strategy.

Synergia was contracted by ARPHS and ARC to lead the HIA through its scoping and appraisal phases. This document reports on the emergent findings of the HIA process, gathered through a series of workshops, evidence reviews and impact modelling undertaken between December 2008 and June 2009.

1.2 HEALTH AND WELL-BEING IMPACT ASSESSMENT: BACKGROUND AND PURPOSE

HIA is a formal process through which policy and planning are able to maximise their beneficial effects on health and well-being, and minimise or eliminate their potential harms through innovative solutions.

The determinants of health and well-being are influenced by environments, policies and activities occurring both within and outside the health sector. HIA offers the opportunity to systematically explore potential health effects of a policy, plan, programme or project, and to incorporate health and well-being considerations into policy and planning. HIA complements the use of economic and environmental impact assessment at national and local levels.

Using local and published evidence, a HIA process delivers a set of evidence-based recommendations to inform and influence decision-makers.

An important consideration in HIA is the distribution of health effects, by identifying which populations bear disproportionate impacts on their health, and to what extent these inequities can be reduced.

HIAs are gaining increasing recognition in New Zealand, and are a well-established approach internationally. The National Health Committee has championed the use of HIAs since publishing their Guide to HIA in 2004 (Public Health Advisory Committee 2004), and in 2007 issued a follow-up report on new opportunities for HIA in New Zealand (Public Health Advisory Committee 2007).

HIA’s influence is prospective – it is systematically applied in the window between the initial formulation of policy and planning and their detailed finalisation. Applied in this way, HIA supports democratic engagement, equity, sustainable development, ethical use of evidence, openness and transparency. HIA fosters cross-sectoral approaches to policy development and aligns with the ‘whole of government’ philosophy.

HIA considers the broad scope of determinants of health and well-being, encompassing the social and economic environment, the physical environment, as well as individual characteristics and behaviours.

Further details on HIA can be found in Appendix 3 (page 82).
2. STRATEGIC CONTEXT

2.1 BACKGROUND TO ARLTS

The ARLTS is being developed by a three key groups: the Regional Transport Committee, Regional Transport Executive Group and Technical Advisory Committee.

The last ARLTS was completed in 2005 and is due to expire in 2010; therefore the ARLTS 2009 is being developed to plan for the next 30 years. The last ARLTS called for a substantial increase in public transport spending, the completion of key elements of the strategic road network and placed new emphasis on travel demand management, in particular walking and cycling.

The ARLTS that is currently being developed will examine similar issues, however the long-term scope of the strategy means that there is an opportunity to assess some of the fundamental challenges that Auckland faces. Important aspects of the strategy will be to consider how the region can better align transport and land use decisions and, for the first time, to examine the potential impacts of increasing energy costs.

The Land Transport Management Amendment Act 2008 requires changes to the ARLTS: the timeframe has been extended to 30 years, can now include projects of high regional significance and includes the Franklin district.

2.2 IMPLICATIONS OF CHANGES IN AUCKLAND GOVERNANCE

The Auckland Regional Council and the Auckland Regional Public Health Service commissioned this HIA so that the legislative requirement of transport policies and strategies to protect and promote the public health could be fed into in the design of the ARLTS from the outset.

At the time this HIA was being concluded, the report of the Royal Commission into governance of the Auckland region was released, and the government made a set of decisions in response to the Commission’s recommendations. These decisions would bring about a single Auckland Council to govern the region in place of the ARC and the seven territorial authorities. Under the Royal Commission’s recommendations, the Auckland Regional Transport Authority would continue in its role; at the time of writing a decision on the future of ARTA had not been made.

At the time of writing, it is uncertain how these changes will affect the role of the ARLTS in leading the direction for land transport in the region; the changes will certainly affect some of the ways in which the strategy, if required, would be implemented and by which agencies or organisations.

Notwithstanding what these changes hold for the future of governance in the region, this HIA provides a reference point for health and well-being-related concerns and aspirations regarding Auckland’s transport. The recommendations arising from this HIA point to the roles of both existing local government structures in the near term, and the Auckland Council in the longer term.
2.3 NZ TRANSPORT STRATEGY TARGETS

The New Zealand Transport Strategy 2008 has a number of targets with which the ARLTS must align its strategic objectives. These are to:

- Halve the per capita greenhouse gas emissions from domestic transport by 2040;
- Increase the coastal shipping’s share of inter-regional freight to 30 percent of tonne-kilometres by 2040;
- Increase the rail share of freight to 25 percent of tonne-kilometres by 2040;
- Become one of the first countries in the world to widely use electric vehicles;
- Reduce the rated CO\textsubscript{2} emissions per kilometre of combined average new and used vehicles entering the light vehicle fleet to 170 grams CO\textsubscript{2} per kilometre by 2015, with a corresponding reduction in average fuel used per kilometre;
- Increase the area of crown transport land covered with indigenous vegetation;
- Reduce the number of people exposed to health-endangering noise levels from transport;
- Reduce the number of people exposed to health-endangering concentrations of air pollution, in locations where the impact of emissions arising from transport is significant;
- Increase use of public transport to seven percent of all trips by 2040 (ie from 111 million boardings in 2006/7 to more than 525 million boardings in 2040);
- Increase walking, cycling and other active modes to 30 percent of total trips in urban areas by 2040.

2.4 STRATEGIC OPTIONS

Under the Land Transport Management Act 2003 the AARLTS is required to consider different strategic options. The previous proposal for the ARLTS was to use scenarios developed under the Land Use/Transport Futures project. However the output of that project was not available in time, therefore the strategic options needed to be reassessed.

As at February 2009, there were four strategic options, with which have the following common elements:

- maintenance and renewals;
- all currently committed projects (i.e. funded projects);
- integrated PT ticketing and fares;
- a high level of travel demand management measures (particularly behaviour change measures and walking cycling infrastructure improvements);
- high level of town centre amenity;
- road safety improvements;
- engine technology improvements;
- rural transport improvements;
• higher future fuel prices.

**Strategic Option 1 – Demand Management**

This option focuses on “push” factors in which establishing road pricing and making improvements to public transport and walking and cycling modes will push people out of their cars and influence them to use more active and sustainable methods.

**Strategic Option 2 – Mixed Investment**

This option essentially maintains the current approach, where improvements are made for all modes of transport but shifts away from road investment. There will be roading developments with the Waterview Connection, widespread arterial road improvements and a range of Territorial Authorities roading projects. This option also includes future expansion of the Rapid Transit Network (RTN) namely rail developments, including the CBD tunnel and increased frequency.

**Strategic Option 3 – PT led change**

This option concentrates on “pull” factors to encourage people out of their cars by heavily investing in public transport. Public transport improvements being proposed by Parsons Brinkerhoff include all rail RTN (including Harbour Crossing and North Shore), expanded Quality Transit Network (QTN), increased frequencies, bus priorities on all congested Quality Transit Network links. This option would also include some roading improvements.

**Strategic Option 4 – ‘Quantum Shift’**

This option involves a combination of the push factors from Option 1 and the pull factors from Option 3, together with a much more aggressive approach to land use intensification than was assumed in Options 1-3. It also assumes that a series of policy and regulatory changes will be introduced at a national level to address issues such as vehicle standards, emission controls, and road pricing.
3. DEVELOPMENT OF THIS HEALTH AND WELL-BEING IMPACT ASSESSMENT

There are four key stages to health and well-being impact assessments. These are identified as:

(a) Screening – the initial selection process to assess a policy’s suitability for HIA.
(b) Scoping – highlighting the key issues needing to be considered to define and shape the HIA.
(c) Appraisal and reporting – identifying the relevant determinants of health and well-being and using specific tools to identify potential health impacts then assessing the significance of these impacts and drawing out practical changes to the policy.
(d) Evaluation – assessing how the process was undertaken and the extent to which the recommendations were taken up by the policy-makers.

The first phase of the HIA, screening, was effectively undertaken through the selection of the ARLTS as the focus for the HIA. This document focuses on the processes and findings of the scoping and appraisal phases. It also outlines an evaluation framework that could be applied to assess the overall outcomes of the HIA process.

3.1 SCOPING

The scoping phase informed the appraisal workshops held in late 2008. The first workshop, facilitated by Adrian Field of Synergia Ltd, was held in November 2008, with participants representing the following organisations and/or interests:

- Auckland Regional Public Health Service
- Auckland Regional Council
- Ministry of Social Development
- Walk Auckland
- Hauora Raukura o Tainui
- Hapai te Hauora Tapui Ltd
- AUT.

A second workshop focusing on Māori perspectives on transport and drawing on whānau ora health impact assessment processes, was led by Megan Tunks of Hapai te Hauora Tapui Ltd. Participants in the workshop represented the following organisations and/or interests:

- Auckland Regional Council Māori Relations Team
- Te Whānau o Waipereira Trust
- Waitakere City Council
- Taumata Runanga.

One of the key opportunities that this HIA presents is its early initiation. Starting the HIA in the early stages of drafting of the ARLTS, means that it can have a greater ability to influence its strategic direction.

The only major constraints on the HIA are the framework for its development, which had been substantially agreed by the Regional Transport Committee; and the land use aspects of the
strategy, which have been established through the Regional Growth Strategy. These however gave considerable room for the HIA to influence the direction and content of the ARLTS.

The key themes to emerge from the scoping process were:

- **Safety**: Opportunities to ensure optimal safety for all users of the different modes of transport.
- **Access and Mobility**: Opportunities to increase access and mobility, particularly for disadvantaged groups, to be able reach services, amenities and facilities that support healthy living.
- **Increasing active modes of transport**: Opportunities for embedding active modes of transport across the region.
- **Emissions and noise**: Opportunities to reduce air and noise pollution and to enhance the positive health impacts of improving environmental sustainability in this area.

At the second workshop, focusing on Māori health issues, the concept of kaitiakitanga (guardianship) was raised by participants. In the context of the Regional Land Transport Strategy this was seen as an important component illustrating the different world views of health between tangata whenua and non-Māori.

The central topics identified in the general workshop in the previous week also emerged at the Māori stakeholder workshop, but with some there were particular issues raised in relation to inequities and Māori perspectives:

- **Safety** including accidents and injuries, alcohol and road safety;
- **Active transport** including investment by local, regional and central government;
- **Emissions** including air and noise pollution and impacts on water in the region, and in turn the effect on ‘kai cupboards’;
- **Access and mobility**, including cost of public transport and impact of ‘Super Goldcard’, access for vulnerable populations and people with disabilities.

### 3.2 APPRAISAL

Appraisal workshops were held on the 24 and 25 February 2009. The mainstream workshop was at the Parnell Community Centre and the Whānau Ora workshop was held at Epsom Community Centre.

At the mainstream workshop, some 31 stakeholders were present from the following organisations and/or interests:

- Auckland Regional Council
- Auckland Regional Public Health Service
- Auckland Regional Transport Authority
- Auckland University of Technology
- CCS Disability Action
- Counties Manukau District Health Board
- Cycle Action Network
- Hapai te Hauora Tapui
- Manukau City Council
Ministry of Health  
Mobility Assistance Dogs Trust  
NZ Police  
Ministry of Social Development  
NZ Transport Agency  
Papakura District Council  
Rodney District Council  
Waitakere City Council  
Walk Auckland.

At the Whānau Ora workshop, some 13 stakeholders were present from the following organisation and/or interests:

- Auckland Regional Council  
- Auckland Regional Public Health Service  
- Auckland Regional Transport Authority  
- Design Tribe (an architectural consultancy)  
- Hapai te Hauora Tapui  
- NZ Police  
- Te Ora o Manukau.

A full list of participants in the HIA is listed in Appendix 1 (page 72).

The remainder of this report details principally with the findings of the appraisal phase and recommendations that emerged.

### 3.3 APPLICATION OF SYSTEMS THINKING APPROACHES

An important element of the approach that Synergia brought to this HIA was the application of ‘systems thinking’ approaches. Systems thinking is described as an approach that

‘...considers connections among different components, plans for the implications of their interaction, and requires transdisciplinary thinking as well as active engagement of those who have a stake in the outcome to govern the course of change’ (Leischow & Milstein 2006).

Systems thinking enables people to develop insights into the nature of a system and how it behaves, and then design effective solutions to meet complex challenges. The approach is holistic and deals with complex situations by taking a ‘whole picture’ view of the critical dynamics across an issue or situation, rather than seeking to divide the problem into small and separate elements.

Key features of systems-based approaches include:

- Recognition that complex issues such as health are affected by actions within and outside the health sector;
- Actively seeking the input of individuals and organisations with significantly different perspectives, cultures and goals;
- Consideration of both the causes and consequences of different actions, and the interplay between different issues across a system;
• Involvement of stakeholders in the identification of problems and issues, and in developing of strategies and interventions in response to these issues;

• Assessment of problem analysis and responses against the empirical evidence.

Although these features have commonalities with core approaches to HIA, a key point of difference is the explicit consideration given to the linkages and interconnections in the causal pathways of the issue under examination. This requires a consideration not only of impacts, but also of the factors that give rise to a situation, and how they are linked together.

Many HIAs place a strong emphasis on impacts and a much smaller emphasis on developing responses.

A systems approach, in contrast, actively seeks to understand and clearly map the web of linkages and work with stakeholders to develop a range of responses that address the underlying causes working across a system. This will be evident in the discussion in sections that follow, exploring the key focus areas of the HIA.
4. TRANSPORT, HEALTH AND WELL-BEING

4.1 FRAMING CONSIDERATIONS FOR TRANSPORT AND HEALTH

In exploring the influences on health and well-being of current and future transport policy, it is useful to consider a framework for how stakeholders consider well-being and urban environments in their own lives and their communities. Hancock’s ecosystem model of health (Hancock 1993) provides a useful starting point for these considerations, showing the health of individuals to be “nested in”, and dependent on, the health of their families, communities, built and natural environments and global ecosystems. Key areas of the model with regard to transport policy choices and well-being are considered below.

In considering the future of transport in New Zealand, our unique culture, environment and heritage are also important. A generic model such as Hancock’s can be adapted to reflect these unique aspects of well-being, particularly using Māori models of well-being, which provide an important counterpoint to the mainstream concepts of health and well-being. In this discussion of aspects of well-being and transport also draw on concepts from two well established models for health and health promotion by Mason Durie: Te Pae Mahutonga and Te Whare Tapa Whā (Durie 1982 and Durie 1999)

The discussion below looks at the many influences of transport on health, drawing on the variety of evidence about many aspects of transport and well-being, which can be assessed against the
priorities identified through the stakeholder consultation. The four priorities identified in the scoping workshop (active transport, emissions, access and mobility, and safety) are specifically placed in the context of Hancock’s model.

4.2 PHYSICAL, MENTAL AND SPIRITUAL HEALTH: TE TAHA TINANA, TE TAHA WAIRUA AND TE TAHA HINENGARO

Research has highlighted the potential impacts of transport on physical activity, injury, cardiovascular and respiratory disease. Alongside these, community-based research in Auckland has also highlighted the importance of stress, social disconnection, disconnection from natural environments and a growing sense of time pressure.

With regard to emissions, motor vehicle traffic is the key source of air pollution that is concentrated at ground levels in urban areas (World Health Organisation 2000). Millions of tonnes of pollutants are emitted into the air as smoke, dust and invisible gas each year. Pollutants are substances in the air which are above natural levels that can have negative effects on plants, animals and people. Some pollutants are released straight into the air, while others are created by chemical reactions that occur in the air. Air pollution can include invisible particles and gases, and have many health impacts, resulting in increased school and work absences, hospitalisation, and increased mortality (Auckland Regional Council 2007a).

Vehicles with internal combustion engines emit air pollutants and particulate matter. Nitrogen oxides and hydrocarbons are able to oxidise in air to ozone if exposed to greater quantities of sunlight. The ‘secondary air pollutant’ that is created is becoming more and more of a health issue (Kjellstrom & Hill 2002).

The mortality rates that are a result of vehicle emissions are considered as the ‘invisible’ death toll. Studies carried out in Europe using comparable methods, have estimated the number of deaths as a result of air pollution from fine particle emissions to be approximately double the number of deaths from road traffic injuries (Kunzli et al 2000).

The risk of motor vehicle air pollution in New Zealand was assessed in the 2007 HAPINZ (Health and Air Pollution in New Zealand) study. The research was able to estimate the annual additional mortality due to air pollution exposures. However this research could not dissociate the motor vehicle emissions from non vehicle emissions. Nationally, the estimated annual additional mortality for to air pollution exposures amounts to two percent of total deaths (Fisher et al 2007).

For the Auckland region, the current health costs of air pollution from all sources are estimated to be at least $548 million per annum with at least 236 Aucklanders dying prematurely each year due to motor vehicle emissions alone. As well as the premature deaths, vehicle pollution results in 368,000 days being lost region-wide due to illness or poor health – especially in the young, the elderly and people with heart disease, respiratory disease, asthma and bronchitis (Auckland Regional Council 2009c).

Five pollutants – carbon monoxide, particulate matter, nitrogen dioxide, ozone and sulphur dioxide are common within the Auckland region. These different pollutants are associated with varying health impacts (Auckland Regional Council 2007b).

There is mounting evidence to prove that noise can have negative health effects on physical and mental well-being. Noise is particularly problematic for communities that live near major traffic routes, airports and industrial areas. Noise can influence a number of different health effects
including interruption of communication and sleep; impair performance at work and school, annoyance, aggression and depression. Some evidence also shows that noise can exacerbate heart disease and hypertension, and cause hearing impairments (World Health Organisation 2000). More recent evidence indicates that exposure to high levels of road traffic noise increases the risk of heart attacks (Selander et al 2009).

**Active transport** also has the potential to have a significant impact on health and well-being. Transport infrastructure can either inhibit or promote forms of active transport (Public Health Advisory Committee 2003). There are two key advantages of active transport. The first is related to decreased use of motor vehicles, which would reduce emissions and road traffic injury rates. The second is the substantial positive impact on health from regular physical activity (World Health Organisation 2000).

There is a significant amount of evidence showing that physical activity enhances health. Spending a total of 30 minutes of fast walking or cycling each day, even if it is broken up into 10 to 15 segments can reduce the risk of several different health risks such as cardiovascular disease, obesity and type 2 diabetes.

Using transport related physical activity is a feasible way to enhance and maintain physical activity as it provides a structured routine for regular activity for large proportion of the population. However, industrialized countries are becoming more and more reliant on travel by motor vehicle. Travel related physical activity is increasingly being replaced by motorised transport in many industrialised countries. Transport related physical activity has great potential to provide a sustainable alternative as it improves levels of physical activity and does not cause pollution from vehicle emissions (Badland & Schofield 2005; Maynard & Fishman 2009).

**Safety** is a prominent issue in relation to transport and has significant effects on health and well-being. This is evident from health statistics from all counties that have high levels of motorisation. Throughout the 1960s and 1970s rates for morbidity and mortality from road traffic injuries were increasing in proportion to the population. Although there has been an increase in the number of motor vehicles in New Zealand, the rates have decreased as a result of various types of safety initiatives that have been implemented, including road safety programmes, infrastructural improvements and improved design of motor vehicles. However road traffic injuries remain a major contributor of death and disability in New Zealand (Kjellstrom & Hill 2002). Road traffic is also known to cause effects on mental health and well-being. Studies show that about 1 in six (14 percent) of motor accident survivors experience post traumatic stress disorder, a quarter (25 percent) have psychological issues a year after the accident and one third experience clinical symptoms at follow-up 18 months afterwards (Goldberg & Gara 1990; Green et al 1993).

### 4.3 WHĀNAU, FAMILIES, AND THEIR PSYCHO-SOCIO-ECONOMIC CONTEXT

How we are able to meet our family responsibilities on a day to day basis is a key part of transport strategy, particularly for women and for whānau. Included in this is managing the requirements of children, elderly parents and wider family responsibilities, which might include unplanned travel in cases of illness or emergency. Emerging evidence suggests that women continue to be the main providers of child and elder care, as well as continuing to undertake the majority of trips involving school, shopping and other household related activities, while also
accessing paid work, education and training. This places an unequal burden of time pressure on women, making it more difficult to make transport choices in alignment with their awareness of transport issues (Dobbs 2005; Strazdins & Loughrey 2008).

The social and economic context of transport and well-being includes equitable access to social goods and services, as well as inequities in exposure to the harmful impacts of transport policy choices by socioeconomic status and ethnicity. Economic inequities are already evident in the affordability of transport options and therefore affordable access to well-being enhancing goods and services including employment, education, nutritious food, recreation and natural environments. Inequities in affordable transport access create inequities in people's ability to participate in society in meaningful ways – Te Oranga (participation).

**Access and mobility** are key enablers for enhancing daily living through providing access to employment, services, amenities and facilities, and assisting with developing social connections. Availability of transport options for those with mobility restrictions (either through socioeconomic disadvantage preventing private motor vehicle access, or through age and disability), is an important means of accessing local services and participating in community life (Barton & Tsourou 2000a; Denmark 1998).

For those with limited mobility options, access to transport services is a key resource to enable employment, service access and community participation. Access to and use of local resources such as health services, grocery shops and parks or open spaces, can provide opportunities for health, through use of the services themselves (Field 2004). Lack of service or amenity access, or an obsolete or inappropriately designed built environment, can similarly act as a constraint on achieving health (Barton & Tsourou 2000b; Giles-Corti & Donovan 2002; Parks et al 2003). For example, access to supermarkets and grocers enable people to reach sources of food, but lack of access to food outlets, particularly supermarkets, can widen health inequities by forcing those with limited mobility options to use lower quality and/or more expensive food options. Instances of such restrictive environments have been cited as leading causes of food poverty, where those without transport options are unable to access healthy food (Leather 1996). Similarly, access to primary health care services, are important for preventing the ongoing development of ill-health in individuals and communities.

4.4 LOCAL PHYSICAL ENVIRONMENT AND NATURE: WAIORA

People’s health is intimately connected to the health of their local ecosystems, including clean air and water, natural environments and biodiversity. The ability of local environments to contribute to recreation and spiritual well-being relies on the health of these environments. Spiritual connection with land, as well as the ability to use the land and water for traditional food and recreation is of particular importance to the cultural well-being of Māori.

An example of research that indicates the importance of natural greenspace is a UK study showing physical activity in natural environments to be more beneficial for well-being compared with physical activity in other settings (Pretty et al 2005). Other studies have also linked access to greenspace with encouraging physical activity (Giles-Corti et al 2005; McNeill et al 2006). There is a challenge, therefore to create urban environments that include significant amounts of biodiversity along transport corridors to meet both environmental and well-being objectives.
4.5 COMMUNITY

Connection with neighbourhood communities, and communities of interest, is of high importance for social well-being. “Drive through neighbourhoods” distance people from their immediate locality, and lead to a loss of neighbourhood connection. Transport choices can therefore act as barriers or opportunities for connecting with neighbourhood communities through chance encounters, and a perception of community safety by the presence of people walking in the neighbourhood.

Neighbourhood safety from crime can be an important enabler for accessing goods and services via a wider range of transport choices. Perception of safety from crime is influenced by real levels of crime, media portrayal of crime in specific neighbourhoods, and the environmental design of neighbourhoods.

4.6 WORK

The way that workplaces are sited and designed, as well as the policies implemented by workplaces influence the transport choices that working people make. Enhancing well-being through workplace transport choices includes zoning that allows residential and non-emitting workplaces to be close together, workplaces that actively participate in travel demand management, and workplaces that work with local government to enhance the safety and amenity of local environments for commuting by active transport.

4.7 HUMAN BIOLOGY

As well as identifying vulnerable populations, in particular children, combinations of increased risk can substantially increase the vulnerability of specific populations. For instance biology of vulnerable populations, plus ethnic and economic disadvantage, plus increased environmental exposure due to urban design and transport policy can equal a potent cocktail of risk of adverse outcomes for well-being.

4.8 HUMAN-MADE ENVIRONMENT

The design of the built environment in cities has a strong influence on transport choices. As cities have grown, many have developed in ways that are less connected and do not offer communities many realistic options for travel other than private vehicles. A focus on urban design around car reliance leads to an urban environment that encourages car use and its consequences. On the other hand, an urban environment that encompasses principles of walkability such as intelligent mixed use zoning, street connectivity, and appropriate density can encourage active transport.

4.9 CULTURE

Three broad aspects of culture and well-being relating to transport policy can be considered here. Firstly, the place of cars and car use in our culture in New Zealand. There is much rhetoric about this, and little research about what the key levers for change are. The connections between car ownership, power, status, gender and sexuality have been explored in American culture (Wollen and Kerr 2002), however, and in moving forward into a transport system that enhances well-being, these powerful connections will need to be reconsidered.
Secondly, the reflection of our unique culture in our urban landscapes can be aided by transport policy, and this reflection is particularly important for creating urban environments that are conducive to Māori well-being. Using a Māori cultural landscape strategy, such as Te Aranga, has the potential to benefit Māori as well as all other New Zealanders (Hoskins 2008; Hoskins et al 2008).

Thirdly, our culture of transport policy-making can in itself be well-being enhancing, as well as more likely to result in policies that improve well-being rather than harm health. Policy-making that involves processes for meaningful community participation in decision-making can improve sense of control, and sense of participation in society, as well as be more likely to enhance the acceptability of policies that require communities to change their behaviour.

4.10 BIOSPHERE

Today’s greatest environmental health challenges relate to the human health impacts of detrimental changes to global ecosystems.

Human activity is known to be the key contributor to climate change over the past 50 years (Intergovernmental Panel on Climate Change 2007). By 2007, the NZ energy greenhouse gas inventory had shown that emissions from the transport sector were tracking 69 per cent higher than 1990 levels. The bulk of this increase came from road transport emissions which grew by more than 76 per cent to represent 41.2 per cent of all CO$_2$ energy emissions for New Zealand. Currently, motor vehicles in New Zealand are almost exclusively fuelled by fossil fuels, such as petrol and diesel, which result in greenhouse gas emissions (Auckland Regional Council 2009b; Ministry of Economic Development 2008). Transport therefore has a significant role in addressing climate change and its effects on well-being or can continue to contribute to increasing carbon emissions, depending on the policy choices we make.

There are several effects that climate change has on the environment such as increases in temperature, change in rainfall patterns and a rise in extreme weather events. Within the next 80 years the temperature in New Zealand is predicted to increase between 0.7 and 5.1°C according to global climate modelling. Westerlies are estimated to increase in winter and spring, as well as more rainfall on the west coasts of the North and South Island and the east and north will see dry conditions. These changes in climate can have direct and indirect effects on health (Ministry for the Environment 2008). Direct impacts on health include increased mortality from thermal extremes, diarrhoeal deaths and increased prevalence of skin cancer from depletion of the ozone layer. Indirect impacts are broader and more complex. They can include increased rates of waterborne disease from flooding and increased rates of vector-borne diseases like dengue fever (McMichael et al 2002); economic impacts, impacts on socioeconomic inequities, and impacts due to environmental refugees, particularly from our neighbouring Pacific Islands.

Further information on the linkages between the four focus areas and health and well-being can be found in a companion literature review prepared for this project, and also in the Working Paper prepared for the Auckland Regional Council (Auckland Regional Council 2009b).
5. POTENTIAL IMPACTS AND ENABLERS FOR KEY FOCUS AREAS

During the mainstream appraisal workshop, participants were asked to discuss the potential impacts (positive and negative) of each of the key focus areas, and to identify the foundations that need to be in place to maximise positive outcomes. These were framed through five central questions for each focus area:

- What would be the impacts on [access and mobility/active transport/emissions/safety] if the strategy is designed well?
- What would be the impacts if the strategy is designed poorly?
- What are the particular issues for vulnerable population groups?
- What are the actions needed to make the policies effective for [access and mobility/active transport/emissions/safety]?
- What are the key elements of transport strategy/policy to ensure the best possible outcomes occur and poor health and well-being outcomes are minimised?

These questions were posed in concurrent working groups for each focus area. The purpose was to explore both the potential consequences of the strategy on the focus areas and on health; and to then explore potential mitigation or support strategies. Using a ‘world cafe’ format, facilitators moved between tables in rounds of conversation, to create a dense web of ideas and connections that were developed in a short period of time (Brown 2005). The strengths of this approach are firstly, that many people are able to contribute across all focus areas; and secondly, that ideas developed by participants can be built upon by others as participants move between groups.

Full transcripts of these breakout sessions can be found in Appendix 2.

The diagrams presented in each of the sections that follow synthesise these discussions, focusing on the potential positive or negative outcomes and the steps needed to put these in place. Each diagram depicts three stages on a pathway to improving transport-related health outcomes identified by HIA participants:

- the strategic foundations that are required to enable each of the focus areas;
- the actions flowing out of the strategy that need to be driven by central, regional and local government, as well as other important players such as employers and community organisations;
- the positive health and well-being impacts that can flow from having the focus areas in place (and where the inverse negative impacts can occur if access and mobility, active transport, emissions and safety are not achieved).

These discussions provided the foundation for identifying key health and well-being issues for the ARLTS, and recommendations to address them, which are explored in subsequent sections.

*Information on this process is also available at [http://www.theworldcafe.com/twc.htm](http://www.theworldcafe.com/twc.htm).
5.1 ACTIVE TRANSPORT

5.1.1 Potential impacts of the strategy on active transport

Participants examining the Active Transport theme suggested the following positive outcomes that could be achieved through the strategy:

- **Active transport supporting public transport**: Often discussion on public transport has been to emphasise how it supports people to be more active in walking to their local bus stop or train station, and on to other destinations. However, a more interlinked relationship was offered, in which active transport has the potential to make public transport more viable. To create such a self-reinforcing cycle requires the infrastructure of public transport to more directly support active transport, such as through racks on buses/trains; walking links to PT routes, and effective transport shelters.

- **Culture of active transport**: The ARLTS should be aimed towards supporting a culture whereby people want to and enjoy using active transport as a first choice, with active transport as source of pride.

- **Supportive environments for active transport**: Key to creating supportive environments is enabling a positive enjoyable active transport experience and making it the easiest option. Active transport was seen by participants to require urban environments that are legible, where people can understand how a place works and can find their way around; that are safe to use and explore; and that are barrier-free, to minimise disincentives to using active transport.

- **Social connections**: Active transport was seen as an important means by which people can explore their neighbourhoods and forge connections across communities.

The concerns of potential harmful impacts of the strategy, if its design or implementation were not supportive of active transport, were:

- **Further embedding car-dominated environments**: The over-riding concern was the potential for car-oriented planning to become entrenched in the region, and that the passage of cars would be the key transport priority. Urban environments that are designed primarily for cars – which are a defining feature of much of the Auckland region – were seen to have an inherent and systemic ‘discomfort’ for people wishing to use active transport modes, and undermine efforts for people to be more active.

- **Undermining safety**: An urban system that is experienced or perceived as unsafe was seen to be a key barrier to people’s willingness to adopt active transport modes. Urban systems that do not ensure optimal road and pedestrian safety, as well as personal safety, will fail to minimise injury and deaths.

- **Obesity**: Physical activity, as a key outcome of active transport, is an important risk factor for obesity. If the strategy fails to promote and support active living, participants were concerned that as a result, less activity and higher levels of obesity would be the long-term result in generations to come.
5.1.2 Issues for vulnerable populations

Key issues for vulnerable populations included the following:

- **Designing for families/whānau and people with disabilities**: A common theme of discussions was that where urban design caters for people with disabilities, and families/whānau, it will have created a system of universally accessible design, by removing common barriers to active transport.

- **Thinking outside the CBD**: Auckland’s centralised transport orientation was a concern expressed by some participants; they were keen to explore how public transport and active transport can be more effectively supported in areas outside the CBD.

- **Rural areas**: People living in rural areas have different active transport requirements to people living in other areas. Active transport is generally more of a recreational and social activity in these areas, but there was nevertheless a concern to ensure that the strategy supported active living in these areas, particularly in terms of safety (such as for cycling), and for connections to passenger transport (such as park and ride facilities). It was also noted that many urban people travel to rural areas for activity, including cycling and horse riding.

- **Peri-urban areas**: There are many new housing developments occurring on the urban fringes of Auckland which lack service provision and public transport infrastructure. They are set up so that new residents can arrive in their car, but are not designed for active transport, and often lack street lighting, pavement networks and shops and community facilities.

- **Cost of cycling**: For low-income families, the costs of bikes can be prohibitively expensive. One innovative suggestion was to trial ‘community cycles’ allowing people across different parts of Auckland to use free bikes, as exist in some parts of Europe.

5.1.3 Potential policy responses for active transport

The key elements of transport strategy to support active transport were seen to be:

- **Policy prioritisation**: Active transport needs to be at the centre of transport and urban planning, if real change is to be achieved, with active transport as a leading priority in the road user hierarchy. This is not simply a matter of regional planning, but also extends to territorial planning and planning by employers to support active transport.

- **Policies that build active environments**: Features of this included incorporating land use with transport and economic planning, particularly around mixed use centres and open space access. A common theme was that urban centres need to be seen as more than simply retail centres, but need to support a diversity of uses.

- **Designing communities for walking and cycling**: Workshop participants stressed the need for environments that support active transport specifically by families and people with disabilities, to ensure universally accessible design. This requires placing active transport needs as a central priority of planning, with road and service infrastructure to support that.
• **Active transport investment**: Participants suggested that a forward investment path for active transport needs to be defined by the ARLTS, ensuring affordable transport options and supporting multi-purpose journeys through public and active transport.

• **Regulatory environment**: Although this is more of a national level policy issue, some participants expressed concern that current fringe benefit tax incentives favour use of cars over public or active transport. Others suggested shifting to a ‘pay as you drive’ for road user charges rather than flat registration charges.

### 5.1.4 Key strategy-led actions for active transport

To take the ARLTS forward, the following actions were proposed for active transport:

• **Active transport infrastructure**: This included location of public transport near public services; greater provision of ‘city hop’ car hire to support ‘just in case’ driving; facilities at key locations, such as bike racks in open spaces at schools, hospitals and other transport-generating nodes; resting places for walkers; improvements in pavement design and provision; and a greater choice of destinations in urban environments for active transport, including co-located facilities with public transport links.

• **Supportive environments for active transport**: Proposals in this theme included employer subsidies for active transport, enforcement of no parking rules on pavements, and speed reductions in residential areas and town centres.

• **Demand management**: Participants stressed the need for integrated ticketing, family public transport passes and parking restrictions.

• **Communications and information**: There was a need identified for ongoing messaging to Aucklanders of opportunities for active transport to support a shift in demand, and cultivating an active transport culture. Options included promoting narratives or stories of how active transport can be achieved at an individual or organisational level; promoting transport options for people with disabilities; and further refinement of online transport information with walking and cycling options.

The diagram below outlines the issues raised in this theme, and highlights the flow from strategic underpinnings of the ARLTS, through to on the ground actions, and the potential health and well-being outcomes identified by participants.
5.2 ACCESS AND MOBILITY

5.2.1 Potential impacts of the strategy on access and mobility

Participants who considered the 'access' and 'mobility' impacts of the strategy suggested that its ultimate success (or not) would come down to the level of timely access to key health and wellness related services and amenities. In particular, this related to

a) **key health facilities such as hospitals and ambulatory centres** such as the Manukau Super Clinic in Browns Road, Greenlane Clinical Centre, and Waitakere Hospital;

b) **employment and training nodes**, particularly manufacturing;

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Impacts and Enablers: Active Transport

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<tr>
<th>Strategic foundations</th>
<th>Actions</th>
<th>Potential health-related outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated planning</td>
<td>Demand management (e.g. parking restrictions, integrated ticketing, road pricing)</td>
<td>Filter, healthier populations</td>
</tr>
<tr>
<td>Active transport prioritisation</td>
<td>Mixed-use centres supporting multiple activities</td>
<td>Vehicle emissions reductions</td>
</tr>
<tr>
<td>Design principles supporting families/people with disabilities</td>
<td>Communities and urban centres designed for active transport</td>
<td>Reductions in burden of diabetes and obesity</td>
</tr>
<tr>
<td>Infrastructural investment</td>
<td>Supportive infrastructure in place (e.g. resting places, traffic calming, bike racks in centres and PT)</td>
<td>Culture of active transport</td>
</tr>
<tr>
<td>Regulatory environment</td>
<td>Information and communication</td>
<td>Reductions in burden of diabetes and obesity</td>
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<td></td>
<td>Employer support for active transport</td>
<td>Social connections</td>
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Issues for vulnerable populations

- Different urban, rural and peri-urban needs
- Ensuring active transport works for families, older people, people with disabilities
- Issues for large low-income families (particularly Maori and Pacific) – access to walking school buses, impact of road pricing

- Vehicle emissions reductions
- Perceived/actual safety of urban environments
- Reduction in transport related injury/mortality
c) amenities that support physical activity both within the metropolitan area (such as sports grounds, Cornwall Park and Auckland’s various beaches) and outside (such as the Waitakere and Hunua ranges); and

d) nodes of community connection such as hubs, events, social supports and the degree to which public transport can promote ‘incidental’ connection through greater community contact and exposure to community activities

5.2.2 Issues for vulnerable populations

Key issues for vulnerable populations centred on the flexibility of the various modes of transport to cater to vulnerable groups particularly:

- parents and caregivers of children, for example, the difficulties getting prams on buses;
- cyclists and the provision of a safer environment for them;
- youth and the degree to which public transport can support independence;
- Māori and Pacific peoples and access to health services, marae and churches;
- older persons and people with disabilities, particularly people with cognitive disability (such as blindness), who cannot use mapping and real-time scheduling systems, and other elements of public transport infrastructure;
- people in rural and peri-urban areas.

Concerns were raised that without these considerations taken into account, a poorly designed strategy could lead to:

- disconnection of key groups, particularly families, youth and older persons;
- greater congestion with disproportionate impacts on those in typically poorer areas who have longer commutes and poorer access to independent travel (especially cars);
- exposure to economic impacts of oil prices: In an environment where oil prices are unstable but generally high, a strategy that fails to support the needs of vulnerable populations such as elderly may expose them to using transport that does not afford either a safe or affordable passage through Auckland. Many people in rural areas tend to be more dependent on cars, and those from lower income groups in these areas will be more isolated if their transport needs cannot be affordably met;
- low cost public transport: Some participants suggested offering those on low incomes cheaper public transport to encourage use and support their access across the region.

5.2.3 Key actions to support access and mobility

The participants identified the following key actions to support improved access and mobility within the ARLTS:
• **Whole of journey approaches**, from door to door and back again, particularly through the eyes of vulnerable populations and various weather situations. For example, rest stops for older persons on the way to the bus stop, through routes under cover if the weather is wet, shade and shelter at the bus stop, smoke-free bus stops, variable and flexible seating options for different needs (such as bike and pram racks on buses), places to put shopping, guide dogs, push bikes and prams, having secure places to put bikes etc at workplaces etc.

• **Involvement of vulnerable groups**, these journeys look differently through different eyes which are often difficult to anticipate, and therefore should be included in planning and consultations.

• **Integrated ticketing and networks** across all modes, to support greater mobility and smooth transitions.

• **Affordable fares**, particularly for vulnerable and low income populations.

• **Clear priorities for road use**.

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5.2.4 **Key strategy-led actions for access and mobility**

The following support strategies were identified to help facilitate the actions and necessary change that will need to occur with such a strategy:

• **Political support** from higher levels of government.

• **Incentives** including both financial and non-financial (such as priority lanes). However, enforcement is seen to be crucial the success of such incentives.

• **Supportive urban planning/land use** and mixed use to help decrease travel needs and closer access to workplace, education and community hubs.

• **Supportive school and workplace initiatives** such as work travel plans, showers and lockup facilities.

• **Education, information and change messages** to help shift hearts and minds and people’s perceptions of travel and speed.

• **Public sector collaboration** to help generate a whole of public sector response such as ARTA, ACC, CMDHB etc.

• **Built in safety components** whether that be through mechanisms to support safe car pooling, through to lower speed limits in built up areas.

• **Further develop transport options for older people**, such as volunteer driver services.

The diagram below outlines the issues and key strategic directions raised in this theme.
5.3 EMISSIONS

5.3.1 Potential impacts of the strategy on emissions

The Emissions theme included three separate kinds of emissions: air pollution, carbon dioxide and noise.

Participants examining the Emissions theme suggested the following positive outcomes that could be achieved through the strategy:

- **Minimising air pollution:** The ARLTS should be aiming to meet the highest international standards with regard to air pollution. This is important in terms of our economy, which depends on our clean, green image internationally.

- **Carbon dioxide emissions:** The ARLTS would ensure that the region’s transport met internationally recognised greenhouse gas emission reduction targets.

- **There would be appropriate emissions standards set for all vehicles:** Emissions standards would be applied to private vehicles, public transport vehicles and freight,
but with inequities caused by emissions standards and transport affordability mitigated. Public transport would be a leader in terms of emissions – “no more smoky buses, trains and ferries”.

- **The effects of noise on communities would be recognised**: The ARLTS would particularly address the effects of noise on vulnerable populations such as young children.

- **Run-off to water and soil from on-road and off-road vehicles would be considered as an emission**: Clean water and clean soil are vital aspects of a sustainable urban environment, and are important culturally and as sources of food.

- **Vibration is considered explicitly as part of the strategy**: The ARLTS would include evidence and strategies to mitigate the effects of vibration on community well-being.

The concerns of potential harmful impacts of the strategy, if its design or implementation did not address these three kinds of emissions, were:

- **Deaths and illness from air pollution and noise will increase**: If air quality is not addressed explicitly in the strategy, worsening air pollution deaths and illness will result.

- **Decreased incentive to develop a good public transport system**: Meeting air quality standards was highlighted as a key incentive to develop a world-class public transport system that embraces clean technologies.

- **Long-term financial costs**: There was concern that costs to the healthcare system through the burden of disease due to air pollution, as well as negative impacts on tourism of poor air quality, will affect the economy.

### 5.3.2 Issues for vulnerable populations

Key issues for vulnerable populations included the following:

- **Poor housing next to arterials, motorways and rail corridors**: There was widespread concern that poorly designed intensification will increase the exposure of low income families to air pollution, noise and vibration, without increasing the access of these families to improved public transport choices.

- **Exposure of vulnerable populations**: Certain groups were identified as at greater risk from exposure to air pollution and noise, and particular land uses were highlighted as vulnerable, and for special protection. These included early childhood education centres, hospitals and schools.

- **Māori and Pacific communities**: The likelihood that Māori and Pacific communities experience inequitable exposure to air pollution and noise was identified as a concern.

- **Affordability of transport and access**: Participants identified that if strict emissions standards were enforced for private motor vehicles, inequities in affordable access to transport would result, and these would need to be addressed through affordable, equitable public transport access. As discussed earlier, poorer populations are more exposed to the impacts of high fuel prices.
• Run-off to water and soil: A gap was identified in our current knowledge about how transport run-off affects vulnerable populations.

5.3.3 Potential policy responses to emissions

The key elements of transport strategy to support active transport were seen to be:

• **Identify liveable corridors and freight corridors:** Ensuring that vulnerable land uses are located on liveable corridors, and where they are located on freight corridors, freight emissions would need to be reduced.

• **Prioritise clean, safe, reliable, affordable public transport:** Maximising ferry use, acknowledging that Auckland’s geography of water could be used as an opportunity rather than a barrier to public transport development (through maximising use of water-borne transport). In addition, emphasis was placed on policies that ensured that non-ownership of a car would not be disadvantageous in the future in terms of access to vital goods and services. Strategies that maximise the efficiency of public transport should be included, such as transit lanes and priority traffic light management.

• **Prioritising active transport for short journeys:** Workshop participants identified that most car journeys are short, and many could be replaced by walking and cycling, especially if infrastructure for walking and cycling was improved. This would require prioritising investment in walking and cycling infrastructure in the ARLTS.

• **Valuing externalities:** When it comes to cost-benefit analysis, emissions externalities, such as cost to environment, healthcare costs, and Kyoto costs need to be included. Measures of economic growth were recommended to include these costs of emissions.

5.3.4 Key strategy-led actions around emissions

To take the ARLTS forward, the following actions were proposed for active transport:

• **Advocacy at central government level:** Advocacy as part of the ARLTS was discussed by several groups. This included advocating strongly for central government legislation around vehicle emissions standards that applied to all land transport, as well as ferries and coastal shipping. In addition, advocacy was suggested for greenhouse gas reduction policies that supported the Auckland region becoming the national leader in addressing greenhouse gas emissions.

• **Subsidies for low income families:** Suggestions included subsidising public transport for low-income families to address the changes in affordability of car use brought about by emissions standards and increasing fuel prices; as well as subsidising low income households to “scrap” especially high emissions vehicles and purchase cleaner, more energy efficient vehicles; not only would these be cleaner and more energy efficient, but they would also build in greater resilience in low income populations to fuel price rises.

• **Improve our understanding of "good" mixed use, and "good" intensification:** Increased exposure to poor air quality and noise through housing intensification were
concerning for many participants. The use of international examples of high quality urban design was felt to be vital if we were to achieve increased density while addressing these negative effects.

- **Development of indicators**: Discussion about indicators was particularly focused on indicators of the value of emissions externalities.
- **Integrated planning**: Suggestions included ensuring regional council fully integrates land use and transport planning, that state highway and regional transport plans should be co-ordinated, and that air, land and water planning and transport plan are also linked.
- **Communications and information**: Participants identified an opportunity to provide (e.g. the Maxx website).

The diagram below outlines the issues raised in this theme, and highlights the follow from strategic underpinnings of the ARLTS, through to on the ground actions, and the potential health and well-being outcomes identified by participants.

### Impacts and Enablers: Emissions

<table>
<thead>
<tr>
<th>Strategic foundations</th>
<th>Actions</th>
<th>Potential health-related outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated planning</td>
<td>Advocate for central government emissions regulations for air pollution, noise and greenhouse gases</td>
<td>Reduced mortality and morbidity from air pollution and noise</td>
</tr>
<tr>
<td>Prioritisation of clean, safe, affordable public transport and active transport for short journeys</td>
<td>Support low income families to make low emissions transport choices</td>
<td>Prevention of the worst public health and economic impacts of global climate change</td>
</tr>
<tr>
<td>Design principles that identify liveable corridors and centres, and maximise the “goods” of intensification for wellbeing, while minimising the “bads”</td>
<td>Communities and urban centres designed for active transport</td>
<td>Health co-benefits including reducing obesity and its consequences</td>
</tr>
<tr>
<td>Valuation of emissions externalities</td>
<td>Develop exemplars for “good” housing and transport intensification and mixed use urban design</td>
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</tr>
<tr>
<td></td>
<td>Develop methods for communicating the effects of transport choices to communities</td>
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</tbody>
</table>

### Issues for vulnerable populations

- Poor housing next to arterials, motorways and rail corridors
- Exposure of vulnerable populations, including Maori and Pacific populations
- Affordability of low-emission alternatives
- Run-off to water and soil
5.4 SAFETY

5.4.1 Potential impacts of the strategy on safety

Participants examining the Safety theme suggested the following positive outcomes that could be achieved through the strategy:

- **Improved health and well-being outcomes**: Key outcomes that were identified included reductions in road injuries and fatalities, and fewer pedestrian injuries.
- **Perceptions of safety**: Environments that are seen to be safer would promote more active transport modes.
- **Supportive environments for safety**: These included improved environments for cyclists, and greater choice of safe routes; safety barriers; a more pedestrian-friendly environment; use of traffic lights rather than roundabouts; supporting recreational active transport; and provision of mobility taxis.
- **Improved public transport use**: Addressing the security aspects of public transport (such as in evening buses and train stations at night) and the ongoing improvements to the public transport fleet (such as buses that kneel) will support increased public transport use.
- **Integrated approaches**: The ARLTS could foster an integrated approach for safety, linking responsibilities of different central and local government agencies/offices, research and community networks. The objectives or advantages of such an approach would be to ensure the infrastructure (including roading, shelters, street lighting and contractors’ requirements) developed around transport was of a consistent high standard, and incorporated principles of injury prevention through environmental design.
- **Maintenance of car culture**: A key concern was that if the transport strategy would fail to erode the car-dominated culture of Auckland and continue to undermine efforts to support safety for users of all modes of transport.

Participants identified the need for developing good indicators for safety beyond the current suite, which better identify the absolute and relative risk, and which provide markers where differences can be made.

5.4.2 Issues for vulnerable populations

Key issues for vulnerable populations included the following:

- **Vulnerable road users**: From a safety perspective, there are many road users who are more vulnerable to death or injury, particularly pedestrians, cyclists, motorcyclists, young people and older people.
- **Design for most vulnerable populations**: Participants suggested that a transport system that provided safe and secure passage for the most vulnerable populations, including elderly, families, young women and people with disabilities would ensure a universally accessible and safe transport system. A further issue is that children from more deprived areas tend to be more likely to walk to school than children from least
deprived areas; the safety of the environment around these schools is therefore an important concern.

- **Motorcyclists**: Motorcycles comprise 2-3 percent of the national vehicle fleet in NZ, but the cost of motorcycle injury claims to the ACC Motor Vehicle account is approximately 18-20 percent. Regulatory changes requiring greater visibility, such as LED running lights and high visibility vests would help reduce the injury rate; this is particularly relevant given the growth of low-powered scooters in recent years.

### 5.4.3 Potential policy responses for safety

The key elements of transport strategy to support transport safety were seen to be:

- **Design leadership**: The ARLTS could provide important design leadership that provided overarching principles for safety and fosters integrated and consistent approaches across the region. The design principles should be informed by strong consultation on the needs of all transport users covering all modes of transport. Participants suggested that a key goal should be to reduce the volume of cars and other forms of private transport and increase the use of other transport modes.

- **Demand management**: This included building or enhancing the infrastructure of cycling and walking (including safe pedestrian/cycle lanes alongside motorways); and using ‘road dieting’ where roads are reduced in number of travel lanes and/or effective width in order to achieve systemic improvements in safety and active transport modes (such as dedicated cycle or PT lanes).

- **Guidance for land use decision-making**: Participants were of the view that there was a disconnect between land use decisions at the local level versus the regional strategic or regulatory level, and that this was creating inconsistent application of safety principles in different parts of the Auckland region.

### 5.4.4 Key strategy-led actions for safety

To take the ARLTS forward, the following actions were proposed for safety:

- **Improving the environment of safety**: Suggestions for this included enhanced safety guidance for transport infrastructure development; application of injury prevention through environmental design principles; improving the safety of passenger transport for all users (such as kneeling buses); improving the infrastructure for pedestrians and cyclists; and providing visual clues for pedestrians in busy areas to improve awareness of injury risk. One suggestion was that police in uniform should be allowed to travel free on public transport to and from work, to help improve perceptions of safety. It was also suggested that transport planning should incorporate differentiated safety approaches based around particular settings and times of the day, such as school opening and closing times.

- **Information and education**: This included ongoing driver education, and improving motorcyclist education (particularly given the widespread availability of scooters to people without motorcyclist licences); and developing a culture shift in attitudes and responsiveness to cyclists.
• **Investment**: Increased investment in safety initiatives supporting both safer environments and developing a culture of safety across the people of the region.

Some participants noted that bus driver safety is an important consideration, as they are at the cutting edge of many of the transport changes in the region, and ensuring a safe environment in which they work, will have flow-on effects to other public transport users.

### Impacts and Enablers: Safety

#### Strategic foundations
- Design leadership fostering safer environments
- Funding safe active and public transport infrastructure
- Information/communication investment
- Region-wide safety frameworks
- Regulatory environment

#### Actions
- Improving environments of safety: traffic calming, road dieting, pedestrian/cycle lanes, public transport
- Information and communication to develop culture shift favouring safety
- Supportive infrastructure in place (e.g., resting places, traffic calming, bike racks in centres and PT)
- Low cost public transport

#### Potential health-related outcomes
- Reduction in transport related injury/mortality
- Improved perceptions of safety
- Safer places to live, work and play
- Improved public transport usage
- Integrated safety approaches region-wide
- Weakened car culture

### Issues for vulnerable populations
- Vulnerable transport users (e.g., pedestrians, cyclists, motorcyclists, young people and older people)
- Ensuring design of transport environment works for families, older people, people with disabilities
6. WHĀNAU ORA CONSULTATION: KEY THEMES FOR CONSIDERATION

6.1 MĀORI CONCEPTS OF HEALTH AND WELL-BEING

Hauora or health, is an all embracing concept which embodies the importance of wairua (spiritual), whānau (family), hinengaro (mental) and tinana (physical aspects) (Durie 1998).

From the Māori viewpoint, issues involving te whenua (land), te reo (language), te ao turoa (environment) and whānaungatanga (relationships, kinships, kaupapa and whakapapa whānau) are central to Māori culture, and hauora Māori.

Hauora is a reflection of the well being of whānau, hapū and iwi (Minister of Health & Associate Minister of Health 2002). Whānau is widely recognised as the core social unit of traditional and contemporary Māori society. The assumption is that if whānau health is protected so will the health of the hapū and iwi. It is from this premise that Māori live full and active lives.

Health outcomes are unevenly distributed between population groups. Māori, as a population group have on average the poorest health status of any ethnic group. There is a growing body of evidence relating to the role that issues such as income and employment, transport, housing conditions and urban design have on the health status of a whānau.

Whānau ora health impact assessment (WOHIA) emphasizes the determinants of health as they impact on Māori. A particular focus of WOHIA is how the particular policy under review – in this case the Auckland Regional Land Transport strategy can support Māori health and well-being and reduce health inequities between Māori and non-Māori.

6.2 CONCERNS RAISED BY MĀORI STAKEHOLDERS

6.2.1 Process and participation

An important issue raised in the whānau ora appraisal workshop focused on Māori participation in the policy making process and the governance of the strategy.

Participants identified that ‘getting it right for Māori’, in terms of addressing key health issues that impact on Māori, would mean that the needs of all would be met.

The ability for Māori to exercise control over the direction and shape of their institutions, communities and development, is influenced through Māori participation. Currently very few Māori participate as councillors in local government and there are no Māori councillors in the Auckland Regional Council.

Participants in the appraisal workshop questioned how Māori as a group participate, and what partnership role mana whenua (iwi from the Auckland region, such as Tainui or Ngati Whatua) has in the policy process. The composition of the Regional Transport Committee calls for a ‘cultural representative’ which is not specifically defined to be Māori specific. Although the ‘cultural representative’ on the Regional Transport Committee is Māori, participants were concerned that there was not a mana whenua representative on the committee, and that this is an important issue of how well-being considerations for mana whenua will be addressed through the strategy.
6.2.2 Equity and cultural considerations

In order to consider the impact of each of the strategic options on whānau, workshop participants identified the importance of considering where large numbers of whānau live, where they travel for work, (and what time of the day they work) where whānau attend education, where other whānau members reside, where whānau access services and recreation, or travel to participate in tribal matters.

Important equity considerations that were identified included:

- The impact of road pricing on people with low income and large family sizes (of which Māori are strongly represented) was a significant concern. These groups are often required to travel extensively on a daily basis to work, school, whānau and other settings, and road pricing regimes may hit these groups hardest.

- In lower income housing areas where Māori and Pacific whānau are more represented, air pollution and noise are often more prevalent. A potentially deadly combination of poverty, poor housing conditions and exposure to poor air quality, mean tamariki, kaumatua and kuia are more vulnerable in suffering respiratory issues.

- Transport is needed to access employment, and the type of work whānau are involved with for example the manufacturing industry and shift work may limit the availability of public transport options.

Access and mobility were seen by participants as a fundamental issue in transport policy. Participants identified a need for more consideration of the future projections for where Māori are moving to in the future. Participants questioned whether the future transport system would accommodate whānau.

Examples were given that highlights the intertwined nature of transport issues for Māori. Transport is needed to access services, but urban design and planning in some areas makes it impossible for whānau to access services by active transport or public transport. Examples are highlighted below.

- For some low income Māori, travelling from one side of Auckland into the city and using active modes is not a realistic option. Many of the areas which are highly populated by Māori and Pacific people don’t have decent footpaths for them to access active modes, and some of the areas which whānau live in may not be seen as desirable or safe for active transport.

- To attend kura kaupapa (Māori immersion language schools), often requires whānau to travel out of area and school travel plans are not a option. Available and affordable land sites for the establishment of kura kaupapa and kohanga reo (Māori language pre-school learning nests) have meant that whānau are exposed to high traffic density, noise and air pollution, as well as an increased likelihood of road injuries. Many marae are located in areas serviced poorly (if at all by public transport). Many whānau travel regularly to tangi, and other whānau and tribal hui requiring frequent travel around and out of Auckland.

- Some of the Rapid Transport Networks such as the North Shore Busway, and ferry routes come from locations in which whānau are less likely to reside. They are also
very ‘city centric’ – they tend to have an end point in the central city. There is a need to provide travel options to other areas which whānau regularly access.

- Some strategies like workplace travel plans and school travel plans are working well, however they are generally targeted towards non-Māori communities which can exacerbate existing patterns of inequity.

- Policies that are focused towards pulling whānau out of cars in favour of public transport may in their practical application be neither affordable nor practical; for example when three different buses are needed to get to a workplace, or other venue, or when there are a number of whānau members that need to be dropped off or picked up from different places.

In these examples, issues of access and mobility, emissions, adequacy of public transport and safety are all brought to bear in the daily life of Māori families.

The potential for transport emissions run-off to pollute land and waterways was a further issue raised by participants, and was seen to undermine traditional practices. In Māori world views, access to whenua is a pre-requisite for good health, and the sites may have important significance to mana whenua as well as to the natural and cultural heritage of the area.

Run off from road development, pollution into the sea affecting the supply of kaimoana (traditional sea food beds), old urupa (or burial sites) that are relocated due to roading projects (such as airport roading developments), are all elements which impact on kaitiakitanga and consequently the well-being of whānau and hapū of the area.

Some features of transport in Auckland have particular historical meaning for Māori. One participant gave an example of the Old Great South Road, which was originally built as a route for soldiers to travel on during the land wars.

Participants also questioned where new roads would be built and the process of acquiring the land. What happens, for example, if the land is under treaty claim?

6.3 POTENTIALLY POSITIVE STRATEGIC DIRECTIONS OR ACTIONS FOR MĀORI

6.3.1 Responsive Policy for Māori

Advice provided by Te Pumanawa Hauora (Māori Health Research Centre) to Te Kete Hauora (Māori Health Directorate, Ministry of Health) identified a strategic framework for developing Māori health policy. The report identifies the policy development process as being responsive to Māori when it:

- actively involves Māori in policy development;
- actively involves Māori in decision making;
- consults meaningfully with Māori;
- affirms Māori cultural viewpoints;
- is culturally safe; uses te reo Māori correctly;
respects Māori intellectual property rights;
• acknowledges the rights/special needs of tangata whenua;
• identifies the impact on Crown/tangata whenua relationship;
• respects Māori and in turn develops trust.

Te Pumanawa Hauora identified the policy outcome as being responsive to Māori when:
• policy outcome supports Māori health gain;
• improves accessibility for Māori by addressing known barriers to access;
• is consistent with the Government’s Māori Development and Treaty policies;
• addresses health priorities of Māori;
• promotes Māori wishes to take responsibility for their own health (Cunningham & Taite 2007).

In the context of the Regional Land Transport Strategy, examples of more responsive policy outcomes for Māori include:
• addressing the issues which affect Māori use of public transport such as cost and availability (issues identified in the previous section);
• paying particular attention to policy options which seek to address health issues such as improving the air quality in communities (by reducing vehicle emissions) where large numbers of Māori reside;
• addressing the involvement of Mana whenua in the policy making process.

6.3.2 Investing in public transport to benefit whānau

Suggestions put forward by participants included:

• Making public transport affordable to whānau, and providing safe, clean, weather proof and accessible public transport shelters/sites with regular services on routes which whānau access.
• Supporting caregivers of children by allowing for push chairs to be carried on the front of buses, and for buses that kneel to allow those with a disability to use. Some participants identified the size of some Māori and Pacific whānau, and making sure that public transport options accommodated these needs.
• Working with the organisers of large Māori hui to provide public transport options, for example the ASB festival.
• Providing public transport to areas where whānau have chosen to live close to papakainga, and which are currently not serviced by public transport.

Māori wardens provide an important service within Māori settings and communities, and participants suggested their roles could be supported by allowing them to travel free of charge in their uniforms on public transport (in much the same way as police officers were once encouraged to do).
6.3.3 Road pricing

It was suggested that vehicles with many occupants could be exempt from road pricing charges (in the same way that transit lanes favour vehicles with three or more occupants). Māori have the highest participation rate for car pooling, except for urban Māori males 18-25 yrs who are single users. It was therefore proposed that establishing road pricing enabling those vehicles that have at least two whānau members in the vehicle with the driver to travel without cost (or to look for other incentives).
7. Stakeholder Feedback on Strategic Directions

During the stakeholder consultation process, participants were asked to identify which of the strategic options they favoured, or if there was a scale and/or mix of options was required.

To recap, the four strategic options put to stakeholder were:

- **Strategic Option 1 – Demand Management**: Focusing on “push” factors in which establishing road pricing and making improvements to public transport and walking and cycling modes will push people out of their cars and influence them to use more active and sustainable methods.

- **Strategic Option 2 – Mixed Investment**: Maintaining current approach, where improvements are made for all modes of transport but shifts away from road investment.

- **Strategic Option 3 – PT led change**: This option concentrates on “pulling” factors to encourage people out of their cars by heavily investing in public transport and some roading improvements.

- **Strategic Option 4 – 'Quantum Shift'**: This option involves a combination of the push factors from Option 1 and the pull factors from Option 3, together with a much more aggressive approach to land use intensification than was assumed in Options 1-3.

There was a strong signal from participants that there was insufficient information available to be able to assess each option in a considered way; indeed, the modelling for the options had only recently been completed and little detail was able to be communicated to stakeholders beyond the general intention of each direction.

Despite these limitations, there was a general view among stakeholders that a significant change was needed above and beyond that which had gone before, if the strategy were to make a meaningful contribution towards national policy targets, significantly increase active transport and achieve improved health and well-being outcomes.

Some participants suggested this was potentially best captured by the ‘quantum shift’ scenario, although the label appeared to communicate a level of change that many interpreted as unrealistic. There was a general agreement that the quantum shift scenario should be re-named to communicate a scale of development well above current aspirations, but which would only be achievable with extensive policy interventions.

There was also a general sense that this significantly increased scale of change needed to have at its heart a focus on demand management and public transport investment – essentially combining strategic options 1 and 3.

Notable points raised by stakeholders included:

- active integration of transport with land use planning;
- prioritisation of active transport and public transport at the top of the road user hierarchy;
- significant investment in active transport infrastructure and improving the safety of active transport;
• ongoing improvements in the environment of transport safety, including road dieting (as noted before, where roads are reduced in number of travel lanes and/or effective width), speed reductions, traffic calming and supportive urban design;
• culture shift away from the car;
• supporting transport access by low-income groups and other vulnerable populations;
• focus on transport development in both urban and peri-urban areas.

The discussions on this topic culminated in participants writing their preferred option(s), together with reasons for this, on post-it notes and placing them on a board for discussion. Transcripts of these comments are included in the workshop notes displayed in Appendix 2.
8. **Health Impact Modelling Findings**

This section reviews selected outputs from the ARLTS 2041 strategic option modelling and the potential quantifiable health impacts. The section is structured around the four focus areas of the HIA (emissions, safety, access and mobility, and active transport); and covers the following 2010 ARLTS objectives: ensuring environmental sustainability; assisting safety and personal security; protecting and promoting public health; and improving access and mobility.

The ART3 modelling provides 2006 data as a baseline and for the four 2041 strategic options (see section 2.4 for a summary of the strategic options). Additional modelling was undertaken by Dr Graeme Lindsay of the University of Auckland’s School of Population Health.

The analyses are based on the data outputs supplied by the ARC from the ART3 modelling process as of July 2009.* The ART3 modelling was undertaken to support development of the ARLTS 2010. The modelling explores scenarios for each of the four strategic options discussed earlier in this report.

At the time of writing, revisions were likely to be made to the ARLTS model, with data inputs/assumptions to be checked and revised as necessary.

8.1 **General Comments**

- In general, there is relatively little difference between the different ARLTS scenarios, in terms of their projected 2041 impacts.

- All ARLTS 2041 scenarios developed by the ARC, and developed further for this HIA, fall short of meeting the objectives of the New Zealand Transport Strategy regarding environmental sustainability and protecting and promoting public health.

- The fourth or “quantum” shift strategic option, although more aggressive than the other strategic options, is unambitious when compared to what has been achieved elsewhere in the world and does not meet most targets.

- Under all scenarios, road vehicle use is projected to remain very high (73-78 percent of 2041 trip mode share depending on the scenario cf 87 percent in 2006). Active transport mode share is not as high as what it could be based on cities elsewhere in the world. The modelling indicates that public transport will achieve a low 7 percent to 9 percent of mode share in 2041 compared to 3 percent in 2006.

- Positive change is indicated in road safety, with the external inputs to the modelling indicating that crashes, injuries and death are projected to greatly decrease by 2041.

- Future strategic development could be substantially supported using modelling that takes a “backcasting approach”, whereby relevant targets are used as the starting point, and modelling is undertaken to identify what is needed to achieve these targets and where the key leverage points are.

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* File output 'RLTS_09_v4_AllScenJuly09.xls', and related discussions with staff.
Modelling would also be improved by involving the health sector and other stakeholders as an integral part of the option/model design and decision-making on the desired outputs of the model.

8.2 ACTIVE TRANSPORT IMPACTS

The NZTS target is to increase walking, cycling and other active modes to 30 percent of total trips (for ages 5 and older) in main urban areas by 2040.

Due to data limitations on trip legs versus trip chains and short distance trips, a number of assumptions were made and the 30 percent NZTS target was regarded as equivalent to 15 percent for ART3 modelling purposes.

Using this measure, all four ARLTS 2041 options meet or exceed the NZTS target for active mode share (15 percent-18 percent mode share or 30-36 percent NZTS equivalent). Data were not broken down by actual active mode such as walking and cycling.

Although the ARLTS model predicts that all ARLTS strategic options will meet the NZTS target, this target is not as high as what has been achieved in other cities elsewhere in the world.

Further comments on active transport are made in section 8.3 on safety impacts.

8.3 ACCESS AND MOBILITY IMPACTS

The ART3 modelling data produces a range of outputs in relation to access and mobility. This section comments on aspects of these data.

8.3.1 Modelling of public transport mode share

The modelling shows that all 2041 strategic options meet the overall NZTS 2040 target of seven percent of all trips to be by public transport by 2040. However, the NZTS requires that large urban areas, including Auckland, need to take a greater share of this target, for Auckland this equates to approximately 11 percent of all trips. Strategic options 1 and 2 each had seven percent mode share and options 3 and 4 had nine percent, compared to three percent mode share in 2006).

The modelling had a separate Auckland target of 160 annual public transport trips per person. Using this measure all strategic options fall short of the target (85-101 for options 1-3 and 116 trips for option 4).

Although all strategic options meet the NZTS 2040 target, the public transport mode share modelled is very low compared to what other cities elsewhere in the world have managed to achieve. For example, Curitiba, a large city in Brazil, was once a car dominated city like Auckland but now approximately 60 percent of trips to work are by the extensive bus rapid transit system.

Future ARLTS modelling should consider international comparisons for public transport mode share, based on what has been achieved in different urban settings. This should include reviewing international examples of modelled results with actual results for successful public transport projects, to ensure the transport model is adequately sensitive to the impacts of public transport projects.
8.3.2 Modelling of availability of travel choices

The ARC’s modelling looked at availability of employment, tertiary, health and retail facilities within 30 minutes (see table 8.7 below) and 45 minutes by car and public transport (PT).

Table 8.7: Availability of travel choices: percentage of opportunities within 30 min of households

<table>
<thead>
<tr>
<th>Mode</th>
<th>Auckland 2006</th>
<th>2041 ARLTS strategic option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Employment, Car percent</td>
<td>49</td>
<td>59</td>
</tr>
<tr>
<td>Employment, PT percent</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Tertiary, Car percent</td>
<td>48</td>
<td>64</td>
</tr>
<tr>
<td>Tertiary, PT percent</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Health, Car percent</td>
<td>52</td>
<td>45</td>
</tr>
<tr>
<td>Health, PT percent</td>
<td>17</td>
<td>30</td>
</tr>
</tbody>
</table>

Source: ARLTS modelling data (RLTS_09_v4_AllScenJuly09.xls)

Access to these opportunities by public transport is projected to increase for all strategic options compared to 2006, with option 4 generally having the highest access with the exception of access to health facilities. Option 4 also had the highest access to opportunities by car.

However, given that the modelling indicates that overall public transport mode share will reach only 7-9 percent in 2041, the percentage of opportunities within 30 minutes would increase if public transport frequency and availability was modelled to be higher than that currently modelled.

8.3.3 ART3 modelling of public transport access for people living in the most deprived areas

Outputs from ART3 were used to consider access to public transport for people living in NZDep 7-10 areas (i.e. the most deprived areas) of Auckland for the AM peak and the interpeak period (IP).

All four ARLTS 2041 scenarios showed a decline for interpeak access to good public transport compared to 2006. This was particularly marked for options 1-3 (see figure 8.4 below). There was a slight decline in AM access for option 1-3 and option 4 was the only option that had increased AM access compared to 2006.
Such a scenario, if it were to arise, would be inequitable and very concerning; the scenario would mean that people living in the most deprived areas of Auckland would have on average worse access to public transport in 2041 than in 2006. Note however that the outputs of the ART3 modelling are compared against the geographical pattern of deprivation for 2006; this same distribution is assumed to apply in 2041.

In terms of the direction of the overall strategy, the future rollout of public transport services needs to be regularly revisited to ensure that the most deprived populations have increased access to public transport, rather than decreased.

Ideally, these types of analyses should be expanded to cover all NZDep areas to ensure that the poorer areas of Auckland are getting at least the same access as the wealthier parts of Auckland.

8.3.4 ARLTS modelling of public transport service reliability

The ART3 modelling shows that the percentage of congested public transport kilometres for all 2041 strategic options approximately halves to around 10-12 percent compared to 24 percent in 2006.

Reduced public transport congestion is desirable for encouraging uptake of public transport and also from an emissions perspective. Lower speeds and start-stop traffic conditions result in significantly higher fuel consumption and emissions.

Measures that prioritise public transport over other vehicle travel are likely to reduce public transport emissions, increase reliability and attraction of public transport. Some of these measures are already in place in Auckland, for example, bus only lanes, and priority signalling at lights. There may be value in incorporating different scales of rollout of measures such as these as part of the ARLTS modelling (the complexity of this exercise is however acknowledged...
in a region-wide model such as ART3, where multiple model runs are required to incorporate not
only these actions in many different parts of Auckland, but also their downstream effects).

8.4 EMISSIONS IMPACTS

8.4.1 ARLTS modelling of emissions

The ART3 modelling emission outputs for the 2006 baseline and for the different ARLTS 2041
strategic options are outlined in the table below.

Core inputs into the ART3 model include the Vehicle Emissions Prediction Model (VEPM) version
3.0 which uses national fleet data and provides emission factors and fuel consumption data;
assumptions on mode share, vehicle kilometres travelled (VKT), congestion and average travel
speed.

A limitation of the inputs to the VEPM is the national fleet data provided by the Ministry of
Transport. This needs updating by the Ministry to reflect predictions on increased fuel efficiency
and emissions standards, biofuel uptake and electrification by 2041. As a result the ART3
modelling may currently be overestimating the emissions in 2041.

Table 8.1: ARLTS modelling emission parameters and outputs

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protecting and Promoting Public Health</td>
<td>Emissions to air</td>
</tr>
<tr>
<td></td>
<td>Daily kg of:</td>
</tr>
<tr>
<td></td>
<td>volatile organic chemicals (VOC)</td>
</tr>
<tr>
<td></td>
<td>NO_X</td>
</tr>
<tr>
<td></td>
<td>PM_{10}</td>
</tr>
<tr>
<td></td>
<td>Noise and vibration</td>
</tr>
<tr>
<td></td>
<td>Noise: road traffic volume count for selected areas</td>
</tr>
<tr>
<td></td>
<td>Vibration: train volumes per 2-hour period</td>
</tr>
<tr>
<td>Ensuring Environmental Sustainability</td>
<td>Use of non-renewable resources</td>
</tr>
<tr>
<td></td>
<td>Daily fuel consumption for region and per capita</td>
</tr>
<tr>
<td></td>
<td>Greenhouse gas emissions</td>
</tr>
<tr>
<td></td>
<td>CO_{2} (daily kg for region and per capita)</td>
</tr>
<tr>
<td></td>
<td>Target CO_{2} per capita (2.6 kg per person per day, i.e. 50 percent of the 2006 figure of 5.2 kg)</td>
</tr>
<tr>
<td></td>
<td>Emissions to water</td>
</tr>
<tr>
<td></td>
<td>Modelled as being directly proportional to the vehicle kilometres travelled for the different ARLTS scenarios. No data on the actual type, amount, distribution, impact of pollutants</td>
</tr>
<tr>
<td>Vehicle km Travelled (VKT)</td>
<td>2041 estimates of daily VKT for each of the strategic options</td>
</tr>
</tbody>
</table>

* Daily means per weekday. Weekend VKT and emissions were not an output of the ART3 model.
8.4.2 Road vehicle kilometres travelled in 2006 and 2041

Vehicle Kilometres Travelled (VKT) estimates are a key factor in determining air, water and noise pollution; greenhouse gas emissions and road safety. It is therefore important to have an overview of the 2041 VKT projections from the ART3 model (see table below). All of the ARC’s modelling of the strategic options show increases in VKT from 2006 to 2041 of between 25 percent and 39 percent.

The increase in VKT projected for 2041 is the primary reason that all ARLTS scenarios do not ensure environmental sustainability, with fuel consumption, greenhouse gas emissions, water emissions, noise and vibration increasing under all ARLTS strategic options (see subsequent sections).

Table 8.2: Auckland region VKT (road vehicles) – 2006 and ARLTS 2041

<table>
<thead>
<tr>
<th>VKT parameter</th>
<th>2006 (baseline)</th>
<th>2041 ARLTS Strategic Option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>ARLTS model weekday VKT (million)*</td>
<td>29.98</td>
<td>41.36</td>
</tr>
<tr>
<td>percent increase from 2006</td>
<td>-</td>
<td>38</td>
</tr>
<tr>
<td>Annual VKT (billion, estimated) #</td>
<td>10.55</td>
<td>14.55</td>
</tr>
</tbody>
</table>

* From ART3 model.
# Annual estimates calculated as part of this HIA - based on ratio of weekday to weekend VKT in the NZ Household Travel Survey 2003-2006 (weekend VKT 88.2 percent of weekday VKT).

8.4.3 Use of non-renewable resources: fuel consumption 2006 and 2041

The ART3 modelling indicates that the total regional fuel consumption increases markedly (68 percent to 73 percent) for all 2041 strategic options compared to 2006. On a per capita basis the ART3 modelling indicates that fuel consumption increases by two percent to 13 percent compared to 2006 (see table 8.3 below).

Table 8.3: Auckland region road vehicle fuel consumption – 2006 and ARLTS 2041

<table>
<thead>
<tr>
<th>Fuel consumption parameter *</th>
<th>2006 (baseline)</th>
<th>2041 ARLTS Strategic Option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Fuel, regional (weekday litres, million)</td>
<td>2.96</td>
<td>4.98</td>
</tr>
<tr>
<td>percent increase 2006 to 2041</td>
<td>-</td>
<td>68</td>
</tr>
<tr>
<td>Fuel per capita</td>
<td>2.20</td>
<td>2.41</td>
</tr>
</tbody>
</table>

* New Zealand Household Travel Survey 2003-2006. Data provided by Lynley Povey, Ministry of Transport.
Of note is the much larger increase in regional fuel consumption than the increase in regional VKT (see previous section). This was raised with the modelling teams at the ARC, and it was agreed that this was likely to be due to assumptions in a separate emissions model, and that the fleet average vehicle fuel consumption should be less in 2041 than 2006, due to improved technology and some electrification of the fleet. There are however some factors that increase fuel consumption such as lower vehicle speeds due to congestion. At the time of writing, the ARC was revisiting the model inputs and assumptions used for calculating fuel consumption.

Also of note is the large disparity between the per capita and total fuel consumption increase that highlights a drawback of per capita indicators, particularly if used in isolation. Population growth substantially masks the large growth in total fuel consumption (or other measures such as greenhouse gas emissions). As a rule, per capita data should not be used in isolation and instead presented with total data (it is noted that ART3 modelling uses both, but that the NZTS target relates to per capital consumption).

8.4.4 ARLTS 2041 scenarios and greenhouse gas emissions

For this HIA, the following data and information sources were reviewed and compared against the ARLTS 2041 greenhouse strategic options:

- ART3 model outputs with regards to CO₂ emissions and the Vehicle Emissions Prediction Model which provides land transport emissions and fuel use inputs for the ARLTS modelling.
- The New Zealand Transport Strategy (NZTS) 2008, the government targets in this area and the Transport Monitoring Indicator Framework 2008 that sits alongside the NZTS (www.transport.govt.nz/tmif/TMIF.htm).
- The Environmental Impact of Transport Climate Change-related Indicators E1001 to E1007 related to the NZTS (www.transport.govt.nz/tmif/Environmental percent20Impact.htm).
- Relevant climate change literature.

The ART3 modelling of the four ARLTS strategic options shows relatively little difference in CO₂ emissions (see figure 8.1 below). All scenarios show almost a doubling in the amount of vehicle CO₂ emissions (11.6 to 12.9 million kg per weekday depending on the option, compared to 7.1 million kg daily in 2006).
The ARLTS has a 2041 target of 2.6 kg CO\(_2\) per person per day, i.e. 50 percent of the 2006 level of 5.2 kg per person per day. However, all ARLTS model scenarios show CO\(_2\) emissions per capita actually increase to 5.7-6.3 kg per person per weekday in 2041.

**Figure 8.1: Daily CO\(_2\) emissions – total and per capita for 2006 and 2041 ARLTS scenarios**

There are important implications raised by the 2041 modelling:

- All ARLTS 2041 scenarios are projected to show a significant increase in CO\(_2\) emissions and are unacceptable given the urgency regarding climate change. The trend in emissions is opposite to the desired direction of the NZTS target to "Halve per capita greenhouse emissions from domestic transport by 2040".

- The projections indicated by the ART3 modelling run counter to the direction of national and international directions in controlling greenhouse gas emissions. The government has a target of reducing New Zealand’s overall greenhouse gas emissions 50 percent by 2050 ("50 by 50"). The government has also recently announced that New Zealand is prepared to take on a responsibility target for greenhouse gas emissions reductions of between 10 per cent and 20 per cent below 1990 levels by 2020 (subject to a range of conditions being met with regard to the development of a comprehensive global agreement). It is becoming increasingly likely that an 80 percent cut in emissions by industrialised countries by 2050 will be needed in order to limit warming to 2 deg C by 2100.

- In addition to CO\(_2\), combustion of fuel produces a number of other greenhouse gases, such as methane and nitrous oxide (N\(_2\)O). It is important to note that the above NZTS greenhouse gas target has a CO\(_2\) equivalent (CO\(_2\)e) component. This is not included in the ARLTS 2041 modelling, meaning that other greenhouse gases are not incorporated.

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• Given that the Land Transport Management Act 2003 definition of "land transport" includes maritime transport and rail, the ARLTS greenhouse emissions modelling is incomplete as emissions from other sources such as coastal shipping, ferries and rail have not been included.

As noted earlier, the Vehicle Emission Prediction Model does not currently include uptake of factors such as future Euro emission standards, biofuel or electrification. As a result the ARLTS modelling may be overestimating emissions.

8.4.5 Noise and vibration

There is increasing evidence that noise affects health and well-being (see section 4.2). Noise and vibration and the impacts of these on vulnerable populations were identified as issues by HIA workshop participants.

It is worth noting that noise reduction is a NZTS target (to "Reduce the number of people exposed to health-endangering noise levels from transport"). The NZTS has a number of indicators associated with this target regarding the percentage of the population and residential buildings exposed to road traffic, seaport (and airport) noise in excess of certain decibel levels.

There is also a "Social cost of transport-related noise" indicator, which is under development.

The ARLTS noise modelling used a number of proxy measures for noise including traffic volumes and train volumes. Overall ‘road traffic volumes’ in regional growth and town centres for 2041 was used as a proxy for noise. This subset of the regional road traffic shows that traffic volumes in 2041 for these areas are slightly greater (4-9 percent) than 2006 for strategic options 1-3 and 5 percent less for option 4.

ARLTS train vibration was modelled as being proportional to train volumes (2-hour period). Train volumes were 4.5-9.0 times the 2006 volumes depending on the ARLTS scenario. No other data or criteria were identified on vibration for trains and none for road traffic.

The RLTS noise and vibration criteria and data collected are limited to these proxies; this makes it difficult to comment on potential impacts on health, well-being and vulnerable populations. Although the ART3 modelling for certain areas shows relatively little change from 2006, it is important to note that 2041 road VKT for the region increases 55-73 percent compared with 2006 (see previous VKT section). It is therefore likely that the population exposed to health-endangering noise and vibration levels will increase by 2041 given that road VKT, train volumes and population numbers increase. However, it is unclear how much of this may be countered by factors such as increased use of electric vehicles/trains by 2041 or urban design mitigation features.

8.4.6 Vehicle air pollution health events for Auckland in 2041

This section outlines the estimates for the mortality and other health events as well as associated costs in 2041 due to vehicle air pollution for the different ARLTS strategic options. The relevant NZTS 2008 target is to "Reduce the number of people exposed to health-

* See [www.transport.govt.nz/tmif/Public percent20Health.htm](http://www.transport.govt.nz/tmif/Public%20Health.htm)
endangering concentrations of air pollution in locations where the impact of transport emissions is significant.”

The methodology involved extrapolating results from the HAPiNZ (Health and Pollution in New Zealand) 2007 study to the 2041 ARLTS scenarios. The HAPiNZ study estimated air pollution events in urban areas for the 30 years and older age group in 2001 due to vehicle as well as domestic and industrial pollution. For more details on the HAPiNZ study findings, methodology and limitations please see the full report or executive summary available at [www.hapinz.org.nz](http://www.hapinz.org.nz) (Fisher et al 2007).

Key data used for this HIA were the population growth from 2006 to 2041 and the ARLTS 2041 model outputs of vehicle air emissions. Data used for the 2009 ARC internal report “A review and update of HAPiNZ for the Auckland region” (Auckland Regional Council 2009c) and further analyses as part of this HIA process provided the baseline number of events for Auckland 2006.

**Modelling of vehicle emissions**

The outputs from the ARC’s modelling are shown in table 8.4 below (which uses both the emissions model and the transport VKT model). Daily emissions of volatile organic chemicals (VOC) are approximately 59-65 percent of those in 2006. Emissions of NO\(_X\) and PM\(_{10}\) are 56-62 percent and PM\(_{10}\) 68-76 percent of the 2006 amounts respectively. No other emissions (apart from CO\(_2\)) were modelled.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Auckland Region 2006</th>
<th>2041 ARLTS strategic option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>VOC (daily kg)</td>
<td>10,005</td>
<td>6,421</td>
</tr>
<tr>
<td>NO(_X) (daily kg)</td>
<td>31,786</td>
<td>19,135</td>
</tr>
<tr>
<td>PM(_{10}) (daily kg)</td>
<td>2,287</td>
<td>1,693</td>
</tr>
</tbody>
</table>

Source: ARLTS modelling data (RLTS_09_v4_AllScenJuly109.xls)

**Vehicle air pollution health events in 2006 and for the 2041 ARLTS scenarios**

The estimated health effects in 2006 and for the 2041 ARLTS scenarios calculated as part of this HIA are outlined in this section.

Although the ART3 model outputs above shows decreased daily amounts of vehicle pollutants by 2041, there are increased numbers of people susceptible to air pollution due to the population increase. There is relatively little difference between the various 2041 ARLTS scenarios in the amount of vehicle air pollutants.

All ARLTS 2041 scenarios indicate an increase in health events compared to 2006 (see table below). In summary, vehicle air pollution in 2041 is associated with approximately:

- 240-270 cases of premature mortality annually in 2041 (compared to 236 in 2006)
• 450-510 cases of bronchitis and related illnesses
• 205-230 hospital admissions for respiratory and cardiac conditions
• 400,000 restricted-activity days annually, i.e. days on which people cannot do the things that might otherwise do if air pollution was not present.

Most of these health effects are associated with particulate pollution (PM$_{10}$). However, other pollutants such as carbon monoxide (CO) and volatile organic compounds (e.g. benzene) also contribute.

These estimates are very likely to be conservative as the HAPiNZ report only included people aged 30+. There is good evidence that air pollution has significant effects on children such as impaired lung development, asthma and infant mortality. Also, there is increasing evidence that the harmful effects of particulate pollution may be greater than the figures used for the HAPiNZ modelling.

Table 8.5: Estimated vehicle air pollution health events for the Auckland region - (number of cases for the population aged over 30 years)

<table>
<thead>
<tr>
<th>Health effect</th>
<th>Auckland Region 2006</th>
<th>2041 ARLTS strategic option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Mortality</td>
<td>236 *</td>
<td>261</td>
</tr>
<tr>
<td>Restricted-activity days (RAD)</td>
<td>367,981*</td>
<td>407,470</td>
</tr>
<tr>
<td>Bronchitis and related illnesses **</td>
<td>447</td>
<td>495</td>
</tr>
<tr>
<td>Acute respiratory and cardiac admissions **</td>
<td>203</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.</td>
</tr>
<tr>
<td>1. * From ARC 2009 &quot;A review and update of HAPiNZ for the Auckland region” internal report.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ** Calculated as part of this HIA based on methodology used in the ARC 2009 report.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. RAD from PM$<em>{10}$ mortality is mix of PM$</em>{10}$ and CO (carbon monoxide) effects; bronchitis/related illnesses and admissions due to CO.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 2041 estimates based on (a) estimated resident population medium growth scenario from 2006 to 2041 (54.8 percent growth) – ref: ARC Model (2006 base) Regional Age Sex Low Med High Output (2006-2051)-1.xls, (b) difference in the daily kg of PM$<em>{10}$ for each 2041 scenario compared with 2006. CO change assumed to be same as for PM$</em>{10}$ as CO not currently an ARLTS model output.</td>
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<tr>
<td>5. Cancer cases due to benzene were not estimated due to the relatively low baseline numbers in the 2007 HAPiNZ report.</td>
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</table>

Cost of vehicle air pollution health events in 2006 and in 2041

As part of this HIA, the estimated costs associated with health events outlined in the previous section were calculated using the values in the HAPiNZ 2007 report. Note that these are not personal costs, but the external costs to the New Zealand health system and economy. Most of the costs are associated with deaths from air pollution.

The total cost in 2006 was estimated to be at least $251m in 2006, and projected to increase to $254-302m in 2041 depending on the ARLTS scenario. The cost expressed on a per distance basis is around $20 per 1,000 km and $120-140 per Auckland resident.
These are however likely to be conservative estimates for reasons noted in the previous section. Also, not all potential costs were included in the 2007 HAPiNZ analysis due to limited data. For example: costs of doctor’s visits; increased use of medications; costs associated with short-term effects; asthma cases; milder effects such as headaches, drowsiness, loss of quality of life that may not be covered in the restricted-activity day analysis.

Table 8.6: Estimated annual costs of vehicle air pollution health events for the Auckland region - 2006 and 2041 ARLTS scenarios

<table>
<thead>
<tr>
<th>Cost</th>
<th>Auckland 2006</th>
<th>2041 ARLTS strategic option and estimated costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cost ($ million)</td>
<td>251</td>
<td>302 286 280 254</td>
</tr>
<tr>
<td>Cost per Auckland region resident ($)</td>
<td>183 142 135 132 120</td>
<td></td>
</tr>
<tr>
<td>Cost per 100m km ($)</td>
<td>2,385,000</td>
<td>2,074,000 1,894,000 1,904,000 1,928,000</td>
</tr>
<tr>
<td>Cost per 1,000 km ($)</td>
<td>23.85</td>
<td>20.74 18.94 19.04 19.28</td>
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</tbody>
</table>

* Costs calculated as part of the HIA.
* Costs per case from HAPiNZ 2007 (fatality/cancer - $750,000, chronic bronchitis - $75,000, cardiac admission - $3,675, respiratory admission - $2,700, restricted-activity day - $92).

An important point to note is that although ARLTS 2041 modelling shows decreased air emissions (of VOCC, NOX and PM10) in each of the 2041 scenarios, the number of deaths and other health events actually increase compared to 2006 due to the increased Auckland region population exposed to air pollution by 2041. As a result, the modelling undertaken for this HIA indicates that the ARLTS does not currently meet the goals of improving public health – public health actually worsens under each of the scenarios. Larger reductions in air pollution than those currently modelled will be required in order to reduce the number of air pollution-related health events. It should also be noted that strategic option 4 could produce more health events with greater cost than indicated, owing to the concentration of the population in the central isthmus and the likely greater exposure of more of the population to emissions that may result.

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As the ARLTS model outputs are only daily kg of PM10, NOX and VOC, the extent of possible analyses of the effects on health are somewhat limited. Effects on health would be able to refined further if carbon monoxide outputs were also modelled.

8.5 SAFETY IMPACTS

The ARLTS uses information gained external to the model to obtain likely scenarios for road safety. The model results rely on this information (detailed in ARLTS Working Paper 17), and was analysed by total road crashes, injuries and deaths for the Auckland region (Auckland Regional Council 2009a). This data also broken down by urban arterials, rural arterials and motorways categories. These inputs were developed to consider past and future trends, improvements and investment in road safety and the impact these could have on the region’s
road safety. These analyses, used as inputs to the ART3 model, indicated that total crashes, injuries and death decrease by 62-65 percent in 2041 compared to 2006 (see figure below). The dramatic increase in road safety with all 2041 ARLTS scenarios is encouraging, but possibly at odds with the large increase (25-43 percent) in VKT in 2041 compared to 2006.

**Figure 8.2: Auckland region road crashes/injuries/deaths - 2006 and 2041 ARLTS scenarios**

Source: ARC ARLTS modelling data

There would be benefit from incorporating the ‘safety in numbers’ effect for pedestrian and cyclist injuries/deaths. This effect has been demonstrated in a number of cities worldwide and shows that as more people walk and cycle, it becomes significantly safer for individual pedestrian and cyclists (Jacobsen 2003). Conversely, walking and cycling become less safe as levels decline. This is illustrated in figure 8.3 on the following page (Netherlands Ministry of Transport Public Works and Water Management 2006).

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`ARLTS Working Paper 17 considered past trends and improvements in safety and determined what may be achievable in the region if these rates were projected out. This assumed that money would be allocated for targeted safety improvements and other incentives would be developed. These are included within the policies of the ARLTS. These are then projected and used to determine accident rates for VKTs.`
Figure 8.3: Number of cyclists killed per 100 million km cycled versus cycling distance per person per day in several European countries


8.6 TECHNICAL RECOMMENDATIONS FOR FUTURE ARLTS TRANSPORT MODELLING

It is recommended that the issues raised below are incorporated in future ARLTS transport modelling activities.

8.6.1 Air pollution

Future RLTS modelling of the effects of air pollution should take account population increases as well as performance against the relevant standards and guidelines, not just the amount of air pollutants emitted.

The HAPiNZ data only considered outcomes in people aged 30 and over. It would also be worth considering evaluating the potential impact of vehicle air pollution for the population aged under 30 years, in particular, for children due to increasing concerns of air pollution on this group. In addition, the ARC HAPiNZ analyses for Auckland should be considered for updating as and when further air pollution data and evidence becomes available.

Future ARLTS model runs should include carbon monoxide (CO) as an output – currently it covers PM$_{10}$, volatile organic compounds and NO$_x$ only. This would enable refinement of the health effects due to CO.

8.6.2 Greenhouse gas emissions

A ‘backcasting’ approach to ARLTS modelling should be adopted; that is, additional ARLTS scenarios should be developed to determine what needs to be done in order to meet:
- the current NZTS target of halving per capita greenhouse gas emissions from domestic transport by 2040
- the government’s 2020 greenhouse gas emission reduction target (if/when finalised at Copenhagen in December 2009)
- the government’s current target of a 50 percent reduction in emissions by 2050.

Furthermore, the emissions modelling information should adopt a CO$_2$ equivalent approach and include other greenhouse gases that are produced from fuel combustion, not just CO$_2$.

Greenhouse gas emission calculations should be aligned with processes used for tracking progress against the NZTS targets and used by the Ministry for the Environment (MfE)/Ministry of Economic Development (MED) when calculating New Zealand’s greenhouse gas inventories.

Update the VEPM and ARLTS greenhouse gas emission modelling when the Ministry of Transport updates the fleet projections.

### 8.6.3 Electric vehicles

Assumptions in the vehicle emissions modelling should be reviewed as follows:

- fuel consumption model outputs will be heavily dependent on the proportion of electric vehicles in the 2041 fleet;
- a range of fleet percentage electrification up to 100 percent should be included in the vehicle emissions model.

Electrification will also impact on air pollution outputs and greenhouse gas emissions. Emissions associated with electricity generation should ideally be taken into account.

### 8.6.4 Water pollution

Workshop participants in this HIA process regarded clean water and soil as vital aspects of a sustainable urban environment (see section 5.3). The effect on ‘kai cupboards’ and how transport emissions might affect vulnerable populations were also identified as issues by participants.

The NZTS has indicators on the number of stormwater quality improvement devices per km of road; harbour water quality (indicator under development); and maritime oil spills. The ARC’s modelling considers water pollution as proportional to the increase in road vehicle kilometres travelled. There are no data on the type, amount, distribution and impact of pollutants.

Further modelling work should be considered to better estimate the impact of the different ARLTS scenarios and stormwater runoff/catchment management on water/soil pollution, vulnerable population and the potential effect on ‘kai cupboards’. There should also be development of appropriate transport water pollution indicators, including consideration of the NZTS indicators already in place or under development.

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*www.transport.govt.nz/tmil/Environmental percent20Impact.htm*
8.6.5 Noise and vibration

The current ARLTS noise modelling does not enable progress against the NZTS noise indicators to be assessed. More detailed noise/vibration modelling should be conducted to enable assessment of the potential impact on health, well-being and vulnerable populations.

Appropriate indicators for noise and vibration should be adopted and developed as part of the ARLTS review process.

8.6.6 Active transport

It would be useful if ARLTS data were broken down by actual active mode, and ideally data on trip distances and trips by age group would also be modelled. This would enable further comments and quantification of the potential health effects of active transport. This would also enable application of health economic benefits which are typically expressed on a per kilometre basis with different values for walking and cycling.
9. **Key Recommendations for ARLTS**

This section details the recommendations for the Auckland Regional Land Transport Strategy, drawing on and developing further the feedback from stakeholder workshops and the evidence from the literature.

An important issue to note is that for the most part, the solutions proposed already exist in the Auckland region; the issue is how those solutions can be implemented at a scale and level of distribution that is well beyond that which is currently provided.

### 9.1 Strategic Foundations for ARLTS to Promote Health and Well-being

#### 9.1.1 Integrated planning

There was a strong signal from the consultation that transport is not a discrete element of policy and/or strategy, but is intimately linked with land use strategies, together with strategies for regional economic development and social and health services.

It is recommended that:

- The transport strategy’s ongoing development is not bound by assumptions about land use scenarios, but that the strategy actively questions the assumptions of land use development and charts a joint path forward for the development of the region to ensure the strongest possible health and well-being outcomes.

- The strategy actively links with regional economic and spatial planning strategies, and with plans for housing, social and health services in the region, to ensure alignment of long-term planning, and in particular to ensure transport and service access for vulnerable populations.

#### 9.1.2 Identifying leverage points for change

For future policy and strategic development, modelling scenarios should be developed focused on achieving overarching strategic goals or targets, and the key leverage points for change that are required. This will enable greater confidence in the ability of strategies to protect and promote public health and well-being. This is consistent with the general direction of feedback and recommendations from the HIA that a scale of change is needed that is greater than what has gone before.

A “backcasting” approach to modelling would support this, by using relevant targets as the starting point, with modelling is undertaken to identify what is needed to achieve these targets and where are the key leverage points for change. Modelling should also be undertaken to evaluate the performance against the relevant NZTS indicators (when these are finalised).
9.1.3 Investment path for active and public transport

A recurrent theme of stakeholder consultation for this HIA is that if the long-term goals of the strategy are to be achieved, there needs to be a path for investment in active and public transport, which together should be the priorities in the road user hierarchy.

It is recommended that the strategy makes these priorities explicit and commits to a long-term funding path that significantly increases investment in active and public transport.

9.1.4 Access for vulnerable populations

If the transport system in Auckland works effectively for, and responds flexibly to the most vulnerable populations, particularly families, older people, children, people on low incomes and people with disabilities, then the system will work for all Aucklanders. It is recommended that the strategy prioritises interventions for these population groups (detailed in section 5.2).

9.1.5 Representation

Māori participants in the consultation were concerned that the regional transport committee has minimal Māori representation, with no participation from mana whenua. Transport was seen by Māori as an important determinant of well-being, and the relative lack of representation carries the potential to ignore or overlook issues of Māori and mana whenua well-being.

It is recommended that the Regional Transport Committee expand its membership to include mana whenua participation.

9.1.6 Demand management

Demand management is a key strategic lever for the ARLTS, which was supported by the stakeholder consultation. It is recommended that the ARLTS prioritise demand management approaches, including the following:

- integrated and affordable ticketing;
- family public transport passes;
- reducing parking;
- incentives to active transport and public transport modes;
- well-connected, attractive and comprehensive active transport infrastructure;
- consideration of how fare zone boundaries impact on low-income and transport-disadvantaged groups (recognising the significant cumulative difference in fares with one zone or across zones).

Actions to take this forward are detailed in section 8.2.
9.1.7 Advocacy for national regulatory change

There are many issues that are subject to national policy guidance, and the ARC has an important advocacy role to central government. It is recommended that the RTC/ARC exercises its advocacy role to lobby for national policy change on the following issues:

- fringe benefit tax incentives for private transport that currently favour car use over active or public transport;
- rigorous emissions policies that will reduce the impact of motorised transport on air and noise pollution, and greenhouse gas emissions;
- ensuring that national transport policy continues to maintain its core objective to protect and promote the public health, and that these are not undermined by contradictory policy signals.

9.1.8 Future watch

The people and transport system of Auckland has evolved and also changed dynamically over the last 20 years, in response to migration and fertility changes, and economic changes at national and international scales. It is recommended that the RTC/ARC continues to monitor the changing demographic, social and economic face of the region so that the implementation of the ARLTS is responsive to change and able to capitalise on emerging conditions.

9.2 STRATEGY-LED ACTIONS TO TAKE STRATEGY FORWARD

9.2.1 Active transport infrastructure

Active transport has the potential to be a pivotal link in a self-reinforcing cycle that could make public transport more viable. To create such a self-reinforcing cycle requires the infrastructure of public transport to more directly support active transport.

It is recommended that the implementation of the ARLTS extensively develops the active transport infrastructure, such as through

- racks on buses (as are now used in Los Angeles and Canberra)
- cycle lanes
- bike storage on trains
- walking links to PT routes
- effective transport shelters.
- resting places along pedestrian routes
- adaptable spaces on buses and trains for wheelchairs, prams and children.

**Responsibility for Action:** ARC and Territorial Authorities over 2009-2010 and Auckland Council from 2010; ongoing responsibility of ARTA.
9.2.2 Expanded public transport network

It is recommended that the strategy leads a comprehensive expansion of public transport, with the objectives of:

- improving the spread and distribution across the region, including building links within and between Auckland sub-centres, in addition to the flows through the Auckland CBD
- ensuring that public transport is equitably distributed by socioeconomic status throughout the region; this could include prioritising high deprivation neighbourhoods for public transport services, and infrastructure for PT, walking and cycling
- ensuring the public transport is attractive in both its cleanliness and styling, and in terms of its perceived safety for users and drivers
- affordability for all Aucklanders, with consideration of how low-income people can access cheaper fares (in the same way that students currently do so)
- flexibility and reach, by exploring innovative ways in which public transport can better meet the needs of shift workers and weekend users.
- providing safe, clean, weather proof and accessible public transport shelters/sites.
- supporting caregivers by allowing for push chairs to be carried on the front of buses, and for buses that kneel to allow those with a disability to use.
- working with the organisers of large Māori hui to provide public transport options, for example the ASB festival
- providing public transport to areas where whānau have chosen to live close to papakainga, and which are currently not serviced by public transport.
- supporting police and/or Māori wardens to travel free of charge in their uniforms on public transport (in much the same way as police officers were once encouraged to).

Responsibility for Action: ARC/Auckland Council and ARTA.

9.2.3 Demand management initiatives

It is recommended that the following initiatives form part of the suite of tools for travel demand management:

- integrated ticketing;
- family PT passes;
- fare reductions for low-income people;
- reducing parking provision;
- incentives to switch to active transport and public transport modes (such as PT subsidies to employees, bike and walking/running shoe provision to those who agree to do so on at least three days per week – these have been successfully trialled in initiatives overseas).

If road pricing is introduced, it is recommended that steps are taken to ensure low-income families with many family members (common among Māori and Pacific families) do not bear an
inequitable burden of the costs, and that innovative means of ensuring this are developed. An example suggested by participants was for vehicles that have at least two family/whānau members in the vehicle with the driver to travel without cost

**Responsibility for Action:** ARC/Auckland Council, ARTA and employers, led by public and local/regional government sectors.

### 9.2.4 Urban design that supports most vulnerable populations

A common theme of discussions was that where urban design caters for people with disabilities, and families/whānau, it will have created a system of universally accessible design, by removing common barriers to active transport, creates safe environments and provides links to essential services and amenities.

It is recommended that territorial authorities focus their urban design efforts with the needs of these population groups in mind.

**Responsibility for Action:** Territorial authorities over 2009-2010/Auckland Council from 2010.

### 9.2.5 School and employer support for workplace travel planning

School travel plans have become commonplace in the Auckland region, and workplace travel plans are developing a presence. Feedback from workshop participants indicated that school travel plans have become most strongly established in less deprived areas, and concerns were expressed that a failure to adapt them to meet more deprived communities will exacerbate health inequities. There is also room for substantial growth in workplace travel plans, including carpooling, facilities for those using active transport (such as bike stands and showers) and subsidies/incentives for active transport.

A further concern expressed was that children from more deprived areas are more likely to walk to school, and more likely to be injured in road crashes, than those from least deprived areas, even without having a school travel plan in place. It is therefore an even more pressing urgency to ensure a safe environment around low decile schools.

It is recommended that:

- ARTA investigates how school travel plans can be adapted to meet the needs of schools serving more deprived communities;
- ARTA expands its workplace travel plan programme to expand its reach across public and private sectors;
- ARTA develop information and programmes specifically for small to medium size business (currently only large organisations get the benefits of workplace travel plans) to enable them to use the principles to develop their own travel plans;
- ARTA investigates how workplace travel planning can better serve low-income employees, shift workers and women.

**Responsibility for Action:** ARTA, territorial authorities (including Auckland Council from 2010), public and private sector employers.
9.2.6 Information and communications

The stakeholder consultation identified a range of ways in which information and communications could be used to support improved health and well-being outcomes through implementing the transport strategy. These included:

- promoting workplace travel plans (including active transport and car pooling)
- promoting driver/motor cyclist safety and education
- promoting pedestrian/cyclist safety education (such as not stepping out without looking, and ensuring that there are visual clues for cars and pedestrians)
- improving perceptions of active transport – marketing to address perceptions, link with national campaign
- strengthening awareness of the contributions of vehicles to carbon emissions and air pollution
- providing financial costs of different trip choices as part of web-based information about transport choices
- strengthening awareness of options for people with disabilities and temporary disabilities
- providing route planning
- providing accurate and detailed transport information, including walking options
- integrating information services that provide not just transport information and comparisons of distance and time by different modes, but also contributions to emissions, physical activity and financial costs for a particular journey by available mode choices.

Many of these options already exist and are delivered by ARC, ARTA and territorial authorities. It is recommended that ARC and ARTA review the scale and focus of existing services and identify how they can be adapted to support improved outcomes.

It is stressed however that the evidence from the health promotion literature is that information/education campaigns have their limitations, and need to be accompanied by environmental changes at the social, physical and policy levels. In particular, information/education campaigns tend to work best with middle and upper income groups, and tend to be least effective with more deprived groups. Information campaigns are also important in supporting people’s willingness to change ahead of regulatory change.

**Responsibility for Action:** ARC/Auckland Council, ARTA, territorial authorities.

The diagram on the following page summarises the key directions identified by the HIA process for the implementation of the ARLTS. The environmental changes required and the potential health and well-being outcomes are indicated.
Key directions for Auckland Regional Land Transport Strategy

Environmental outcomes
- Physical activity as an embedded part of daily life
- Long-term reductions in obesity, diabetes and heart disease
- Social connections across communities
- Fewer transport-related injuries/fatalities
- Reduced morbidity and mortality from air and noise pollution
- Reductions in carbon dioxide emissions
- Safer driving behaviour
- Transport system that meets needs of vulnerable populations and supports reductions in inequities
- Ability to access essential and/or health promoting services and amenities

Supportive environments for active living
- Well-connected communities
- Mixed use centres that are safe and walkable, with connected streets, PT linkages and comprehensive service access
- Vibrant city life
- Reduced congestion
- Well integrated public transport
- Environments that are safe for active transport - street layout, crossing, lighting, traffic calming
- Providing more meaningful alternatives to single occupancy vehicles
- Improved transport integration with key health services
- Emissions standards for all vehicles
- Reduced air pollution, noise pollution and carbon emissions
- Reduced run-off to soil and water

Strategic foundations
- Strategic actions aiming to achieve these outcomes
- Ensuring long-term sustainability and resilience

Strategic-led actions
- Implementation of demand management approaches
- Urban design approaches that support access and mobility by families and people with disabilities - designed for needs of most vulnerable populations
- Facilities
- AT/PT subsidies/incentives
- Carpooling
- Employers buy-in
- Knowledge of impacts on carbon emissions
- Information and communications

Health and wellbeing outcomes
- Fringe benefit tax
- Emissions policy
- National transport policy
- Advocacy for regulatory change
- Future watch - awareness of impact of population and transport modality change

Well-connected and comprehensive AT/PT infrastructure
- Demand management
- Incentives to active transport and public transport modes
- Well-connected and comprehensive AT/PT infrastructure
- Integrated ticketing
- Family PT passes
- Reducing parking
- Linkages with PT
- Racks on buses
- Resting places
- Adaptable spaces for wheelchairs, prams and children

Spread/distribution
- Clean and safe
- Linkages between centres
- Affordable - subsidies for low-income families
- Flexibility and reach - weekend users and shift workers

Land use
- Economic
- Transport
- Social and health services
- Integrated planning
- Investment path - active transport and public transport as leading priorities
- Policies that promote access for families and people with disabilities, and other vulnerable populations
- Maori and mana whenua
- All types of transport users
- Representation

Implementation of demand management approaches

Knowledge of impacts on carbon emissions

Information and communications
10. **Reflections on the HIA Process**

As a final component of the HIA, views were sought from stakeholders at Auckland Regional Council and Auckland Regional Public Health Service, as well as participants in the HIA process. Those who led the HIA also provided reflections and learnings for future HIAs.

### 10.1 Benefits and Successes of the HIA

There was seen to be significant value in bringing stakeholders from many different sectors into the HIA process. The range of organisations and perspectives that were involved brought in fresh ideas which were able to feed into the strategy’s development, and in particular to reflect the perspectives of those who could be considered to be ‘transport disadvantaged’. Many of the issues raised in the HIA have been incorporated into the consultation drafts of the ARLTS.

The Regional Transport Committee received a presentation of findings from the consultation workshops in May 2009. Their response to the draft report was very positive and commended the draft report for its quality. Members of the committee were also appreciative of the range of input received for the HIA and for the scope of its findings, and the committee chair agreed that a template of the recommendations be produced so that the implementation of the HIA’s recommendations can be monitored.

ARC stakeholders particularly valued the input of Māori perspectives (through whānau ora HIA approaches) into the HIA process, with the view that these added dimensions that gave the process more depth and value. There was also value seen in undertaking the HIA at an early stage in the development of the ARLTS, so that health and well-being perspectives could be brought into the strategy’s development process, and not as a critique at the end of the process.

There was also a view that the team leading the HIA, who came from public health, social science, Māori health and health sector management fields, brought a useful range of perspectives to the design of the HIA, and that there were learnings for all through this mixture of disciplines and perspectives.

Participant feedback from the consultation workshops was also very positive. Participants tended to rate the quality of the discussions, the organisations and perspectives brought to the process, the information presented and the general organisation at 4 in a scale of 1 to 5.

Workshop participants particularly valued the different perspectives and knowledge that were shared, the debate that occurred through the workshops, the interactive group discussion formats, and the overall structure of the sessions. Many were keen to ensure the findings were presented to the Regional Transport Committee.

### 10.2 Challenges and Weaknesses of the HIA

A challenge for bringing health and well-being issues into transport planning is communicating to decision-makers the breadth of health and well-being – that it is more than simply health services. Although the point was thought to have been well made through the course of the HIA, including to the Regional Transport Committee, one ARC stakeholder suggested that the scope of health and well-being needs to be constantly reiterated.
Had time and budget permitted, a useful addition to the HIA would have been research on examples in New Zealand and internationally where transport planning has successfully incorporated the issues raised in the HIA. Within the limited budget of the HIA this was not possible, but could be an important contributor to future transport planning, and its interface with health. This would also have been an important way of validating the findings of the consultation process.

Although there was a wide range of sectors and organisations represented in the consultation process, there was a view that it would always be useful to have more voices at the table, such as Age Concern and union organisations, as well as other Māori interests, to ensure the widest possible range of perspectives are included.

The limited time and budget of the HIA process also reduced the opportunity for a more iterative feedback process. The process only allowed a brief period of feedback from participants, and a follow-up workshop would have provided the opportunity to debate the recommendations further and to add depth to the findings. Workshop participants were generally positive about the process, but in feedback some were unclear how the information provided would be taken forward.

10.3 KEY LEARNINGS

Stakeholder feedback suggested a number of learnings from the HIA:

- the potential of HIA as a learning process, to not only bring in people’s perspectives but also to raise collective awareness of health and transport issues;
- that consultation processes such as HIAs take time and effort from stakeholders and participants, not just the project leaders;
- the value of approaching the HIA that was grounded in a systems perspective, focusing not only on impacts but also on enablers of change;
- the importance of integrating research with practice that the HIA process offers;
- the value of engagement processes such as HIAs as a means of developing closer links between organisations and to bring in issues that were not previously considered.

A limitation of established HIA methods is that they are intended to start with a proposed policy or planning solution, which is then reviewed through the lens of a HIA. Where the issue being explored is at an earlier stage of conceptualisation (as is the case with the ARLTS), more participatory approaches to policy and planning may be appropriate, which involve diverse stakeholders in agenda setting and problem identification, and which work towards a collaborative solution. This participatory approach was the first principle on which this HIA was undertaken.

From the perspective of HIA practitioners, we feel some of the success of the HIA was to do with explicitly bringing enablers as well as impacts into the consultation processes, so that participants had a shared sense of what needed to be in the strategy, as much as what the impacts might be. This we feel is a significant shortfall of Public Health Advisory Committee guidance, which is strongly impact focused, and gives less emphasis to identifying solutions, or on creating conditions to prevent problems arising.
The Public Health Advisory Committee guidance on HIAs also leans heavily towards intensive use of detailed tables; while these provide useful frameworks for analysis, they have limitations as engagement tools. We felt that grounding of the HIA in systems approaches and the engagement tools that were used in this HIA brought more people into discussions and enabled a wider range of active participation in the HIA than would otherwise have been achieved.

10.4 FUTURE OPPORTUNITIES AND CHALLENGES PRESENTED BY THE HIA

A key challenge raised by many was the impact of the super-city for the future of the ARLTS and the uptake of the HIA’s recommendations. With such a significant change to take place by late-2010, there was a fear that momentum would be lost.

One of the opportunities that this HIA process presented was a strengthened relationship between ARC and ARPHS; in particular, the ARC saw a role for ARPHS in active participation in ARLTS working groups, and in monitoring the uptake of the HIA recommendations. This will be critically important in the light of the pending super-city, as ARPHS will be well-placed to be an independent monitor of the implementation of the HIA findings.

There was a view that the (draft) HIA report made for optimistic reading - that there are ways in which the problems of transport in Auckland can be addressed to better promote health and well-being, the challenge was ensuring they were adopted.
**APPENDIX 1: HIA PARTICIPANTS**

<table>
<thead>
<tr>
<th>Auckland Regional Council</th>
<th>Martin Dawe</th>
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<tr>
<td></td>
<td>Elfyn Handerson</td>
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<td></td>
<td>Kristy Hill</td>
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<td></td>
<td>Gerda Kuschel</td>
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<td>Jade Wikaira</td>
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<td>Auckland Regional Public Health Service</td>
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  Georgina Parata

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APPENDIX 2: APPRAISAL WORKSHOP SESSIONS

Note: This section details the discussions as reported in feedback from group discussions at the mainstream workshops.
There is need to be standards for cars and level of emissions at the local level.

Making sure that having a car isn't a means to an end for communities.

Having an effective public transport system that is accessible and affordable, particularly in Auckland and lower socio-economic areas.

Legislation around the types of cars that can be brought into the country.

Supporting low income families to scrap old cars and get better quality cars.

Models for green vehicles.

Technical issues may have unexpected consequences.

Developing indicators of value at an early stage.

Improving our understanding of "good" mixed use, including finding difficult examples in practice.

Addressing existing bad habits and finding a sustainable way, or as well as improving new design.

Consumer some emissions standards for lenders and insurers.

Promoting effective messages about carbon emissions, safety, efficiency, costs, and quality of different trip choices.

Coordination of planning ensuring regional council's transport plans and water planning/land use planning.

Emissions

What are the actions needed to make the policies effective for emissions?

What are the impacts on emissions if the strategy is designed well?

What are the impacts on emissions of the strategy is designed poorly?

What are the key elements of transport strategy/policy to ensure the best possible outcomes for emissions and poor health outcomes are minimized?

Reduce or minimize emissions (air and noise pollution)

Would like to see the strategy to meet the highest international standards.

NZ has clear emissions targets and we need to uphold this.

Encourage stronger tools for all vehicles.

Encourage thoughtful movement but in a sustainable way, e.g. pedestrian and transit needs integrated.

Value is a consistent priority.

Consider impact of other vehicle movements on environment.

F7 is a reader in terms of emissions for more transport plans, lands, or houses.

The effects of noise on communities will be addressed.

Consider how all vehicles are banned from vehicles on roads and off-road.

Encourage and incentivize.

Less incentive to develop a good public transport system.

Costs is the big issue, costs of healthcare etc.

Impacts on learning and effects on the economy.

Poor housing next to motorists and self-costs of poor design.

Certain groups are particularly affected by emissions from other schools, e.g. children's associations meet with nurses and teachers.

Some new emissions being created.

Mean and Pacific communities having difficulties and greater exposure.

Affordable incomes, purchasing cars that meet the costs.

People who live in a poorly designed housing, specification.

Turn off to poor areas - amount and effects.
Strategic Options (transcripts of comments from workshop participants)

**Strategic Option 1 - Demand Management**
I prefer option 1 as it pushes people out of cars, it needs to be supported by the pull factors in option 3 also. Option 4 is too aspirational and impossible.

**Strategic Option 3 - Public Transport led change**
Extensive integrated public transport to - or closer to areas/communities not currently served and encourage development of "active transport" at a community level to link with new PT services. Connect the disconnected.

Other comments

- **Strategic Option 4 - Quantum Leap**

  Focus on implementation of transport related public health policy (including existing policy)
  - I believe that strategic option 1 & 3 are important and that active transport should be encouraged
  - Strategic option 5 - real need to have land use - transport integration
  - Improved mobility for transport disadvantaged/better services to deprived communities
  - The option to be supported is the one the modelling shows gives the greatest benefit in term of PT and active modes, whilst reorganising land use aspirations. At this stage it appears to be 1 & 3
  - Facilitate people out of the car culture by providing PT as a preferred option

- **Other comments**

  - Quantum shift - good on the committee for thinking outside the square. Must also extend to the TLA's on the border e.g. Rodney and Franklin. PT and Active Transport. Health must be a driver, also cater...
  - With a better name. Strong focus on all that we have discussed today with regards to many active transport as the whole journey or part journey/Pt access the preferred choice - safe, enjoyable a cultural shift to pride in "getting out of the car."
  - To achieve 30% active mode by 2040 - status quo or variations won't achieve this aim. Under 1% of Aucklanders cycle - 50% would cycle if it was safe. How do we get people to walk and cycle more. Make it safe and make it work as an integral component of PT. Completes and enables bus and train transport. Equity in use of PT - unlimited no of bikes carried on trains - bike racks on routes, cycle training, option 4 is needed

- **Strategic Option 2 - Major redevelopment of land use**

  Must provide transport to low socio-economic groups
  - Must improve public transport and reach urban and peri-urban areas
  - Strategic Option 4 with review of existing land use
  - Instead of quantum shift call it "integrated transport and land use sustainability". Putting active transport as top priority and creating whole of journey positive experience
  - Must have active transport, the easy and safe thing to do.
  - More clarification/information regarding "aggressive approach" to land use intensification and design
  - Must have better links between modes e.g. bike/pram racks on buses and facilities at work such as showers
  - Must prioritise low income communities to impact on social inequalities
  - Long-term strategy (30 years) so that land use is included and regional linked to national & 'holistic' and whole government approach
  - Must have a hierarchy with pedestrians at top, cyclists, PT users, car poolers, etc. and then cars single occupant vehicles at the bottom. This priority should be used for all funding allocations
  - Strategic option 4 with major redevelopment of land use
  - With 30% active across the region and effective PT across the region (not just RTN)
  - Must also have a strong focus on ensuring that these in our most vulnerable communities have better public/active transport options
  - Must address equity issues in mobility and access and active transport. Use international examples and make the healthy choice the easy choice

- **Strategic Option 4 with review of existing land use**

  - Instead of quantum shift call it "integrated transport and land use sustainability". Putting active transport as top priority and creating whole of journey positive experience
  - Quantum shift - good on the committee for thinking outside the square. Must also extend to the TLA's on the border e.g. Rodney and Franklin. PT and Active Transport. Health must be a driver, also cater...

Page 85
APPENDIX 3: HIA BACKGROUND


Health Impact Assessment (HIA) is defined as a formal way to predict the potential effects of policies on health, well-being and equity. It is used to help facilitate better policy-making based on evidence, focused on outcomes and encouraging collaboration between sectors and stakeholders.

HIA is based on the recognition that the health status of people and communities is greatly influenced by factors lying outside the health sector, for example in areas such as housing or transport.

However, HIA does not aim to make health and well-being paramount considerations over economic or environmental concerns. Rather, it enriches the policy-making process, providing a broader base of information to make trade-offs between objectives where necessary, and makes explicit the health implications of those trade-offs.

The four key stages of Health Impact Assessment are identified as: (a) screening – the initial selection process to assess a policy’s suitability for HIA; (b) scoping – highlighting the key issues needing to be considered to define and shape the HIA; (c) appraisal and reporting – identifying the relevant determinants of health and using specific tools to identify potential health impacts then assessing the significance of these impacts and drawing out practical changes to the policy; (d) evaluation – assessing how the process was undertaken and the extent to which the recommendations were taken up by the policy-makers.

HIA can be applied at the ‘project’ level (eg, when a new road is being built in a particular community), or on the policy level (eg, public transport policy, housing assistance policy, student loans policy).

The use of HIA is part of wider moves towards sustainable development, cross-sectoral collaboration and a ‘whole of government’ approach. It is undertaken when there are policy alternatives being considered but before commitment has been made.

Key reasons to undertake HIA include:

- to help policy-makers use a sustainable development approach;
- to assist policy makers meet public health requirements of legislation and policy direction, such as the Local Government Act (2002) and the Land Transport Management Act (2002);
- to help policy-makers incorporate evidence into policy-making;
- to promote cross-sectoral collaboration;
- to promote a participatory, consultative approach to policy-making;
- to improve health and well-being, and reduce inequities in health;
- to help policy-makers consider Treaty of Waitangi implications.
Further information on HIAs can be accessed at the following sources:

- HIA Support Unit (Ministry of Health)
- *Guide to Health Impact Assessment in NZ*
- *An idea whose time has come;* a follow-up report on the Guide to Health Impact Assessment
- Whānau ora health impact assessment
APPENDIX 4: AUCKLAND REGION PROFILE

POPULATION AND AREA FEATURES

The Auckland Region encompasses 500,000 square kilometres and according to the 2006 Census there were 1,303,068 people living in the Auckland Region. 90 percent of the Auckland population live within urban Auckland (Auckland Regional Council 2006).

Auckland is New Zealand’s fastest growing region. Between 2001 and 2006, the population increased by approximately 144,000 people (a 12.4 percent increase), comprising half the country’s population growth. By 2051, the region is projected to increase from 1.3 million to 2.3 million.

People from over 100 different ethnicities reside in the Auckland region. The Auckland region comprises of 58.5 percent European, 11.1 percent Māori, 14.4 percent Pacific, 18.9 percent Asian, 8.0 percent New Zealander, 1.5 percent Middle Eastern/ Latin American/ African, and 0.1 percent is made up of other ethnicities.

As well as the increased infrastructural demands that this growth will place on the region, there are likely to be some key pressure points:

- an ageing population
- population distribution between urban and rural areas
- greater ethnic diversity

There are considerable differences in socio-economic status across the Auckland region as it includes some of the most and least well off communities in New Zealand. Approximately 22 percent (293,000) of the people living in the Auckland region live in areas that are most deprived (rated 9 or 10 on the deprivation index). This includes 27 percent (80,000) of all the children in the region (Auckland Regional Council 2006).

A companion document profiles the people and transport of the Auckland region, and explores these population dynamics in more detail.

TRANSPORT IN THE AUCKLAND REGION

Auckland’s transport network has developed through historical settlement patterns, the geographical constraints that arise from its isthmus location, and past levels of investment in transport infrastructure and services. The region’s network is broadly structured around its motorway networks, with a strong emphasis on radial routes that converge and/or pass through the CBD area (Auckland Regional Council 2009d)

The level of car ownership in Auckland is high, as there is one car for every 1.5 people. Passenger transport in the Auckland region is growing although remains relatively low. In the

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* The New Zealand Index of Deprivation is constructed from nine Census 2006 variables, and provides a summary deprivation score from 1 to 10 for small areas. A score of 1 is allocated to the least deprived 10 percent of areas, and 10 is allocated to the most deprived 10 percent of areas.
2006 Census, 5.4 percent of trips to work in the Auckland region were by public transport (bus, train or ferry).

In the 2007/08 year, there were:

- 32,000 trips into the CBD by passenger transport per day
- 54.4 million boardings on passenger transport, an increase on the previous year of 4.4 percent
- 13 percent of passenger transport trips were by train, 79 percent by bus and 8 percent by ferry
- Over the 12 months to June 2008, approximately 425,933 passenger journeys were subsidised under the Total Mobility scheme which provides low-cost access to taxi services for people with disabilities (Auckland Regional Transport Authority 2008b).

A key phenomenon in the past three years affecting the use of different transport modalities in the region is the fluctuating fuel prices. At the time this report was prepared fuel prices had fallen from a peak of close to $2 per litre for diesel, due largely to international reductions in the demand for liquid fuels due to the price itself and to wider economic circumstances; they were however rising again by February 2009. ARTA notes that the close link between rates of oil supply, oil demand and price represent a fundamental change in the economics of liquid fuels – a link which is expected to lead to high and unstable oil prices in future (Auckland Regional Transport Authority 2008a).

HEALTH STATUS OF AUCKLANDERS

This section relates to the health of Aucklanders in relation to the key focus areas of the HIA identified in the scoping phase: safety, emissions, active transport, and access and mobility.

Emissions

Air pollutants that are emitted from motor vehicles are a primary source of pollution that can cause a number of health issues. Five pollutants – carbon monoxide, particulate matter, nitrogen dioxide, ozone and sulphur dioxide – are common and widespread within the Auckland region (Auckland Regional Council 2007a). It has been estimated that every year, over 400 people in Auckland die prematurely as a result of air pollution. Low air quality is accountable for over 750,000 days of absences from work and school. Air pollution has the largest impacts on the young, older people and people with heart disease, respiratory disease, asthma and bronchitis.

HAPINZ data indicates that total economic costs of air pollution in New Zealand (from both premature death and adverse health impacts) are estimated to be $1.14 billion per year or $421 per person. However, this figure is based on very conservative estimates and the real figures could be considerably higher. In addition, the report only covered New Zealanders aged 30 years or more and therefore missed the effects on children’s morbidity, such as impaired lung development and asthma, that other studies have shown. For the Auckland region, HAPINZ estimates that at least 200 Aucklanders die prematurely every year from motor vehicle emissions alone (Auckland Regional Council 2009b; Fisher et al 2007).
There is likely to be a disproportionately large impact on traffic sourced air pollution (and associated respiratory illness) from short journeys. Most of these shorter journeys are likely to be undertaken by vehicles with cold engines and there is evidence that cold engines produce far higher emissions than engines that have reached full operating temperature (Fisher et al 2007).

Safety

Safety on roads has a significant influence on the health and well being of communities. One to two people are killed on roads within the Auckland region each week. Transport-related mortality is a significant cause of death across all age groups. Anxiety and fear of road accidents is the main reason behind the sharp reduction in walking and cycling behaviour among children and older people (Auckland Regional Transport Authority 2008c).

There is a long-term downward trend in road fatalities in the Auckland region and there is a considerable drop in 2007, compared to previous years. However the overall number of road injuries within the Auckland region has been increasing as the total population has been increasing. In comparison to the Wellington region, Auckland has a higher casualty rate but has lower rates than Northland and other areas.

Notable transport-related death and injury data include:

- Road fatalities related to alcohol, which is 36 percent of all road deaths was at its highest in 2003/2004 and casualties have an increasing trend.
- Pedestrian injuries are decreasing; however pedestrian related deaths, which are 21 percent of all road deaths, have remained steady over the past few years.
- There is a slight increasing trend for cyclist injuries; however the total number of deaths and injuries are small. Although it is important to note that under-reporting of cycle has been identified.
- Motorcyclist injuries are on the rise and the number of registered motorbikes in also growing, but the mortality rate for motorcyclists has a decreasing trend (Auckland Regional Transport Authority 2008c).

The Auckland region has been identified as incurring the largest amount of social costs in the country in relation to road accidents. Social costs are the dollar value of the damage to society as a result of road accidents, which includes financial costs such as medical, legal, loss of output and damages to property and costs that are non-financial such as the loss of life and quality of life. The total social costs for the region in 2006 were estimated at $990 million. Most of the social costs of the accidents within the Auckland region takes place on local roads, specifically arterial roads (Auckland Regional Transport Authority 2008c).

Active transport

At the time of the 2006 Census, active transport (walking or cycling) accounted for 4.6 percent of work trips; compared to 5.4 percent by public transport and 67.8 percent by private transport.

Between 2001 and 2006, active transport (as a percentage of total trips) increased across the region by 0.2 percent. This was however driven by a 1.2 percent increase in Auckland City, and
all other territorial authorities showed a small decline (Statistics New Zealand 2008). Active transport tends to be higher in the areas surrounding established urban or regional centres, particularly the Auckland CBD, Takapuna and Pukekohe.

The importance of active transport, from a health perspective, is that it is a key mean of embedding physical activity as a part of daily life; improving levels of active transport can also have flow-on effects in reducing motorised transport emissions. Data from the New Zealand Health Survey from 2006/07 indicates that adults living in the Auckland DHB area had significantly higher levels of sedentary behaviour than the national average (18.2 percent versus 15 percent). The Waitemata and Counties Manukau DHBs which are also part of the Auckland region have rates slightly higher than the national average, although the differences are not significant (15.4 percent and 16 percent respectively) (Ministry of Health 2008).

Access and mobility

Access relates to the opportunities available for reaching destinations or activities, and mobility represents the choices available to travel to or from these destinations.

Across the Auckland region, household access to motor vehicles is widespread, with more rural and/or areas of low deprivation scores having greater access to motor vehicles, and areas close to large populations tending to have lower access.

Areas closer to the centre of Auckland and those along major transport corridors have highest accessibility to passenger transport and more peripheral areas have the lowest accessibility.

In terms of access to services, facilities and amenities for people living in the Auckland region, the level of access is wide ranging, especially in relation to the level of deprivation of particular neighbourhood.

- Most people living within the urban TAs are within 2000 metres of a general practice facility. More than 25 percent of people living in the Franklin district live over ten kilometres away from a general practice service.

- Neighbourhoods with low NZDep deciles (i.e. wealthier areas) have better access to green activity space compared to neighbourhoods with high deciles; Auckland City and Manukau City have localised pockets areas of high access, however lower access in general across the region. North Shore City and Waitakere City have more consistent access to green activity space.

- Among all the TAs the areas of high deprivation tend to have significantly better access to fruit and vegetable retailers.
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4 Attachment 2: Health Impact Assessment Scoping report

Prepared for

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AUCKLAND REGIONAL LAND TRANSPORT STRATEGY HEALTH IMPACT ASSESSMENT

SCOPING WORKSHOP REPORT

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24 February 2009
# Table of Contents

1. **Introduction** ...........................................................................................................3  
   1.1 Background to the Project ...........................................................................3  
   1.2 Health Impact Assessment: Background and Purpose ........................................3  

2. **Summary of Stakeholder Presentations** .........................................................5  
   2.1 Auckland Regional Public Health Service ...................................................5  
   2.2 Auckland Regional Council ...........................................................................5  

3. **Opportunities for HIA** ....................................................................................7  

4. **Potential Areas of Focus** .................................................................................10  
   4.1 General Health Perspectives .........................................................................10  
   4.2 Māori Health Perspectives ............................................................................11  

5. **Summary of Decisions** .................................................................................12  
   5.1 Scope of HIA .................................................................................................12  
   5.2 Next Steps .....................................................................................................12
1. INTRODUCTION

1.1 BACKGROUND TO THE PROJECT

In late 2008, a Health Impact Assessment (HIA) process was initiated focusing on the Auckland Regional Land Transport Strategy (ARLTS). The ARLTS outlines the region’s land transport system requirements to ensure an integrated, safe, responsive and sustainable transport system for the next 30 years.

In December 2008, the RLTS was in its early phases of being drafted, with a series of strategic options for the strategy identified. These will be the subject of public consultation in 2009. The HIA was initiated early so that health issues can be woven within and can influence the strategic options and the subsequent stages of the strategy.

The Auckland Regional Public Health Service (ARPHS) commissioned the HIA to assess the potential health impacts of the ARLTS and to influence its strategic options so that positive health outcomes can be maximised and potential negative impacts are reduced or eliminated.

The document reports on the scoping phase of the HIA process, to identify the parameters of the HIA. This will inform the appraisal phases beginning in January 2009.

The first workshop, facilitated by Adrian Field of Synergia Ltd, was held in November 2008, with participants representing the following organisations and/or interests:

- Auckland Regional Public Health Service
- Auckland Regional Council
- Ministry of Social Development
- Walk Auckland
- Hauora Raukura Tainui
- Haipai te Hauora Tapui Ltd
- AUT.

A second workshop, focusing on Māori perspectives on transport and drawing on whānau ora health impact assessment processes, was led by Megan Tunks of Hapai te Hauora Tapui Ltd. Attending the workshop were representatives of Auckland Regional Council Māori Relations team, Te Whānau o Waiperaeira Trust, Waitakere City Council and Taumata Runanga.

1.2 HEALTH IMPACT ASSESSMENT: BACKGROUND AND PURPOSE

HIA is a formal process through which policy and planning are able to maximise their beneficial effects on health and wellbeing, and their potential harms are reduced or eliminated through innovative solutions.

The determinants of health and well being are influenced by environments, policies and activities occurring both within and outside the health sector. HIA offers the opportunity to
systematically explore potential health effects of a policy, plan, programme or project, and to incorporate health and well being considerations into policy and planning. HIA complements the use of economic and environmental impact assessment at national and local levels.

Using local and published evidence, an HIA process delivers a set of evidence-based recommendations to inform and influence decision-makers.

An important consideration in HIA is the distribution of health effects across populations and groups within populations, by identifying which populations bear disproportionate impacts on their health, and to what extent can health inequalities be reduced.

HIAs are gaining increasing recognition in New Zealand, and are well-established internationally. The National Health Committee (NHC) has championed the use of HIAs since publishing their Guide to HIA in 2004, and in 2007 issued a follow-up report on new opportunities for HIA in New Zealand (Public Health Advisory Committee 2004; 2007).

HIA’s influence is prospective – it is systematically applied in the window between the initial formulation of policy and planning and their detailed finalisation. Applied in this way, HIA supports democratic engagement, equity, sustainable development, ethical use of evidence, openness and transparency. HIA fosters cross-sectoral approaches to policy development and aligns with the “whole of government” philosophy.

HIA considers the broad scope of determinants of health, encompassing the social and economic environment, the physical environment, as well as individual characteristics and behaviours.

Alongside conventional HIA, Whānau Ora Health Impact Assessment has emerged as an indigenous tool for undertaking HIA in areas or issues where there are significant Māori interests, and where Māori considerations can be placed at the forefront (Ministry of Health 2007). Whānau ora health impact assessment builds on the use of HIA utilising the principles of the Māori Health Strategy – He Korowai Oranga (Minister of Health & Associate Minister of Health 2002). Whānau Ora (or healthy families) are the aim of He Korowai Oranga, and the strategy provides a framework for the public sector to take responsibility for reducing inequalities and improving Māori health outcomes.

A whānau ora approach recognises and builds on the strengths and assets of whānau, encouraging whānau development. It places whānau at the centre of public policy.

Hauora or health, an all embracing concept which embodies the importance of Wairua (spiritual), Whānau (family), Hinengaro (mental) and Tinana (physical aspects) (Durie 1998).

From the Māori viewpoint, issues involving Te Whenua (land), Te Reo (language), Te Ao Turoa (environment) and whānaungatanga (relationships, kinships, kaupapa and whakapapa whānau) are central to Māori culture, and Hauora Māori.

Hauora is a reflection of the well being of whānau, hapū and iwi. Whānau is widely recognised as the core social unit of traditional and contemporary Māori society. The assumption is that if whānau health is protected so will the health of the hapū and iwi. It is from this premise that Māori live full and active lives.
2. SUMMARY OF STAKEHOLDER PRESENTATIONS

2.1 AUCKLAND REGIONAL PUBLIC HEALTH SERVICE

Auckland Regional Public Health Service (ARPHS) is a public health unit, covering all three Auckland DHBs in a region with eight territorial authorities. The organisation is not a consent authority; instead it needs to be proactive rather than reactive on public health issues. To do so it identifies spheres of influence under the banner of sustainable development to promote public health. HIAs are therefore an important tool for ARPHS to influence decision-making in the interests of public health.

ARPHS is project managing the contract for this Health Impact Assessment (jointly funded by ARPHS and Auckland Regional Council). To date ARPHS have project-led five HIAs in the Auckland region:

- Avondale Liveable Communities Plan
- Wairau/Taharoto Transport Corridor
- Mangere Town Centre (for Lets Beat Diabetes, Counties Manakau DHB)
- McLennan (funded by Lets Beat Diabetes)
- Ranui Concept Plan (Waitakere City).

2.2 AUCKLAND REGIONAL COUNCIL

At the appraisal workshops, Casandra Smith (Strategic Policy Analyst) of Auckland Regional Council (ARC) presented the council’s plans for preparing the new Auckland Regional Land Transport Strategy (ARLTS). The ARLTS outlines the region’s land transport system requirements to ensure an integrated, safe, responsive and sustainable transport system. The ARLTS is being developed by a three key groups: the Regional Transport Committee, Regional Transport Executive Group and Technical Advisory Committee.

The last ARLTS was completed in 2005 and is due to expire in 2010; therefore the RTLS 2009 is being developed. The last ARLTS called for a substantial increase in public transport spending, the completion of key elements of the strategic road network and placed new emphasis on travel demand management, in particular walking and cycling.

The ARLTS that is currently being developed will examine similar issues; however the long-term scope of the strategy means that there is an opportunity to assess some of the fundamental challenges that Auckland faces. Important aspects of the strategy will be to consider how the region can better align transport and land use decisions and, for the first time, to examine the potential impacts of increasing energy costs.

The establishment of the Land transport Management Amendment Act 2008 requires changes to the ARLTS: the timeframe has been extended to 30 years, and can now include projects of high regional significance and includes the Franklin district.
The New Zealand Transport Strategy 2008 has a number of targets with which the ARLTS must align its strategic objectives. These are to:

- halve the per capita greenhouse gas emission from domestic transport by 2040;
- increase the coastal shipping’s share of inter-regional freight to 30 percent of tonne-kilometres by 2040;
- increase the rail share of freight to 25 percent of tonne-kilometres by 2040;
- become on the first countries in the world to widely use electronic vehicles;
- reduce the rates CO\textsubscript{2} emissions per kilometre of combined average new and used vehicles entering the light vehicle fleet to 170 grams CO\textsubscript{2} per kilometre by 2015, with a corresponding reduction in average fuel used per kilometre;
- increase the area of crown transport land covered with indigenous vegetation;
- reduce the number of people exposed to health-endangering noise levels from transport;
- reduce the number of people exposed to health-endangering concentration of air pollution, in locations where the impact of emissions arising from transport is significant;
- fourteen percent of all trips to be via public transport in urban areas;
- thirty percent of all trips to be via active modes.

Under the Land Transport Management Amendment Act 2008, the ARTLS is required to consider different strategic options. The previous proposal for the ARLTS was to use scenarios developed under the Land Use/Transport Futures project. However, the output of that project was not available in time, therefore the strategic options needed to be reassessed.

As at February 2009, there were four proposed strategic options, which have the following common elements:

- maintenance and renewals;
- all currently committed projects (ie funded projects);
- integrated PT ticketing and fares;
- a high level of travel demand management measures (particularly behaviour change measures and walking cycling infrastructure improvements);
- high level of town centre amenity;
- road safety improvements;
- engine technology improvements;
- rural transport improvements;
- higher future fuel prices.
Strategic Option 1 – Demand Management

This option focuses on “push” factors in which establishing road pricing and making improvements to public transport and walking and cycling modes will push people out of their cars and influence them to use more active and sustainable methods.

Strategic Option 2 – Mixed Investment

This option essentially maintains the current approach, where improvements are made for all modes of transport but shifts away from road investment. There will be roading developments with the Waterview Connection, widespread arterial road improvements and a range of Territorial Authorities roading projects. Rail developments include the CBD tunnel and increased frequency. Bus developments include future Rapid Transit Networks (RTNs) and increased frequencies.

Strategic Option 3 – PT led change

This option concentrates on “pulling” factors to encourage people out of their cars by heavily investing in public transport. Public transport improvements being developed by Parsons Brinkerhoff include all rail RTN (including Harbour Crossing and North Shore), expanded Quality Transit Network, increased frequencies, bus priorities on all congested Quality Transit Network links. This option would also include some roading improvements.

Strategic Option 4 – “Quantum Shift”

This option involves a combination of the push factors from Option 1 and the pull factors from Option 3, together with a much more aggressive approach to land use intensification than was assumed in Options 1-3. It also assumes that a series of policy and regulatory changes will be introduced at a national level to address issues such as vehicle standards, emission controls, and road pricing.

Sensitivity tests will be used to test the sensitivity of the strategic options against higher fuel process, different land use, travel demand management and key projects. To date 11 sensitivity tests have been identified.

As at December 2008, the ARC intended to publicly consult on strategic options in March/April 2009, with further consultation on the full draft strategy later in the year.

3. Opportunities for HIA

One of the key opportunities that this HIA presents is its early initiation. Starting the HIA in the early stages of drafting of the ARLTS means that it can have a greater ability to influence its strategic direction.

There are some decisions that have already been made in regards to the ARLTS. Firstly the framework that will be used to develop the ARLTS is largely decided. As the current Regional Land Transport Strategy (2005) is only three years old, the RLTS 2009 will be built around the framework of the RLTS 2005, especially in relation to the expectations over the
next ten years. The key features of the RLTS 2005 were to distribute expenditure over the ten year period in a way that:

- gives priority to improving passenger transport;
- delivers a substantial travel demand management programme;
- completes the strategic roading network as a second priority.

The key difference between the 2005 and 2009 RLTS are expected to include:

- extending the period of time for changes to 30 plus years; this will be developed within the Auckland Sustainability Framework. This will allow consideration of long term land use and transport network changes and will require consideration of changes in transport energy availability costs;
- introduction of targets that are compliant with those contained in the GPS 2008 and New Zealand Transport Strategy 2008;
- updating the RLTS to include work that has been completed since 2005, particularly the Auckland Transport Strategic Alignment Project, ARTA’s Auckland Transport Plan, Passenger Transport Network Plan, Sustainable Transport Plan, Rail Development Plan, draft Regional Arterial Road Plan and draft Park and Ride Strategy, and the ARC’s Regional Freight Strategy and draft Regional Parking Strategy;
- including all projects of high regional significance.

Secondly, the land use aspects of the ARLTS, linked to the Regional Growth Strategy (RGS) is a limiting factor. The RGS sets out how the region will grow to 2050. The key principle is that most future growth (residential and business development) is to be focused within the current metropolitan area, in centres of varying sizes and major passenger transport routes. These centres include town centres along the western, eastern and southern passenger transport corridors. A quality compact urban form with a network of well designed, mixed use, walkable, more intensive (higher density) well connected centres and neighbourhoods is the goal. Some urban expansion and growth of rural settlements is also identified, but only where environmental, accessibility and community principles can be met. The principle of more compact growth has been supported by all Auckland councils and is a key objective of the Regional Policy Statement.

Given that there are relatively few constraints on the scope of the HIA, there are a wide range of transport-related health issues that could be focused on. In particular, the HIA has significant scope to influence the content of the three strategic options and to make recommendations on which are most likely to influence health.

The figure on the following page details the framework for the RLTS.
RLTS Framework

Demand Side

- **Economic Measures**
  - Network Road User, Charging, Cordon Pricing, Area Schemes, Route Tolling, Truck Tolling
  - Access Management & Control, Parking supply/pricing, Physical Measures, Road Space Re-allocation

- **Hard TDM**
  - Walking School buses, Travel Planning, Teleworking, Carpools & Clubs, Awareness campaigns

- **Travel Behavior**

Supply Side

- **Network Management**
  - PT Capacity, PT Quality/Equity, Walking, Cycling, Integration, Information
  - Traffic Management, Ramp Signalling, Local area traffic management / local speed zones
  - Intelligent Transport Systems

- **New Road Capacity**
  - Network Expansion, Corridor Expansion, Capacity Type (radial vs bypassed), Bottlenecks/junctions

**Expected Outcome**

- Long term real impact at the source of travel demand
- Direct sustained impact over area charged
- Localised impact on car travel
- Local impacts around individual schools and workplaces
- Essential part of mix with demand side policies
- Dynamic Improvement of current flows in corridors
- Short-term local relief, can lead to more traffic long term
4. Potential areas of focus

4.1 General health perspectives

At the first scoping workshop, open discussion sessions raised a range of potential issues for discussion. These were:

- consideration of vulnerable users of transport; older people, children, disabled, Māori, Pacific and low income;
- embedding active modes of transport in the system;
- safety for all using different modes of transport;
- air quality; harmful emissions and noise;
- rising energy costs and the impacts on families that do not have options;
- access, including communities connecting with the environment; nature; neighbourhood and urban/rural split;
- road share between pedestrians, cyclists, private vehicles and commercial vehicles;
- urban/rural split;
- transport as "barrier" or "enabler".

From this open discussion, participants then took part in developing an "affinity diagram". This is a process in which participants individually identify the issues they see as important using "post it" notes; these are then placed onto a wall and the participants collectively group the responses together to identify key themes. The key advantage of this process is that it gives all participants a voice and input in a way that can often be difficult in relying solely on open discussion.

The key themes to emerge from the affinity process were:

- **Safety**: Dimensions of this include injury prevention; increasing safe walking and cycling infrastructure; young drivers with limited knowledge/education; safety for all users, pedestrians, cyclists and public and private transport users and impact of liberalisation of alcohol use on drivers in the region.
- **Access and mobility**: This can include affordability; community resilience to rising energy costs; Cost effective and efficient options of transport for all populations which are accessible to essential services; regular public transport for low income areas; inequalities for Māori.
- **Increasing active modes of transport**: Increasing support; encouraging active and low powered active transport on a network that is currently not built for it; explore impacts of different modes; environmental sustainability.
- **Emissions and noise**: Reducing exposure to harmful emissions for sensitive populations; reducing harmful impacts of noise; implications of intensification of housing in terms of health; air quality; transport; noise and access to safe green spaces; environmental sustainability.
4.2 MĀORI HEALTH PERSPECTIVES

At the second workshop, focusing on Māori health issues, the concept of kaitiakitanga (guardianship) was raised by participants. In the context of the Regional Land Transport Strategy this was seen as an important component illustrating the different world views of health between tangata whenua and non-Māori.

Run off from road development, pollution into the sea affecting the supply of kaimoana (traditional sea food beds), old urupa (or burial sites) that are relocated due to roading projects (such as airport roading developments), are all elements which impact on kaitiakitanga and consequently the well being of whānau and hapū of the area.

Some features of transport in Auckland have particular historical meaning for Māori. One participant gave an example of the Old Great South Road, which was originally built as a route for soldiers to travel on during the land wars.

The central topics identified in the general workshop in the previous week also emerged at the Māori stakeholder workshop, but with some there were particular issues raised in relation to inequalities and Māori perspectives:

- **Safety** including accidents and injuries, alcohol and road safety
- **Active transport** including investment by local, regional and central government
- **Emissions** including air and noise pollution and impacts on water in the region, and in turn the effect on "kai cupboards"
- **Access and mobility**, including cost of public transport and impact of "Super Goldcard", access for vulnerable populations and people with disabilities.

An example was given that highlights the intertwined nature of transport issues for Māori. Some kura kaupapa and kohanga reo (due to affordability of location) are often located in areas far from where the parents of tamariki (children) live. A walking school bus is not an option here when whānau come from all of Auckland to drop tamariki off at these educational settings, which are also often areas of high traffic density. Catching public transport may not be an option with large families and the need to reach more than one educational setting and different areas for employment. In this example, issues of access and mobility, emissions, adequacy of public transport and safety are all brought to bear in the daily life of Māori families.
5. SUMMARY OF DECISIONS

5.1 SCOPE OF HIA

The following issues will be explored in the appraisal phase of the HIA, to be conducted in 2009.

- **Safety**: To identify opportunities to ensure optimal safety for all users of the different modes of transport.
- **Access and mobility**: To identify opportunities to increase access and mobility, particularly for disadvantaged groups, to be able reach services, amenities and facilities that support healthy living.
- **Active modes**: To identify opportunities for embedding active modes of transport across the region.
- **Harmful emissions**: To identify opportunities to reduce air and noise pollution and to enhance the positive health impacts of improving environmental sustainability in this area.

The HIA will look at the above areas through the lens of the strategic options of the ARTLS and will look at the impacts on each of the areas as a result of the strategic options.

The above four issues will also be explored through workshops with Māori stakeholders, and consideration will be given the cultural significance of these issues, and the impacts that decisions in these areas can have on Māori communities, including marae and kura (schools). The Māori consultation phase will be through application of the whānau ora health impact assessment tool, and will be led by Megan Tunks of Hapai te Hauora Tapui Ltd.

The process will also explore the issues raised for other population groups, including older people, people with disabilities, children and young people, Pacific people and those living in areas of high deprivation.

5.2 NEXT STEPS

The next phase of the HIA process is the appraisal and reporting phase. This will be conducted between January and March 2009, and will involve:

- Appraisal workshops, with a broad representation of groups and individuals with an interest in transport, including representation of the population interests identified above;
- High-level modelling of potential impacts;
- Stakeholder interviews.

The appraisal process will involve stakeholders in both the identification of potential impacts and the steps needed to reduce or eliminate adverse impacts, and maximise positive impacts.
Leading up to the appraisal process, a literature review on the relationship between transport and the four focus areas, together with a regional health profile, will be distributed to stakeholders to inform discussions.

REFERENCES

Attachment 3: Health Impact Assessment Literature review

Prepared for
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AUCKLAND REGIONAL LAND TRANSPORT STRATEGY - HEALTH IMPACT ASSESSMENT

LITERATURE REVIEW

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## CONTENTS

1. **INTRODUCTION** .............................................................................................3

2. **TRANSPORT AND HEALTH INEQUALITIES/INEQUITIES** .........................3
   2.1 Transport and health inequalities/inequities ..............................................3

3. **SAFETY** ........................................................................................................4
   3.1 Road traffic injuries in New Zealand ...........................................................5
   3.2 Risk by age and gender................................................................................5
   3.3 Risk by mode of transport..........................................................................5
      3.3.1 Risk to pedestrians............................................................................6
      3.3.2 Risk for car drivers and passengers ...................................................6
      3.3.3 Risk by ethnicity and socio-economic grouping.................................6
   3.4 Effective transport interventions to improve safety....................................7

4. **EMISSIONS** ..................................................................................................7
   4.1 Greenhouse gas emissions .........................................................................7
   4.2 Air quality and pollutants .........................................................................8
      4.2.1 Particulate Matter..............................................................................8
      4.2.2 Nitrogen dioxide (NO₂)......................................................................9
      4.2.3 Sulphur Dioxide (SO₂)......................................................................9
      4.2.4 Ozone...............................................................................................9
      4.2.5 Carbon Monoxide (CO)....................................................................9
   4.3 Noise ...........................................................................................................9
   4.4 Transport policy and planning interventions to improve climate change, air quality and noise emissions ...........................................................................10

5. **ACTIVE TRANSPORT** ................................................................................10
   5.1 Impact of physical activity on health ...........................................................10
   5.2 Influence of urban form on active transport ..............................................11
   5.3 Effective transport interventions to improve active transport..................12

6. **ACCESS** .......................................................................................................13

7. **REFERENCES** .............................................................................................15
1. INTRODUCTION

This literature review examines the effects of transport on health to support a health impact assessment of the 2009 Auckland Regional Land Transport Strategy (ARTLS). This review focuses on the effects of transport on the following four areas: safety, emissions, access/mobility and active transport, and the support that policies and planning provide in reducing the harmful impacts of transport on health and maximising the beneficial impacts. The domains that will be covered in this literature review emerged from the scoping phase of the health impact assessment, led by Synergia Ltd.

This literature review has been drawn from the following sources:

- commissioned reports, particularly the Public Health Advisory Committee paper on New Zealand evidence for health impacts of transport;
- academic journal articles;
- published information from the Auckland Regional Council.

2. TRANSPORT AND HEALTH INEQUALITIES/INEQUITIES

Transport is a vital aspect of modern life and has the potential to impact both positively and negatively on public health. Potential impacts on health need to be incorporated into transport policy development if improvements in population health are to be realised (Dora 1999). The ability of a transport system to aid and support active transport has significant potential for impacting on health (Public Health Advisory Committee 2003).

2.1 TRANSPORT AND HEALTH INEQUALITIES/INEQUITIES

Over the past half-century, New Zealand, along with many other Western nations, has recorded improvements in overall levels of economic prosperity, measured by such economic indicators as GDP, as well as general improvements in health, measured by health indicators such as life expectancy and infant mortality (Minister of Health and Director General of Health 2007). However, data collected since the 1970s indicates that despite improvements in the general health and well being of New Zealanders, people of lower socio-economic status have poorer health. These inequalities persisted and widened into the 1990s, and it is only in recent years that the health "gap" appears to have begun to close (Blakely et al 2007). Similar findings are evident in other countries, where a substantial weight of evidence points to a gradient of ill-health and mortality running through socio economic strata, with the poorest sections of the population tending to have the worst health outcomes (Davey Smith et al 2001).

The fact that health, like many economic and social goods, is not shared equally across the population has given rise to an expanding research agenda that seeks to uncover the causes of health inequalities, and develop strategies for their reduction. Because these health inequalities cannot be solely attributed to differences in health behaviours between social
groups, the features of social and physical environments are likely to be independent contributors to health (Lantz et al 1998).

Explanations for determinants of health inequalities have often focused on the socio-economic dimension, in terms of such factors as income, education or occupational background. This is, however, only one element of inequality. A wider view of inequalities, proposed by Townsend, would also examine access to material goods, facilities and amenities, and/or a lack of access to the customs, activities and relationships of an ordinary life (Townsend 1987). Taken in this sense of material deprivation, access to transport, as well as the impacts of transport (both positive and negative) can be seen to be important determinants of health inequalities.

A further dimension to consider is that of equity and inequity. The concept of inequality simply describes the presence of a difference between people. Inequity, in contrast, points to a situation whereby the inequalities that arise are unfair, avoidable and unjust (Whitehead & Dahlgren 1990). With regards to transport, the distribution of transport to people, and the health impacts of transport on populations, are key considerations:

"Equity refers to the distribution of resources and opportunities. Transportation decisions can have significant equity impacts. Transportation represents a major portion of consumer, business and government expenditures. It consumes a significant portion of public resources, including taxes and public land. Transportation activities have external impacts (noise and air pollution, crash risk and barrier effects) that affect the quality of community and natural environments, and personal safety. Transport determines where people can live, shop, work, go to school and recreate, and their opportunities in life. Adequate mobility is essential for people to participate in society as citizens, employees, consumers and community members. It affects people’s ability to obtain education, employment, medical service and other critical goods. “ (Victoria Transport Policy Institute 2008)

Considering equity impacts of transport decisions requires an analysis of which populations most benefit or suffer. These could include different income groups, ethnic groups, people who use different transport modalities (such as walking versus car travel), driving ability, geographic location, physical ability and travel need (Victoria Transport Policy Institute 2008).

3. Safety

Safety is a prominent issue in relation to transport and has significant effects on health. This is evident from health statistics from all counties that have high levels of motorisation. Throughout the 1960s and 1970s, rates for morbidity and mortality from road traffic injuries were increasing in proportion to the population. Although there has been an increase in the number of motor vehicles in New Zealand, the rates have decreased as a result of various safety initiatives that have been implemented, including road safety programmes,
infrastructural improvements and improved design of motor vehicles. However, road traffic injuries remain a major contributor of death and disability in New Zealand (Kjellstrom & Hill 2002). Road traffic is also known to affect mental health. Studies show that about one in six (14 percent) of motor accident survivors experience post traumatic stress disorder, a quarter (25 percent) have psychological issues a year after the accident and one third experience clinical symptoms at follow-up 18 months afterwards (Goldberg & Gara 1990; Green et al 1993).

3.1 ROAD TRAFFIC INJURIES IN NEW ZEALAND

In comparison to other countries in the OECD, New Zealand has a high road traffic mortality rate. In 1998 the mortality rate from road accidents was 13.3 deaths for every 100,000 people. This rate was lower than that of the USA, but higher than Australia, Canada, Sweden and the United Kingdom (Kjellstrom & Hill 2002). One of the reasons why New Zealand has a high road accident mortality rate is because of the high number of vehicles per capita; however the mortality rate per vehicle is also one of the highest in developed countries (Kjellstrom & Hill 2002).

Fatalities on road present one aspect of the impacts of road traffic accidents on health; however they do not expose all the impacts on health. For every person killed in a road accident, approximately seven people are hospitalised for non-fatal, serious injuries (Kjellstrom & Hill 2002).

3.2 RISK BY AGE AND GENDER

The group between 15 to 24 years of age is at the highest risk for mortality and morbidity from motor vehicle accidents (Ministry of Health 1999). The age specific rate in 1988 to 1990 was approximately 80 for every 100,000 people for males and approximately 30 for every 100,000 people for females. Children aged 14 and under have the lowest rates of mortality and morbidity; however, males in this age group have higher rates than females. The higher rates for groups aged over 15 are potentially due to a much greater exposure as drivers and passengers than for children. Rates for mortality and morbidity for motor vehicle accidents decrease after the age of 24 and start to increase after the age of 65 (Ministry of Health 1999).

Calculating the disability-adjusted life years (DALYs) is also a useful method of assessing the health impact of transport accidents on different age-sex-ethnic groups (Murray & Lopez 1996). The DALYs shows the preventable quantity of lost healthy life for a specific population group or type of disease/injury. Traffic accidents are ranked third for DALYs lost for men at 4.5 percent of all DALYs with only ischemic heart disease (15.6 percent of all DALYs) and chronic obstructive respiratory disease (5.6 percent of all DALYs) ranked higher. Women rank traffic accidents as 14, which is 1.7 percent of total DALYs (Ministry of Health 2001).

3.3 RISK BY MODE OF TRANSPORT

Motorcyclists have the highest risk of injury of all travel modes, in proportion to the time spent travelling, they have an injury rate of 170 injuries per million hours travelled. Cyclists
also have high rates of injury, at approximately 40 injuries per million hours travelled. Pedestrians have a lower risk in comparison to car drivers or passengers in relation to the number of accidents occur for a given duration of travel (Kjellstrom & Hill 2002).

Examining the incidence of injury expresses the relative risk associated to different modes of transport. The total number of injuries is dependent on the mode of transport as well as the length of time taken to travel by each mode. As the majority of people expend more time travelling by car than by bicycle, their risk of injury in a car is going to be much higher than their risk of injury on a bicycle (Kjellstrom & Hill 2002).

Taking into account the average travelling times for each mode of transport, between 15 to 48 drivers are killed (depending on age) for every 100 million km driven, while for motorcyclists the equivalent range of number to 325 to 973 (Kjellstrom & Hill 2002).

3.3.1 Risk to pedestrians

Children have the highest risk of pedestrian injuries, followed by older people and young people. Children that attend primary schools are susceptible as they are less visible than adults; they also have limited experience and judgement in assessing busy roads. Older adults also have a higher level risk potentially because increased frail physical status and diminished agility and sensory perception. Male pedestrians have a higher risk than females among all age groups. This may reflect behavioural differences between males and females (Land Transport Safety Authority 2000).

The highest risk for pedestrians is in urban areas, where over 92 percent of injuries occur and 67 percent of accidents result in death. Most injuries to pedestrians occur when they are crossing the road when they are not near intersections or using pedestrian crossings (Land Transport Safety Authority 2000).

Speed and alcohol are two important factors that influence pedestrian injuries. The higher the speed that the vehicle is travelling is related to longer stopping distances and therefore a higher risk of serious injury or death if a pedestrian is involved. About 30 percent of adult pedestrians killed from motor vehicle accidents have a blood alcohol level that is higher than the legal driving limit (Land Transport Safety Authority 2000).

3.3.2 Risk for car drivers and passengers

The age and sex of the driver influences the risk of a motor vehicle accident occurring where someone is injured or killed. The risk is higher for younger and older drivers. The risk for older drivers is due to their physical fragility, rather than their increased number of accidents. Among drivers aged 25 and under, males are significantly more likely to have a motor vehicle accident than females. Over the ages of 74, females are at greater risk of a car accident than males. Across all age groups males generally are at greater risk than females, specifically in terms of accidents resulting in death (Kjellstrom & Hill 2002).

3.3.3 Risk by ethnicity and socio-economic grouping

Māori and Pacific drivers have a greater risk of injury per distance travelled. The risk of hospitalisation is three times higher for Māori and nearly three times higher for Pacific
drivers. The highest rate for mortality is for Māori men aged over 75. The highest rates of hospitalisations are for Māori males aged 15 to 24.

A New Zealand study examining the relationship between socio-economic status and traffic crash mortality showed a clear social gradient. The study focused on males aged 20 to 59, using data from national death registrations for people that died between 1992 and 1997. Analysis of the data showed low social class males had double the rate of traffic crash mortality. The rate of the medium social class group was between that of the higher and lower social classes (Kjellstrom & Hill 2002).

3.4 EFFECTIVE TRANSPORT INTERVENTIONS TO IMPROVE SAFETY

Key transport interventions to improve access and mobility include:

- developing separate cycle lanes alongside urban roads;
- building footpaths alongside roading infrastructure;
- initiating traffic calming measures to reduce speeds of traffic, such as speed limits, and physical mechanisms such as speed bumps and traffic islands;
- legislation around use of seatbelts, child restraints and cycle helmets;
- legislation that supports reduction in motor vehicle use and encouraging the use of safer modes of transport like public transport (Quigley et al 2006).

4. EMISSIONS

4.1 GREENHOUSE GAS EMISSIONS

Human activity is known to be the key contributor to climate change over the past 50 years (Intergovernmental Panel on Climate Change 2007). By 2007, the NZ energy greenhouse gas inventory had shown that emissions from the transport sector were tracking 69 per cent higher than 1990 levels. The bulk of this increase came from road transport emissions which grew by more than 76 per cent to represent 41.2 per cent of all CO$_2$ energy emissions for New Zealand. Currently, motor vehicles in New Zealand are almost exclusively fuelled by fossil fuels, such as petrol and diesel, which result in greenhouse gas emissions (Auckland Regional Council 2009a; Ministry of Economic Development 2008). Transport, therefore, has a significant role in addressing climate change and its effects on well being or can continue to contribute to increasing carbon emissions, depending on the policy choices we make.

There are several effects that climate change has on the environment such as increases in temperature, change in rainfall patterns and a rise in extreme weather events. Within the next 80 years the temperature in New Zealand is predicted to increase between 0.7 and 5.1°C according to global climate modelling. Westerlies are estimated to increase in winter and spring, as well as more rainfall on the west coasts of the North and South Island and the east and north will see dry conditions. These changes in climate can have direct and indirect effects on health (Ministry for the Environment 2008). Direct impacts on health include increased mortality from thermal extremes, diarrhoeal deaths and increased prevalence of
skin cancer from depletion of the ozone layer. Indirect impacts include increased rates of waterborne disease from flooding and increased rates of vector-borne diseases like dengue fever (McMichael et al 2002).

4.2 AIR QUALITY AND POLLUTANTS

Motor vehicle traffic is the key source of air pollution that is concentrated on the ground levels of urban areas (World Health Organisation 2000). Millions of tonnes of pollutants are emitted into the air as smoke, dust and invisible gas each year. Pollutants are substances in the air which are above natural levels that can have negative effects on plants, animals and people. Some pollutants are released straight into the air, while others are created by chemical reactions that occur in the air. Air pollution can include invisible particles and gases, and have many health impacts, resulting in increased school and work absences, hospitalisation, and increased mortality (Auckland Regional Council 2007a).

Vehicles with internal combustion engines emit air pollutants and particulate matter. Nitrogen oxides and hydrocarbons are able to oxidise in air to ozone if exposed to greater quantities of sunlight. The “secondary air pollutant” that is created is becoming more and more of health issue (Kjellstrom & Hill 2002).

The mortality rates that are a result of vehicle emissions are considered as the “invisible” death toll. Studies carried out in Europe using comparable methods have estimated the number of deaths as a result of air pollution from fine particle emissions to be approximately double the number of deaths from road traffic injuries (Kunzli et al 2000).

The risk of motor vehicle air pollution in New Zealand was assessed in the 2007 HAPiNZ (Health and Air Pollution in New Zealand) study. The research was able to estimate the annual additional mortality due to air pollution exposures. However this research could not dissociate the motor vehicle emissions from non vehicle emissions. The estimated annual additional mortality due to air pollution exposures amounts to two percent of total deaths (Fisher et al 2007; Fisher et al 2002).

For the Auckland region, the current health costs of air pollution from all sources are estimated to be at least $548 million per annum with at least 236 Aucklanders dying prematurely each year due to motor vehicle emissions alone. As well as the premature deaths, vehicle pollution results in 368,000 days being lost region wide due to illness or poor health – especially in the young, the elderly and people with heart disease, respiratory disease, asthma and bronchitis (Auckland Regional Council 2009b).

Five pollutants – carbon monoxide, particulate matter, nitrogen oxide, ozone and sulphur dioxide are common within the Auckland region. These different pollutants are associated with varying health impacts (Auckland Regional Council 2007b).

4.2.1 Particulate Matter

Particulate matter is solid or liquid fine particles that are produced from emissions that people can respire. Particulate matter which contains chemical and biological contaminants can penetrate into the lungs. Particulate matter can have the following effects on health: exacerbating respiratory conditions and cardiovascular disease leading to increased hospital admissions, increased risk of lung cancer, reduced resistance to infection and increased

4.2.2 Nitrogen dioxide (NO₂)

NO₂ is a gas formed during combustion and motor vehicles amount to a significant source of NO₂ in urban areas. NO₂ affects the lungs directly where it inhibits the lung’s immune defence mechanism. NO₂ can increase susceptibility and severity of asthma; increase reactions to natural allergens, induce stress and anxiety; and can lower resistance to infections like the flu (Auckland Regional Council 2007b; United States Environmental Protection Agency 2008; World Health Organisation 2003).

4.2.3 Sulphur Dioxide (SO₂)

SO₂ is a gas that is mainly produced by industrial processes as well as by diesel vehicles. SO₂ can irritate the lungs leading to coughing, wheezing or breathlessness. Long term exposure to high levels of SO₂ can exacerbate heart disease and cause respiratory illness (Auckland Regional Council 2007b; United States Environmental Protection Agency 2008; World Health Organisation 2003).

4.2.4 Ozone

Ozone is a natural gas that exists in the outer atmosphere. Ozone is formed under specific conditions when nitrogen oxides and volatile organic compounds emitted from motor vehicles and domestic fires react with the presence of sunlight. When ozone is formed at ground level it is a pollutant. Ozone can cause irritation to eyes, nose and throat as well as breathing difficulties. Other effects include lung damage, reduction of lung capacity and lowering resistance to respiratory illnesses (Auckland Regional Council 2007b).

4.2.5 Carbon Monoxide (CO)

CO is a type of gas that is produced from the incomplete combustion of fuels like petrol and diesel. Once absorbed into the bloodstream it has the ability to reduce the level of oxygen that blood can carry. Exposure to CO can cause dizziness, disorientation, visual disturbances, stress, anxiety, nausea, alter co-ordination and attention, cause acute mortality after very high exposure; it also results in increased hospital admissions and mortality from cardiovascular disease (Auckland Regional Council 2007b; United States Environmental Protection Agency 2008; World Health Organisation 2003).

4.3 NOISE

There is mounting evidence to show that noise can have negative health effects on physical and mental well being. Noise is particularly problematic for communities that live near major traffic routes, airports and industrial areas. Noise can influence a number of different health effects including interruption of communication and sleep; impair performance at work and school, annoyance, aggression and depression. Some evidence also shows that noise can exacerbate heart disease and hypertension, and cause hearing impairments (World Health Organisation 2000). More recent evidence indicates that exposure to high levels of road traffic noise increases the risk of heart attacks (Selander et al 2009).
Research in Europe has found that transport is a key source of noise pollution. Ambient sound levels have risen as a result of larger number of road trips and kilometres driven, increased frequency of flying and higher speeds that cars travel at (World Health Organisation 2000).

4.4 TRANSPORT POLICY AND PLANNING INTERVENTIONS TO IMPROVE CLIMATE CHANGE, AIR QUALITY AND NOISE EMISSIONS

Transport policy and planning interventions in these areas include:

- designing urban form to build communities that enhance choice of sustainable modes of transport;
- creating walkable areas that are safe and encourage people of all ages to walk;
- creating facilities for cycling that are coherent, direct, attractive, safe and comfortable;
- promoting carpooling for people travelling to the same location;
- promoting the use of public transport (Auckland Regional Transport Authority 2007);
- improving public transport emissions;
- improving urban design to improve local access to goods and services;
- legislating for improved fuel standards, as well as emissions standards on all vehicles including buses and freight (as part of WOF);
- zoning for freight corridors and for “vulnerable uses” eg ECE, schools, hospitals, elder care.

5. Active Transport

5.1 IMPACT OF PHYSICAL ACTIVITY ON HEALTH

Active transport has potential to have a significant impact on health. Transport infrastructure can either inhibit or promote forms of active transport (Public Health Advisory Committee 2003). There are two key advantages of active transport. The first is related to decreased use of motor vehicles, which would reduce emissions and road traffic injury rates. The second is the substantial positive impact on health from regular physical activity (World Health Organisation 2000).

There is a significant amount of evidence showing that physical activity enhances health. Spending a total of 30 minutes of fast walking or cycling each day, even if it is broken up into 10 to 15 segments can reduce the risk of several different health risks.

Walking and cycling to work have been shown to meet metabolic criteria for achieving health benefits from exercise. The health benefits of regular sustained physical activity include:
a 50 percent decrease in the risk of coronary heart disease
a 50 percent reduction in the risk of developing type two diabetes
a 50 percent reduction in the risk of becoming obese
a 30 percent reduction in the risk of developing hypertension
a 10/8-mmHg decline in blood pressure in people with hypertension
decreased risk of developing osteoporosis
decreased risk of colon cancer
decreased mortality from cerebrovascular disease
reduction in symptoms of depression and anxiety
preventing falls for older people (Hillary Commission 1999; World Health Organisation 2000).

5.2 INFLUENCE OF URBAN FORM ON ACTIVE TRANSPORT

Using transport related physical activity is a feasible way to enhance and maintain physical activity as it provides a structured routine for regular activity for a large proportion of the population. However, industrialised countries are becoming more and more reliant on travel by motor vehicle. As cities grow, they develop in ways that are less connected and do not offer communities many realistic options for travel other than private vehicles. Travel related physical activity is increasingly being replaced by motorised transport in many industrialised countries. Transport related physical activity has great potential to provide a sustainable alternative as it improves levels of physical activity and does not cause pollution from vehicle emissions (Badland & Schofield 2005).

Studies exploring transport related physical activity engagement have found that there are a number of different factors that influence engagement. Distance to travel destination is often recognised as a barrier to engaging in transport related physical activity. Other restrictions that inhibit people from using active modes to travel to places of work and study include shift work, travelling while working and isolated workplaces, which mean that it is not viable to walk or cycle to work (Badland & Schofield 2008).

Developments of suburbs after World War II led to building unconnected street networks and incorporating more cul-de-sacs, which reduced the number of intersections and replaced the conventional grid design of streets. The type of street design increased the network distance to locations and can make transport related physical activity unfeasible.

The critical mass of population density also affects transport in different ways. Areas of high density have larger concentrations of trip-ends, which reduce the length and distance of a trip by minimising travel outside the localised area (Ewing & Cervero 2001). High population density also allows for more affordable public transport (Frank 2000).

Studies have found that areas of mixed use of land where residential properties and commercial properties are spread within the area, decreases the distance to amenities,
which enhances the perception of convenience and encourages active modes of transport (Cervero 1988). Residents living in areas of high mixed land use reported that they ran errands by walking more than people in areas that had limited mix of land use (Leslie et al 2005; Saelens et al 2003). People who lived closer to shops also had higher rates of walking activity (Handy & Clifton 2001).

Mode of travel decisions are based on a complex relationship of socioeconomic demographic factors and the urban design of the local area. Use of transportation is generally a result of travel destination density, mixed land use and density. Previous studies have shown that people living in traditional neighbourhoods were more likely to carpool, use public transport and transport related physical activity modes, and were less likely to travel to work by a motor vehicle in comparison to people that resided in suburban neighbourhoods (Friedman et al 1994). Another study revealed a similar relationship with the utilisation of public transport. People living in areas of higher density and increased mixed land use reported increased use of rail networks to travel to work, after controlling for confounders (Cervero & Radisch 1996).

5.3 EFFECTIVE TRANSPORT INTERVENTIONS TO IMPROVE ACTIVE TRANSPORT

Interventions in this area include:

- encouraging and promoting public transport as it can influence an increase in active transport, as people usually have to walk to the location of public transport;
- developing and increasing access to areas to carry out physical activity, which consist of interventions such as creating walking trails and granting people access to local exercise facilities;
- establishing street-scale and community-scale urban design and land use policies and practices which promote active transport and physical activity;
- implementing behavioural interventions such as providing education, resources and subsidies to motivated groups of volunteers or tailored to a group’s specific needs;
- building infrastructures for alternative modes of transport and promoting the use of alternative modes of transport such as car pooling and forms of public transport;
- providing people with cash subsidies to use alternative transport modes besides driving;
- endorsing the formation of walking school buses for children to travel to school;
- promoting cycling by enabling people to mix cycling with other modes by creating spaces at railway/bus stations for cycle storage and cycle carriage on trains and buses;
- reducing local body requirements for parking around new business developments, but at the same time increase the requirement for workplace travel planning, and for facilities in new commercial buildings for cyclists and walking commuters (bike lockups, gear lockers, showers, drying areas);
removing incentives for car use such as free parking at workplaces and tax incentives for company vehicle fleets (Cairns et al 2004; Quigley et al 2006).

6. Access

Access is the fourth focus area for this HIA. Transport is a key enabler for enhancing daily living through providing access to services, amenities and facilities, and assisting with developing social connections. Availability of transport options for those with mobility restrictions (either through socio-economic disadvantage preventing private motor vehicle access, or through age and disability), is an important means of accessing local services and participating in community life (Barton & Tsourou 2000a; Denmark 1998).

For those with limited mobility options, access to transport services is a key resource to enable service access and community participation. Access to and use of local resources such as health services, grocery shops and parks or open spaces, can provide opportunities for health, through use of the services themselves (Field 2004). Lack of service or amenity access, or an obsolete or inappropriately designed built environment, can similarly act as a constraint on achieving health (Barton & Tsourou 2000b; Giles-Corti & Donovan 2002; Parks et al 2003). For example, access to supermarkets and grocers enable people to reach sources of food, but lack of access to food outlets, particularly supermarkets, can widen health inequalities by forcing those with limited mobility options to use lower quality and/or more expensive food options. Instances of such restrictive environments have been cited as leading causes of food poverty, where those without transport options are unable to access healthy food (Leather 1996). Similarly, access to primary health care services, are important for preventing the ongoing development of ill-health in individuals and communities.

Access to services via transport can also facilitate social cohesion, which is a recognised determinant of health. Venues such as community centres, schools, parks and open spaces, health facilities and shopping facilities, may enable interaction between people that supports a sense of belonging and participation in a community (Baum 1998; Field et al 2004; Warin et al 2000).

Drawing on work published by the UK Social Exclusion Unit, the HIA conducted for the Wellington Regional Land Transport Strategy identified five barriers to service and amenity access (Quigley et al 2006; Social Exclusion Unit 2003):

- availability and physical accessibility of transport;
- cost of transport;
- services and activities located in inaccessible places;
- safety and security of roads, walkways and public transport;
• travel horizons (people being unwilling to travel long distances or unfamiliar with or distrustful of available services).

Four of these relate directly to transport policy and services, and the fifth relates to urban design, which is closely linked in with transport planning.

For people on low incomes or with mobility restrictions, public transport is a particularly important enabler for service access. It is also important that the transport options available are able to cater for people with mobility restrictions, such as buses that can "kneel", and infrastructure that can support accessibility (such as bus stops and stations, safe pedestrian crossings and accessible platforms. Walkways and cycleways connecting residential and service areas are pivotal for supporting active transport (Barton & Tsourou 2000b).

In terms of cost as a barrier, the average New Zealander in 2007 spent 14 percent of their income on transport (Statistics New Zealand 2007), and international evidence indicates that transport occupies a greater proportion of low income families, compared to high income families. As with any service or commodity, price is a key determinant of use, and the extent to which price is a barrier to transport is a key concern from a health inequalities perspective (Barton & Tsourou 2000b). The recent introduction of the “Super Goldcard” enabling free public transport for older populations, has opened up the potential for accessing transport services.

The Auckland region is geographically spread, with many rural or semi-rural sub-populations, within a predominantly urban population. Public transport provision to more distant parts of the region have improved in recent years (such as train links to Helensville and the construction of the North Shore busway). From a health perspective, the concern is to identify the key areas in the region that are of low transport accessibility and high deprivation, and potential issues that may arise.

The perceived or real dangers of roads, pavements, walkways and public transport are important influences on people’s willingness to access services, particularly for women and elderly. Perceptions of safety are also important determinants of parents’ willingness to allow their children to walk to school (Kjellstrom & Hill 2002).

**Effective transport interventions to improve accessibility**

Key transport interventions to improve access and mobility include:

• improving availability and acceptability of transport services, such as more frequent and direct services;

• supportive infrastructures to enable public transport access (such as shelters, walkways and cycleways, and street landscaping);

• integrated ticketing and timetabling;

• affordable transport options, including free and subsidised transport;

• services to meet the needs of people with disabilities, such as accessible and useable public transport, publicly/community provided services, and training for bus, taxi and shuttle drivers to assist with helping people with disabilities (Barton & Tsourou 2000b; Quigley et al 2006).
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Attachment 4: Health Impact Assessment Profile report

Prepared for
Auckland Regional Council and Auckland Regional Public Health Service by Adrian Field and Nishadie Jayasekera, Synergia Ltd 2 Hepburn St, Ponsonby, Auckland 1021, www.synergia.co.nz.
AUCKLAND REGIONAL LAND TRANSPORT STRATEGY
HEALTH IMPACT ASSESSMENT

AREA PROFILE REPORT

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31 October 2009
**TABLE OF CONTENTS**

1. **INTRODUCTION** ........................................................................................................4
2. **THE POPULATION OF THE AUCKLAND REGION** .................................................4
3. **ETHNICITY** .............................................................................................................6
   3.1 **ETHNICITY** ......................................................................................................6
   3.2 **AGE STRUCTURES OF ETHNIC GROUPS** ..........................................................7
4. **DEPRIVATION** .......................................................................................................9
5. **AUCKLAND TRANSPORT** .....................................................................................12
6. **HEALTH-RELATED DATA FOR KEY FOCUS AREAS OF HIA** .........................13
   6.1 **SAFETY** ........................................................................................................13
   6.2 **EMISSIONS** ..................................................................................................15
   6.3 **ACTIVE TRANSPORT** ......................................................................................15
   6.4 **ACCESS AND MOBILITY** ...............................................................................18
      6.4.1 **Access to private motor vehicle transport** .................................................19
      6.4.2 **Access to passenger transport** ................................................................21
      6.4.3 **Access to other services, facilities and amenities** .....................................24

**APPENDIX 1: MAIN MEANS OF TRAVEL TO WORK, 2001 AND 2006** ..............25

**REFERENCES** ...........................................................................................................28
1. Introduction

This document profiles aspects of the health of the people of the Auckland region. Its purpose is to inform a Health Impact Assessment (HIA) process focusing on the Auckland Regional Land Transport Strategy.

The main focus of this document is on four areas that are the agreed scope of the Health Impact Assessment, which emerged through scoping workshops held in November and December 2008:

- **Safety**: To identify opportunities to ensure optimal safety for all users of the different modes of transport.
- **Access**: To identify opportunities to increase access and mobility for disadvantages groups.
- **Active transport**: To identify opportunities for embedding active modes of transport across the region.
- **Harmful emissions**: To identify opportunities to reduce air and noise pollution.

The Auckland Regional Public Health Service (ARPHS) commissioned the HIA to assess the potential health impacts of the Auckland Regional Land Transport Strategy (ARLTS) and to influence its strategic options so that positive health outcomes can be maximised and potential negative impacts are reduced or eliminated. The project is jointly funded by ARPHS and Auckland Regional Council. General information on health impact assessments can be found in Appendix 1.

2. The Population of the Auckland Region

The Auckland region encompasses 500,000 square kilometres and ranges from Wellsford to the Bombay Hills, and includes urban areas, smaller towns, coastal and rural settlements. According to the 2006 Census there were 1,303,068 people living in the Auckland region, which is one third of the population of New Zealand. Ninety percent of the Auckland population live within urban Auckland (Auckland Regional Council 2006b).

There are seven territorial authorities (TAs) that make up the Auckland regions. This includes the four city councils: North Shore, Waitakere, Auckland and Manukau and the three district councils: Rodney, Papakura and part of Franklin. Distribution of the Auckland population within each Territorial Authority (TA) is represented in the following diagram (Auckland Regional Council 2006b).
Auckland is New Zealand’s fastest growing region. Between 2001 and 2006, the population increased by approximately 144,000 people (a 12.4 percent increase), comprising half the country’s population growth. By 2051, the region is projected to increase from 1.3 million to 2.3 million. As well as the increased infrastructural demands that this growth will place on the region, there are likely to be some key pressure points:

- an ageing population;
- population distribution between urban and rural areas;
- greater ethnic diversity.

The future allocation of transport resources will need to meet the demands of these additional citizens in a manner that is able to balance the region’s environmental, economic and social objectives (Auckland Regional Council 2009).
3. **Ethnicity**

People from over 100 different ethnicities reside in the Auckland region. The Auckland region comprises of 58.5 percent European, 11.1 percent Māori, 14.4 percent Pacific, 18.9 percent Asian, 8.0 percent New Zealander, 1.5 percent Middle Eastern/ Latin American/ African, and 0.1 percent is made up of other ethnicities. Although the largest proportion of the Auckland population is made up of European ethnicity, this is significantly lower than the percentage of the New Zealand population that is European at 67.6 percent.

The ethnic group with the largest increase within the last 15 years has been people of Asian origin. In 1991 5.5 percent of the population identified themselves as Asian; compared to 13.1 percent were Asian 10 years later; by 2006 this proportion had increased to 18.9 percent. The growth of the Asian population is due to the rapid rise in immigration, particularly in the mid-1990s and also early in the new century.

Pacific populations have also grown as a proportion of the Auckland population. In 1991 11.9 percent of the Auckland population were pacific people, 13.1 percent in 2001 and 14.1 percent in 2006. Although there were modest rates of immigration from the Pacific Islands during this time, there was also a flow of people moving back to the islands; it is likely therefore these increases are the result of natural increase.

The proportion of Māori in the Auckland region has been reasonably stable. In 1991 the proportion of Māori was 11.1 percent, went up to 11.6 percent in 2001 and back to 11.1 percent in 2006 (Auckland Regional Council 2006a).

### 3.1 Ethnicity

Manukau city has a very diverse ethnic population, with less than half of the usual residents (40.5 percent) identified themselves as European. This was the lowest proportion of European among all the TAs, whereas Rodney had the highest proportion (81.1 percent).

There were relatively larger proportions of Māori in Manakau City (15.3 percent), Papakura District (26.5 percent) and Franklin District (15.4 percent) than in other TAs.

The highest proportion of people who identified themselves as New Zealander were found in Rodney (12.8 percent) and Franklin (11.4 percent), although the largest number in this category is in Auckland city with 28,878 people.
Table 1: Ethnicity by region and territorial authority, 2006

<table>
<thead>
<tr>
<th>Region</th>
<th>European</th>
<th>Māori</th>
<th>Pacific Peoples</th>
<th>Asian</th>
<th>MELAA</th>
<th>New Zealander</th>
<th>'Other'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodney District</td>
<td>81.1</td>
<td>8.7</td>
<td>2.1</td>
<td>3.1</td>
<td>0.4</td>
<td>12.8</td>
<td>0.1</td>
</tr>
<tr>
<td>North Shore District</td>
<td>67.5</td>
<td>6.3</td>
<td>3.3</td>
<td>18.6</td>
<td>1.8</td>
<td>9.8</td>
<td>0.1</td>
</tr>
<tr>
<td>Waitakere City</td>
<td>59</td>
<td>13.1</td>
<td>15.3</td>
<td>16.2</td>
<td>1.5</td>
<td>8.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Auckland City</td>
<td>54.4</td>
<td>7.8</td>
<td>13.1</td>
<td>24.4</td>
<td>1.8</td>
<td>7.5</td>
<td>0</td>
</tr>
<tr>
<td>Manukau City</td>
<td>40.5</td>
<td>15.3</td>
<td>27.9</td>
<td>21.5</td>
<td>1.5</td>
<td>5.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Papakura District</td>
<td>61.2</td>
<td>26.5</td>
<td>10.2</td>
<td>8.2</td>
<td>1.1</td>
<td>8.8</td>
<td>0</td>
</tr>
<tr>
<td>Franklin District</td>
<td>74.6</td>
<td>15.4</td>
<td>3.6</td>
<td>5.1</td>
<td>0.2</td>
<td>11.4</td>
<td>0</td>
</tr>
<tr>
<td>Auckland Region</td>
<td>56.5</td>
<td>11.1</td>
<td>14.4</td>
<td>18.9</td>
<td>1.5</td>
<td>8</td>
<td>0.1</td>
</tr>
<tr>
<td>New Zealand</td>
<td>67.6</td>
<td>14.6</td>
<td>6.9</td>
<td>9.2</td>
<td>0.9</td>
<td>11.1</td>
<td>0</td>
</tr>
</tbody>
</table>
(Note: MELAA is Middle Eastern/Latin American/African)

3.2 AGE STRUCTURES OF ETHNIC GROUPS

There are distinctly differing age structures of the key ethnic groups, which result from the different migration histories and demographic characteristics. The age structures for the NZ European, Māori, Pacific, Asian and total populations are displayed on the following page.
Age structure of NZ European, Māori, Pacific Asian and Total populations, 2006 (Auckland Region).
Of note is the substantially younger age profile of the Māori and Pacific populations, and the higher proportions of the NZ European population in older age groups. This is due to higher levels of fertility among these population groups and lower life expectancy than other groups. The age/sex structures of the European population who were born in New Zealand are mostly due to the demographic changes that have occurred in recent decades, particularly lowered birth rates and ageing population. The age/sex structure of Asian people in the Auckland region is markedly different from that of the other broad ethnic groups. The relatively large numbers of people within the 15 to 24 cohorts shows effects of the immigration policy as increased numbers of students arriving under the provision of the international student visa. The large groups between the ages of 35 and 49 and the reasonably small cohorts over 60 years are characteristic of the age selectivity of the general immigration policy (Auckland Regional Council 2006a).

4. Deprivation

The maps on the following pages display the relative social and economic status of communities across the Auckland region, focusing on each of the three district health boards, drawing on data from the New Zealand Index of Deprivation (Ministry of Health 2008a). There are considerable differences in socio-economic status across the Auckland region as it includes some of the most and least well off communities in New Zealand. Approximately 22 percent (293,000) of the people living in the Auckland region live in areas that are most deprived (rated 9 or 10 on the deprivation index). This includes 27 percent (80,000) of all the children in the region (Auckland Regional Council 2006b).

For each map, areas of high deprivation (poorer areas) are shaded darkest, and areas of low deprivation (wealthier areas) are shaded lighter. Areas of high deprivation are generally concentrated in urban areas, particularly South and West Auckland, and some parts of Auckland City. In rural areas, areas of high deprivation are predominantly in the Wellsford, Pukekohe and Helensville areas.

*The New Zealand Index of Deprivation is constructed from nine Census 2006 variables, and provides a summary deprivation score from 1 to 10 for small areas. A score of 1 is allocated to the least deprived 10 percent of areas, and 10 is allocated to the most deprived 10 percent of areas.
5. AUCKLAND TRANSPORT

Auckland’s transport network has developed through historical settlement patterns, the geographical constraints that arise from its isthmus location, and past levels of investment in transport infrastructure and services. The region’s network is broadly structured around its motorway networks, with a strong emphasis on radial routes that converge and/or pass through the CBD area (Auckland Regional Council 2009).

There is a high level of car ownership in Auckland as there is one car for every 1.5 people. In 2001, 14 percent of households within the Auckland region had three or more vehicles and by 2006 this proportion had grown to 17 percent (Auckland Regional Council 2006b).

A key phenomenon in the past three years affecting the use of different transport modalities in the region is the fluctuating fuel prices. At the time this report was prepared fuel prices had fallen from a peak of close to $2 per litre for diesel, due largely to international reductions in the demand for liquid fuels due to the price as well as wider economic circumstances; they were however rising again by February 2009. ARTA notes that the close link between rates of oil supply, oil demand and price represent a fundamental change in the economics of liquid fuels – a link which is expected to lead to high and unstable oil prices in future (Auckland Regional Transport Authority 2008a).

Annual data on fuel sales indicates that fuel use in the region has been roughly static since 2004/05, although the trend in previous years was strongly upwards. Taking into account population growth, there has been a nine percent decline in per capita fuel use since 2004/05. The national vehicle fleet became less fuel efficient over this period; the only explanation for this trend is reduced travel by Auckland households and businesses (Auckland Regional Transport Authority 2008a).

Passenger transport in the Auckland region is growing although remains relatively low. In the 2006 Census, 5.4 percent of trips to work in the Auckland region were by public transport (bus, train or ferry).

In the 2007/08 year, there were:

- 32,000 trips into the CBD by passenger transport per day;
- 54.4 million boardings on passenger transport, an increase on the previous year of 4.4 percent;
- 13 percent of passenger transport trips were by train, 79 percent by bus and 8 percent by ferry;
- Over the 12 months to June 2008, approximately 425,933 passenger journeys were subsidised under the Total Mobility scheme which provides low-cost access to taxi services for people with disabilities (Auckland Regional Transport Authority 2008b).

Between 2001 and 2006, there were some notable changes in transport mode use. The absolute numbers of rail journeys increased by 133 percent across the region (as a result of improvements in rail infrastructure), as well as a 28 percent increase in people walking or jogging (Auckland Regional Council 2009). However, there did not appear to be major
changes as a proportion of the population (detailed in Appendix 2). Over time, it is likely that changing the mix of transport modes across populations will be key to effecting changes in long term outcomes.

6. Health-Related Data for Key Focus Areas of HIA

6.1 Safety

Safety on roads has a significant influence on the health and well being of communities. One to two people are killed on roads within the Auckland region each week. Transport-related mortality is a significant cause of death across all age groups. Transport related hospitalisations are the second leading cause of hospitalisations across New Zealand, and the Auckland region and is responsible for approximately ten percent of all hospitalisations within the region. Anxiety and fear of road accidents is the main reason behind the sharp reduction in walking and cycling behaviour among children and older people (Auckland Regional Transport Authority 2008c).

Listed below are the key points that have been highlighted from crash data between 1995 and 2007:

- There is a long-term downward trend in road fatalities in the Auckland region and there is a considerable drop in 2007, compared to previous years. However the overall number of road injuries within the Auckland region has been increasing as the total population has been increasing. In comparison to the Wellington region, Auckland has a higher casualty rate but has lower rates than Northland and other areas.
- Speed related road fatalities, which is 38 percent of all road deaths, was at its highest in 2004 and casualties peaked in 2006, followed by a reduction in 2007.
- Road fatalities related to alcohol, which is 36 percent of all road deaths was at its highest in 2003/2004 and casualties have an increasing trend.
- There is a rising trend in deaths at intersections which accounts for 20 percent of all road deaths, which peaked in 2003.
- Pedestrian injuries are decreasing; however pedestrian related deaths, which are 21 percent of all road deaths, have remained steady over the past few years.
- There is a slight increasing trend for cyclist injuries; however the total number of deaths and injuries are small. Although it is important to note that under-reporting of cycling has been identified.
- Motorcyclist injuries are on the rise and the number of registered motorbikes in also growing, but the mortality rate for motorcyclists has a decreasing trend.
- Injury and non-injury rear-end motorway accidents appear to fluctuate from one year to the next, but besides that have been constant over the past few years.
• Use of safety belts and child restraints within the Auckland region is higher than the national average, yet lower than the best region.

• Alcohol and speed enforcement safety attitude in Auckland have fallen between 2003 and 2007 (Auckland Regional Transport Authority 2008c).

The Auckland region has been identified as incurring the largest amount of social costs in the country in relation to road accidents. Social costs are the dollar value of the damage to society as a result of road accidents, which includes financial costs such as medical, legal, loss of output and damages to property and costs that are non-financial such as the loss of life and quality of life. The total social costs for the region in 2006 were estimated at $990 million. Most of the social costs of the accidents within the Auckland region takes place on local roads, specifically arterial roads (Auckland Regional Transport Authority 2008c).

The following table outlines the summary of crash data between 1998 and 2007 for the Auckland region.

<table>
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</thead>
<tbody>
<tr>
<td><strong>Number of road deaths</strong></td>
<td>105</td>
<td>89</td>
<td>70</td>
<td>74</td>
<td>84</td>
<td>81</td>
<td>93</td>
<td>77</td>
<td>84</td>
<td>61</td>
</tr>
<tr>
<td><strong>Serious injuries</strong></td>
<td>527</td>
<td>575</td>
<td>530</td>
<td>560</td>
<td>639</td>
<td>545</td>
<td>576</td>
<td>503</td>
<td>624</td>
<td>483</td>
</tr>
<tr>
<td><strong>Sub-total serious and fatal injuries</strong></td>
<td>632</td>
<td>664</td>
<td>600</td>
<td>634</td>
<td>723</td>
<td>626</td>
<td>669</td>
<td>580</td>
<td>708</td>
<td>543</td>
</tr>
<tr>
<td><strong>Minor injuries</strong></td>
<td>2893</td>
<td>3032</td>
<td>2597</td>
<td>2803</td>
<td>3111</td>
<td>3561</td>
<td>3482</td>
<td>3595</td>
<td>3786</td>
<td>3760</td>
</tr>
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<td>1</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3525</td>
<td>3697</td>
<td>3197</td>
<td>3437</td>
<td>3834</td>
<td>4187</td>
<td>4151</td>
<td>4175</td>
<td>4494</td>
<td>4304</td>
</tr>
<tr>
<td><strong>Alcohol-related crashes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol-related road deaths</td>
<td>32</td>
<td>21</td>
<td>17</td>
<td>16</td>
<td>31</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>% Alcohol deaths</td>
<td>30%</td>
<td>24%</td>
<td>24%</td>
<td>22%</td>
<td>37%</td>
<td>37%</td>
<td>48%</td>
<td>42%</td>
<td>32%</td>
<td>36%</td>
</tr>
<tr>
<td>Alcohol-related road casualties</td>
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<td>617</td>
<td>539</td>
<td>525</td>
<td>629</td>
<td>629</td>
<td>620</td>
<td>660</td>
<td>641</td>
<td>701</td>
</tr>
<tr>
<td>Speed-related crashes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Speed-related road deaths</td>
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<td>29</td>
<td>16</td>
<td>28</td>
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<td>33</td>
<td>23</td>
</tr>
<tr>
<td>% Speed-related deaths</td>
<td>34%</td>
<td>33%</td>
<td>23%</td>
<td>38%</td>
<td>39%</td>
<td>48%</td>
<td>55%</td>
<td>48%</td>
<td>39%</td>
<td>38%</td>
</tr>
<tr>
<td>Speed-related casualties</td>
<td>692</td>
<td>617</td>
<td>539</td>
<td>525</td>
<td>629</td>
<td>629</td>
<td>620</td>
<td>660</td>
<td>641</td>
<td>871</td>
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<tr>
<td><strong>Injury crashes at intersections</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>1323</td>
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<td>1462</td>
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<td>% Injury crashes at intersections</td>
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<td>14%</td>
<td>15%</td>
<td>13%</td>
<td>16%</td>
<td>22%</td>
<td>14%</td>
<td>17%</td>
<td>19%</td>
<td>12%</td>
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<td></td>
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<td>166</td>
<td>154</td>
<td>204</td>
<td>180</td>
<td>179</td>
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<td>192</td>
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<td><strong>Motorcyclist deaths and casualties</strong></td>
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<td></td>
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</tr>
<tr>
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<td>11</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>13</td>
<td>7</td>
<td>4</td>
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<td>220</td>
<td>168</td>
<td>169</td>
<td>190</td>
<td>205</td>
<td>192</td>
<td>252</td>
<td>294</td>
<td>355</td>
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<tr>
<td><strong>Rear-end crashes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear-end injury crashes</td>
<td>136</td>
<td>172</td>
<td>137</td>
<td>228</td>
<td>217</td>
<td>294</td>
<td>288</td>
<td>304</td>
<td>257</td>
<td>281</td>
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<tr>
<td>Rear-end non-injury crashes</td>
<td>765</td>
<td>918</td>
<td>1046</td>
<td>1239</td>
<td>1315</td>
<td>1222</td>
<td>1193</td>
<td>1240</td>
<td>1196</td>
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<td><strong>Total rear-end crashes</strong></td>
<td>901</td>
<td>1090</td>
<td>1183</td>
<td>1467</td>
<td>1532</td>
<td>1516</td>
<td>1481</td>
<td>1544</td>
<td>1453</td>
<td>1517</td>
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<td><strong>Crashes at bends</strong></td>
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<td></td>
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<tr>
<td>Local roads</td>
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<td></td>
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<td></td>
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<tr>
<td>Fatal</td>
<td>25</td>
<td>21</td>
<td>18</td>
<td>17</td>
<td>28</td>
<td>21</td>
<td>26</td>
<td>19</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>All injury</td>
<td>604</td>
<td>656</td>
<td>595</td>
<td>590</td>
<td>669</td>
<td>724</td>
<td>769</td>
<td>739</td>
<td>829</td>
<td>770</td>
</tr>
</tbody>
</table>
6.2 EMISSIONS

Air pollutants that are emitted from motor vehicles are a primary source of pollution that settles on ground levels in urban areas. Pollutants including gases, dust and smoke can cause a number of health issues, resulting in increased school and work absences, hospitalisation and increased mortality (Auckland Regional Council 2007a). Five pollutants - carbon monoxide, particulate matter, nitrogen oxide, ozone and sulphur dioxide - are common and widespread within the Auckland region (Auckland Regional Council 2007b).

It has been estimated that every year, over 400 people in Auckland die prematurely as a result of air pollution. Low air quality is accountable for over 750,000 days of absences from work and school. Air pollution has the largest impacts on the young, older people and people with heart disease, respiratory disease, asthma and bronchitis. Costs that are related to air pollution for the Auckland region are estimated to be over $1.3 billion each year (Auckland Regional Council 2007a).

Auckland Regional Council has identified climate change as a key transport-related issue for the future. In a technical paper prepared for the Auckland Regional Land Transport Strategy, it is predicted that climate change will result in more extreme weather, sea level rises and public health issues such as tropical diseases. Reducing greenhouse gas emissions will be critical to offsetting or preventing these developments arising. On current trends however, it is likely that car ownership will grow at a rate exceeding population growth, which will pose significant challenges for reducing emissions (Auckland Regional Council 2009).

6.3 ACTIVE TRANSPORT

An important indicator of active transport is the census mode of travel to work data. Table 2 below details the number and percentage of the working population travelling to work by different modes in 2006. At the time of the 2006 Census, active transport (walking or cycling) accounted for 4.6 percent of work trips; compared to 5.4 percent by public transport and 67.8 percent by private transport.

Between 2001 and 2006, active transport (as a percentage of total trips) increased across the region by 0.2 percent. This was however driven by a 1.2 percent increase in Auckland...
City, and all other territorial authorities showed a small decline (data detailed in Appendix 1).

Table 2: Main means of travel to work, by region and territorial authority, 2006

<table>
<thead>
<tr>
<th></th>
<th>Worked at Home</th>
<th>Did Not Go To Work Today</th>
<th>Drove a private vehicle</th>
<th>Public transport</th>
<th>Active transport</th>
<th>Other</th>
<th>Not Stated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>40,881</td>
<td>59,844</td>
<td>425,394</td>
<td>34,212</td>
<td>29,058</td>
<td>6,201</td>
<td>32,241</td>
<td>627,834</td>
</tr>
<tr>
<td></td>
<td>6.5%</td>
<td>9.5%</td>
<td>67.8%</td>
<td>5.4%</td>
<td>4.6%</td>
<td>1.0%</td>
<td>5.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Rodney District</td>
<td>5,640</td>
<td>4,881</td>
<td>29,589</td>
<td>786</td>
<td>1,335</td>
<td>297</td>
<td>1,740</td>
<td>44,265</td>
</tr>
<tr>
<td></td>
<td>12.7%</td>
<td>11.0%</td>
<td>66.8%</td>
<td>1.8%</td>
<td>3.0%</td>
<td>0.7%</td>
<td>3.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>North Shore City</td>
<td>7,305</td>
<td>11,067</td>
<td>74,013</td>
<td>6,357</td>
<td>3,993</td>
<td>1,914</td>
<td>4,239</td>
<td>108,894</td>
</tr>
<tr>
<td></td>
<td>6.7%</td>
<td>10.2%</td>
<td>68.0%</td>
<td>5.8%</td>
<td>3.7%</td>
<td>1.8%</td>
<td>3.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Waitakere City</td>
<td>4,800</td>
<td>8,514</td>
<td>63,009</td>
<td>4,188</td>
<td>2,718</td>
<td>495</td>
<td>4,425</td>
<td>88,143</td>
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<tr>
<td></td>
<td>5.4%</td>
<td>9.7%</td>
<td>71.5%</td>
<td>4.8%</td>
<td>3.1%</td>
<td>0.6%</td>
<td>5.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Auckland City</td>
<td>13,023</td>
<td>18,663</td>
<td>125,763</td>
<td>16,935</td>
<td>15,837</td>
<td>2,091</td>
<td>10,233</td>
<td>202,545</td>
</tr>
<tr>
<td></td>
<td>6.4%</td>
<td>9.2%</td>
<td>62.1%</td>
<td>8.4%</td>
<td>7.8%</td>
<td>1.0%</td>
<td>5.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Manukau City</td>
<td>6,588</td>
<td>12,585</td>
<td>103,704</td>
<td>4,896</td>
<td>3,573</td>
<td>1,182</td>
<td>9,519</td>
<td>142,041</td>
</tr>
<tr>
<td></td>
<td>4.6%</td>
<td>8.9%</td>
<td>73.0%</td>
<td>3.4%</td>
<td>2.5%</td>
<td>0.8%</td>
<td>6.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Papakura District</td>
<td>1,152</td>
<td>1,989</td>
<td>14,610</td>
<td>822</td>
<td>780</td>
<td>108</td>
<td>1,140</td>
<td>20,601</td>
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<tr>
<td></td>
<td>5.6%</td>
<td>9.7%</td>
<td>70.9%</td>
<td>4.0%</td>
<td>3.8%</td>
<td>0.5%</td>
<td>5.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Franklin District</td>
<td>3,663</td>
<td>2,961</td>
<td>20,217</td>
<td>285</td>
<td>1,062</td>
<td>138</td>
<td>1,413</td>
<td>29,745</td>
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<tr>
<td></td>
<td>12.3%</td>
<td>10.0%</td>
<td>68.0%</td>
<td>1.0%</td>
<td>3.6%</td>
<td>0.5%</td>
<td>4.8%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

The map on the following page details the use of active transport in getting to work at the time of the 2006 Census. Active transport tends to be higher in the areas surrounding established urban or regional centres, particularly the Auckland CBD, Takapuna and Pukekohe.
2006 Census Travel to Work Data

Percentages are from the total traveling to a workplace by the main mode of transport. Data includes the over 15 year old population only.

Active Transport

- 0% - 4.1%
- 4.2% - 7.8%
- 7.9% - 15%
- 16% - 27%
- 28% - 58%
- Null

TA Boundary
The importance of active transport, from a health perspective, is that it is a key mean of embedding physical activity as a part of daily life; improving levels of active transport can also have flow-on effects in reducing motorised transport emissions. Data from the New Zealand Health Survey from 2006/07 indicates that adults living in the Auckland DHB area had significantly higher levels of sedentary behaviour than the national average (18.2 percent versus 15 percent). The Waitemata and Counties Manukau DHBs which are also part of the Auckland region have rates slightly higher than the national average, although the differences are not significant (15.4 percent and 16 percent respectively).

Adults living in the Waitemata DHB (47 percent) and Counties Manukau DHB (53.9 percent) areas recorded levels of regular physical activity that were similar to the national average (51.4 percent). Adults living in the Auckland DHB area were significantly less likely to take part in regular physical activity (40.3 percent) (Ministry of Health 2008b).

Nationally, 47 percent of children aged 5-14 years usually use active transport to get to and from school (Ministry of Health 2008b). Within the Auckland region, an important programme to promote active transport to school is School Travel Plans (STP); the programme is led by ARTA and is an important arm of traffic demand management in the region. STP takes a collaborative approach to developing travel strategies tailored to individual schools. It includes educational and promotional campaigns to promote active transport (eg walking, Walking School Bus (WSB), scooter, and/or cycling), building of traffic calming measures, installation of crossings, improvement of roads and footpaths, cycle training for students, and parking restrictions (Hinckson et al 2008).

In 2007, participation in the STP programme was associated with a 3.4 percent decrease in car usage and a 2.4 percent increase in active transport. A smaller increase in public transport use was also observed (1.0 percent). Overall, two thirds of the participating schools experienced positive changes to the frequency of active and public transport (Hinckson et al 2008). In 2007/08, it was estimated that there were 4,503 fewer morning peak car trips to participating schools as a result of the school travel plan and Walking School Bus programmes (Auckland Regional Transport Authority 2008b).

The workplace TravelWise programme is similarly aimed at reducing car travel to workplaces; the programme is growing rapidly, although there is relatively little data from participating organisations. Data from seven participating organisations in 2007/08 indicated nearly 1,300 car trips were avoided through the programme. By 2016, the STP and TravelWise programmes aim to achieve 20,000 car trips each morning peak (Auckland Regional Transport Authority 2008b).

6.4 ACCESS AND MOBILITY

Access relates to the opportunities available for reaching destinations or activities, and mobility represents the choices available to travel to or from these destinations. The challenges with access and mobility are closely linked to the land use planning and the region’s transport network. These include:

- providing mobility options for people without access to a motor vehicle;
- allocation of resources to provide transport choices from more peripheral areas;
• better alignment between where land use growth is occurring and where transport improvements are planned;
• availability and coverage of transport options such as public transport in response to car-dominated travel;
• providing or planning for mobility options that address a variety of trips and travel needs, including the needs of people with disabilities (Auckland Regional Council 2009).

6.4.1 Access to private motor vehicle transport

The following map indicates areas with households without access to a motor vehicle (darker blue indicates lower motor vehicle access). This map shows that household access to motor vehicles is widespread across the region, with more rural and/or areas with lower deprivation scores having greater access and areas close to large populations having lower access. North Shore City, Waitakere City, Auckland City and Manukau City have more than 14 percent of households without access to a motor vehicle.

Rural areas, such as in the Rodney and Franklin Districts, have a lower percentage of households with that have no access to a motor vehicle. Also TAs that encompasses urban areas, have a greater percentage of households that have no access to a motor vehicle.
The figure below shows an association between higher deprivation scores and higher numbers of households without access to a motor vehicle, especially for households that have three or more residents.

**Households without motor vehicles by resident number and NZDep01**

![Bar graph showing proportion of households without motor vehicles by deprivation decile and number of residents.]

The map below details private transport use in travelling to work at the time of the 2006 Census. The map indicates public transport is highest in the rural or per-urban areas surround established centres, and lowest in Auckland CBD, Devonport and Hobsonville (likely to be linked to accessing the airbase).
6.4.2 Access to passenger transport

The figure below shows the accessibility of public transport to people in the region, as modelled for the ARC in 2006. Accessibility is measured as a total cost (time and money costs) involved in using public transport, and is determined by the availability, cost frequency and routing of services. The map indicates that areas towards the centre of the region have higher accessibility.
region and those along major public transport corridors have highest accessibility to passenger transport and more peripheral areas have the lowest accessibility. The map also highlights the radial structure of the public transport network that is focus in the Auckland CBD as a hub.

Public Transport Access, Auckland Region

The map on the following page details the working population travelling to work via passenger transport at the time of the 2006 Census. The map generally mirrors the above map, showing public transport use is highest within Auckland City, Waitakere and North Shore.
2006 Census
Travel to Work Data

Percentages are from the total traveling to a workplace by the main mode of transport. Data includes the over 15 year old population only.
6.4.3 Access to other services, facilities and amenities

Transport is a key enabler for accessing a wide range of services, facilities and amenities, which can either support people in their daily lives (such as health services or open space), or expose people to environments that are offer more risks for healthier living (such as takeaway restaurants, liquor outlets and gaming machines). Data from the State of Public Health in the Auckland Region report, published by the Auckland Regional Public Health Service in 2006, indicates the following issues with regard to the spread of services in the region, which could have implications for transport strategy (Auckland Regional Public Health Service 2006). The available data indicates a mixed picture of access to healthier settings.

- Most people living within the urban TAs are within 2000 metres of a general practice facility. More than 25 percent of people living in the Franklin district live over ten kilometres away from a general practice service.

- Neighbourhoods with low NZDep deciles (ie wealthier areas) have better access to green activity space compared to neighbourhoods with high deciles; Auckland City and Manukau City have localised pockets areas of high access, however lower access in general across the region. North Shore City and Waitakere City have more consistent access to green activity space.

- Among all the TAs the areas of high deprivation tend to have significantly better access to fruit and vegetable retailers.
## Appendix 1: Main Means of Travel to Work, 2001 and 2006

<table>
<thead>
<tr>
<th>Area 2001</th>
<th>Worked at Home</th>
<th>Did Not Go To Work Today</th>
<th>Drove a private vehicle</th>
<th>Public transport</th>
<th>Active transport</th>
<th>Other</th>
<th>Not Stated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>37,524</td>
<td>57,174</td>
<td>360,687</td>
<td>28,761</td>
<td>23,664</td>
<td>5,379</td>
<td>20,661</td>
<td>533,853</td>
</tr>
<tr>
<td>Rodney District</td>
<td>4,941</td>
<td>4,347</td>
<td>23,034</td>
<td>660</td>
<td>1,263</td>
<td>186</td>
<td>975</td>
<td>35,403</td>
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<tr>
<td>North Shore City</td>
<td>6,594</td>
<td>10,884</td>
<td>63,369</td>
<td>5,286</td>
<td>3,516</td>
<td>1,758</td>
<td>2,397</td>
<td>93,807</td>
</tr>
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<td>Waitakere City</td>
<td>4,395</td>
<td>8,469</td>
<td>55,128</td>
<td>3,399</td>
<td>2,451</td>
<td>432</td>
<td>2,754</td>
<td>77,037</td>
</tr>
<tr>
<td>Auckland City</td>
<td>11,814</td>
<td>17,622</td>
<td>110,421</td>
<td>13,923</td>
<td>11,460</td>
<td>1,863</td>
<td>7,218</td>
<td>174,321</td>
</tr>
<tr>
<td>Manukau City</td>
<td>6,270</td>
<td>11,934</td>
<td>83,847</td>
<td>4,617</td>
<td>3,396</td>
<td>981</td>
<td>6,045</td>
<td>117,084</td>
</tr>
<tr>
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<td>2,007</td>
<td>12,840</td>
<td>708</td>
<td>765</td>
<td>81</td>
<td>645</td>
<td>18,258</td>
</tr>
<tr>
<td>Franklin District</td>
<td>3,756</td>
<td>2,643</td>
<td>16,326</td>
<td>219</td>
<td>1,008</td>
<td>96</td>
<td>849</td>
<td>24,891</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area 2001</th>
<th>Worked at Home</th>
<th>Did Not Go To Work Today</th>
<th>Drove a private vehicle</th>
<th>Public transport</th>
<th>Active transport</th>
<th>Other</th>
<th>Not Stated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>7.0%</td>
<td>10.7%</td>
<td>67.6%</td>
<td>5.4%</td>
<td>4.4%</td>
<td>1.0%</td>
<td>3.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Rodney District</td>
<td>14.0%</td>
<td>12.3%</td>
<td>65.1%</td>
<td>1.9%</td>
<td>3.6%</td>
<td>0.5%</td>
<td>2.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>North Shore City</td>
<td>7.0%</td>
<td>11.6%</td>
<td>67.6%</td>
<td>5.6%</td>
<td>3.7%</td>
<td>1.9%</td>
<td>2.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Waitakere City</td>
<td>5.7%</td>
<td>11.0%</td>
<td>71.6%</td>
<td>4.4%</td>
<td>3.2%</td>
<td>0.6%</td>
<td>3.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Auckland City</td>
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<td>63.3%</td>
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<td>4.1%</td>
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</tr>
<tr>
<td>Manukau City</td>
<td>5.4%</td>
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<td>100.0%</td>
</tr>
<tr>
<td>Papakura District</td>
<td>6.6%</td>
<td>11.0%</td>
<td>70.3%</td>
<td>3.9%</td>
<td>4.2%</td>
<td>0.4%</td>
<td>3.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Franklin District</td>
<td>15.1%</td>
<td>10.6%</td>
<td>65.6%</td>
<td>0.9%</td>
<td>4.0%</td>
<td>0.4%</td>
<td>3.4%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
## Main Means of Travel to Work 2006

<table>
<thead>
<tr>
<th>Area 2006</th>
<th>Worked at Home</th>
<th>Did Not Go To Work Today</th>
<th>Drove a private vehicle</th>
<th>Public transport</th>
<th>Active transport</th>
<th>Other</th>
<th>Not Stated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>40,881</td>
<td>59,844</td>
<td>425,394</td>
<td>34,212</td>
<td>29,058</td>
<td>6,201</td>
<td>32,241</td>
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## Main Means of Travel to Work 2006

<table>
<thead>
<tr>
<th>Area 2006</th>
<th>Worked at Home</th>
<th>Did Not Go To Work Today</th>
<th>Drove a private vehicle</th>
<th>Public transport</th>
<th>Active transport</th>
<th>Other</th>
<th>Not Stated</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>6.5%</td>
<td>9.5%</td>
<td>67.8%</td>
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<td>5.1%</td>
<td>100.0%</td>
</tr>
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<td>Rodney District</td>
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<td>3.0%</td>
<td>0.7%</td>
<td>3.9%</td>
<td>100.0%</td>
</tr>
<tr>
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<td>3.7%</td>
<td>1.8%</td>
<td>3.9%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Waitakere City</td>
<td>5.4%</td>
<td>9.7%</td>
<td>71.5%</td>
<td>4.8%</td>
<td>3.1%</td>
<td>0.6%</td>
<td>5.0%</td>
<td>100.0%</td>
</tr>
<tr>
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<td>62.1%</td>
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<td>100.0%</td>
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<tr>
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<td>2.5%</td>
<td>0.8%</td>
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<td>100.0%</td>
</tr>
<tr>
<td>Papakura District</td>
<td>5.6%</td>
<td>9.7%</td>
<td>70.9%</td>
<td>4.0%</td>
<td>3.8%</td>
<td>0.5%</td>
<td>5.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Franklin District</td>
<td>12.3%</td>
<td>10.0%</td>
<td>68.0%</td>
<td>1.0%</td>
<td>3.6%</td>
<td>0.5%</td>
<td>4.8%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
### Main Means of Travel to Work 2006: Absolute % change

<table>
<thead>
<tr>
<th>Area 2006</th>
<th>Worked at Home</th>
<th>Did Not Go To Work Today</th>
<th>Drove a private vehicle</th>
<th>Public transport</th>
<th>Active transport</th>
<th>Other</th>
<th>Not Stated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>0.6%</td>
<td>0.5%</td>
<td>12.1%</td>
<td>1.0%</td>
<td>1.0%</td>
<td>0.2%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Rodney District</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Shore City</td>
<td>2.0%</td>
<td>1.5%</td>
<td>18.5%</td>
<td>0.4%</td>
<td>0.2%</td>
<td>0.3%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Waitakere City</td>
<td>0.8%</td>
<td>0.2%</td>
<td>11.3%</td>
<td>1.1%</td>
<td>0.5%</td>
<td>0.2%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Auckland City</td>
<td>0.5%</td>
<td>0.1%</td>
<td>10.2%</td>
<td>1.0%</td>
<td>0.3%</td>
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<td>2.2%</td>
</tr>
<tr>
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<td>0.2%</td>
<td>0.2%</td>
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</tr>
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<td>9.7%</td>
<td>0.6%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Franklin District</td>
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<td>15.6%</td>
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<td>0.2%</td>
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</tbody>
</table>

### Main Means of Travel to Work 2001-2006: Change as percentage of population

<table>
<thead>
<tr>
<th>Area 2006</th>
<th>Worked at Home</th>
<th>Did Not Go To Work Today</th>
<th>Drove a private vehicle</th>
<th>Public transport</th>
<th>Active transport</th>
<th>Other</th>
<th>Not Stated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Region</td>
<td>-0.5%</td>
<td>-1.2%</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.2%</td>
<td>0.0%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Rodney District</td>
<td>-1.2%</td>
<td>-1.3%</td>
<td>1.8%</td>
<td>-0.1%</td>
<td>-0.6%</td>
<td>0.1%</td>
<td>1.2%</td>
</tr>
<tr>
<td>North Shore City</td>
<td>-0.3%</td>
<td>-1.4%</td>
<td>0.4%</td>
<td>0.2%</td>
<td>-0.1%</td>
<td>-0.1%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Waitakere City</td>
<td>-0.3%</td>
<td>-1.3%</td>
<td>-0.1%</td>
<td>0.3%</td>
<td>-0.1%</td>
<td>0.0%</td>
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</tr>
<tr>
<td>Auckland City</td>
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<td>-1.3%</td>
<td>0.4%</td>
<td>1.2%</td>
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<tr>
<td>Manukau City</td>
<td>-0.7%</td>
<td>-1.3%</td>
<td>1.4%</td>
<td>-0.5%</td>
<td>-0.4%</td>
<td>0.0%</td>
<td>1.5%</td>
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<tr>
<td>Papakura District</td>
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<td>-1.3%</td>
<td>0.6%</td>
<td>0.1%</td>
<td>-0.4%</td>
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</tr>
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<td>0.1%</td>
<td>-0.5%</td>
<td>0.1%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>
REFERENCES

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