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This document supports the development of the Auckland Regional Land Transport Strategy 2010. It is the culmination of work developed by the TDM Sub-Group and the Technical Advisory Committee (TAC) to support the Auckland Regional Transport Committee. These groups included representatives from all local territorial authorities, Auckland Regional Transport Authority, Auckland District Public Health Board and other technical experts.

Reviewed by:

A handwritten signature in black ink, appearing to read 'Don Houghton', written in a cursive style.

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Travel Demand Management, Behaviour Change Initiatives and supporting infrastructure

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Executive Summary

This report outlines a high series of targets aimed at educational, work and community travel planning initiatives and the necessary supporting walking and cycling infrastructure that can contribute to local, regional and national transport objectives.

The methodologies used in this report largely follow those used for setting regional travel demand management (TDM) targets for the Auckland Regional Land Transport Strategy 2005, which is thoroughly described in a peer reviewed journal article¹.

The proposed activities have been linked to regional TDM targets for the years 2016, 2026 and 2041. It is anticipated that the programme will be refined and will change as projects are brought forward or reassessed based on performance, cost effectiveness and contribution towards transport modal shift to public transport, walking and cycling modes. This is expected via an update to the Sustainable Transport Plan or some other Regional TDM Implementation Plan.

Some of the suggested activities are aimed at urban areas and some are aimed at rural areas. The broad scope of activities identified in this document is intended to be a framework for future implementation plans that link TDM activities with results the region can reasonably expect to achieve and to enable comparison with other future improvements to the transport network.

Travel initiatives are organised into four categories. The type of activities for educational, work, community travel initiatives and walking and cycling initiatives are summarised below.

Educational travel initiatives	<ul style="list-style-type: none">● school travel plans,● walking school busses,● improve road safety around schools,● improve tools to support ongoing behaviour change in schools with travel plans,● options for schools without travel plans,● work closely with Ministry of Education,● connect schools with regional walking and cycling networks and public transport,● university travel plans.
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¹ A. Percy, P. Clark, J. Valero, A. Van Roon and D. Young. Quantifying Regional Benefits from Travel Demand Management. Road and Transport Research Vol. 15 No. 2 June 2006 *Road and Transport Research*. www.patrec.org/atrf.

Work travel initiatives	<ul style="list-style-type: none"> • travel management associations, • area travel plans, • institutional travel plans, • comprehensive parking management plans, • carpooling/rideshare integrated with park and ride schemes, • teleworking, • freight management, • rural transport to work, • integration of initiatives with redevelopment plans.
Community travel initiatives	<ul style="list-style-type: none"> • neighbourhood accessibility plans, • promotional campaigns such as “Travel Smart”, • demand responsive transportation (rural areas), • personalised travel programme, • transit oriented developments, • new technologies (ie internet shopping, etc).
Walking and cycling initiatives	<ul style="list-style-type: none"> • regional cycling network, • implement local walking and cycling strategies, • integrated traffic assessments (ITAs), • high quality walking and cycling access to public transport, • continue and improve regional cycle monitoring, • develop and implement methods for pedestrian monitoring, • in the long term, review regional cycle network, • bikes on busses, • bike and walking promotional activities (ie bike breakfast),

Table 1: Summary of travel initiatives

This work was supported by a sub-working group consisting of ARTA representatives and territorial authority officers to estimate the impact of these TDM initiatives by utilising regional transport and land use models.

At the time of writing the legislative basis for the Auckland Regional Land Transport Strategy (ARLTS) is contained in the Land Transport Management Act 2003, as amended in 2008. The Royal Commission on Auckland Governance may result in a change in the region’s governance and therefore the ARLTS. This paper summarises the work undertaken to support the development of an Auckland TDM strategy and outlines the TDM based contribution towards achieving regional objectives and the targets set out in the New Zealand Transport Strategy 2008. Regardless of the future Auckland governance structure travel planners will continue to play a key role in contributing towards a sustainable and resilient transport network.

It is anticipated that the overall expected shift or reduction in trips to active or public transport, associated with these TDM initiatives, is approximately 686,600. See table below.

Trips Shifted to Active Modes or PT by 2041	
Education	45,000
Community	290,000
Work (including teleworking)	351,600
Total	686,600

Achieving these TDM targets will result in approximately four per cent reduction in private vehicle CO₂ emissions by 2041². This is documented in Section 10.3 Environmental Impacts. Further work may be needed to compare TDM related carbon reduction to other carbon outcomes of other transport network improvements.

² As calculated via the Auckland Regional Transport model.

1 Abbreviations

ARLTS	Auckland Regional Land Transport Strategy
ARPS	Auckland Regional Policy Statement
ARTA	Auckland Regional Transport Authority
AUT	Auckland University of Technology
CBSM	Community based social marketing
CTI	Community travel initiatives
DRT	Demand Responsive Transit
ETI	Educational travel initiatives
GPS	Government Policy Statement (on transport funding)
HOV	High occupancy vehicle
ITA	Integrated transport assessment
ITS	Intelligent transport systems
LTMA	Land Transport Management Act 2003
NAP	Neighbourhood accessibility plans
NZTA	New Zealand Transport Authority
NZTS	New Zealand Transport Strategy
QTN	Quality Transit Network
RGS	Regional Growth Strategy
RLTS	Regional Land Transport Strategy
RTC	Regional Transport Committee
RTN	Rapid Transit Network
STP	School travel plans
TDM	Travel Demand Management
TMA	Transportation Management Associations
VKT	Vehicle kilometres travelled
WTI	Work travel initiatives
WTP	Work travel plans

2 Purpose

This report has been prepared to assist the Auckland Regional Transport Committee with preparation of the Auckland Regional Land Transport Strategy 2010. The current RLTS was published in 2005. That strategy had a 10-year planning horizon and called for a substantial increase in public transport spending and the completion of key elements of the strategic road network and placed an emphasis on the management of travel demand. The RLTS 2005 recommended allocating 4 per cent of the region's overall transport funding to TDM initiatives (up from 0.3 per cent in the 2003 strategy).

This paper serves the purpose of documenting the methodology for including TDM initiatives in the regional transport modelling process and strategic options analysis and updates technical paper 18 on the TDM package for the RLTS 2005.

This paper proposes a programme of activities that rationalises TDM targets for the years 2016, 2026 and 2041. The Auckland regional transport model (ART3), accounts for both public transport and active modes, such as walking and cycling. However, ART3 does not explicitly represent the types of TDM initiatives that are known to contribute towards shifts to public transport, walking and cycling modes such as those described. The TDM adjustment in the model, either removes the trips from the network (ie teleworking) or reallocates private vehicle trips to public transport or active modes. The TDM adjustment process is a manual process that is imposed on the model using the same methodologies described in the peer reviewed article on Quantifying Regional Benefits from TDM in the *Road and Transport Research* journal (Anna Percy, 2006). One of the purposes of this report is to document the manual adjustment made to the regional transportation modelling and to rationalize the assumptions that support this manual adjustment.

It is anticipated that a more detailed implementation plan or an update to the Sustainable Development Plan 2006 will be developed to support achieving the targets outlined in this paper.

3 Introduction to the RLTS 2010

The need for TDM initiatives has a well documented history in previous RLTSs. Appendix 1 contains a brief review of TDM in previous RLTS's and confirms the importance and contribution that TDM initiatives have had on the Auckland transport network since the early 1990s.

The 2010 RLTS needs to build on the existing strategy and incorporate recent legislative changes and updates to the draft Auckland Regional Policy Statement (ARPS). It also needs to take account of other recent national and regional policy initiatives, including, the 2008 New Zealand Transport Strategy, the New Zealand Energy Strategy (2007), the New Zealand Energy Efficiency and Conservation Strategy (2007), the Auckland Sustainability Framework (2007) and the Auckland OnePlan (version 1 2008). TDM initiatives positively contribute towards most of the regional and national objectives contained in these strategies.

This paper is the final deliverable of the TDM sub-working group and constitutes one of over 15 supporting RLTS technical papers.³ The TDM sub-working group consisted of officers representing local, regional and national organisations and is described in Appendix 2 TDM sub-working group. The main focus of this paper is to describe a programme of TDM initiatives that are expected to contribute towards regional and national targets via:

- Educational Travel Initiatives (ETI)
- Work Travel Initiatives (WTI)
- Community Travel Initiatives (CTI).

In order to support the type and degree of mode shift targets envisaged a parallel programme of TDM supply side improvements and activities is needed aimed at:

- walking infrastructure
- cycling infrastructure.

Improvements to public transport infrastructure are described in the draft Public Transport Network Plan. This report summarises the expected increase in public transport trips that are associated with travel planning initiatives.

3.1 RLTS 2010 TDM Strategy and Definition

The current RLTS, published in 2005, had a 10-year planning horizon. It called for a substantial increase in public transport spending, the completion of key elements of the

³ <http://www.arc.govt.nz/transport/regional-land-transport-strategy-2005/the-new-regional-land-transport-strategy.cfm>

strategic road network and placed new emphasis on alternatives to car travel. Since the LTMA was amended in 2008, the RTC has been working on an updating the RLTS 2005.

During the October 2008 RTC meeting, members resolved to accept the hierarchy of policies as the organising principles of policies for the RLTS 2010. The policy “hierarchy” shown in Figure 1 will be used as the organising principal for the RLTS 2010 policies. The hierarchy ranks policies according to whether they have long term, regional impacts or shorter term, more local impacts. The hierarchy implies a preference for demand management policies ahead of increasing supply (ie increasing capacity) and for expansion of the public transport network ahead of expansion of the road network.

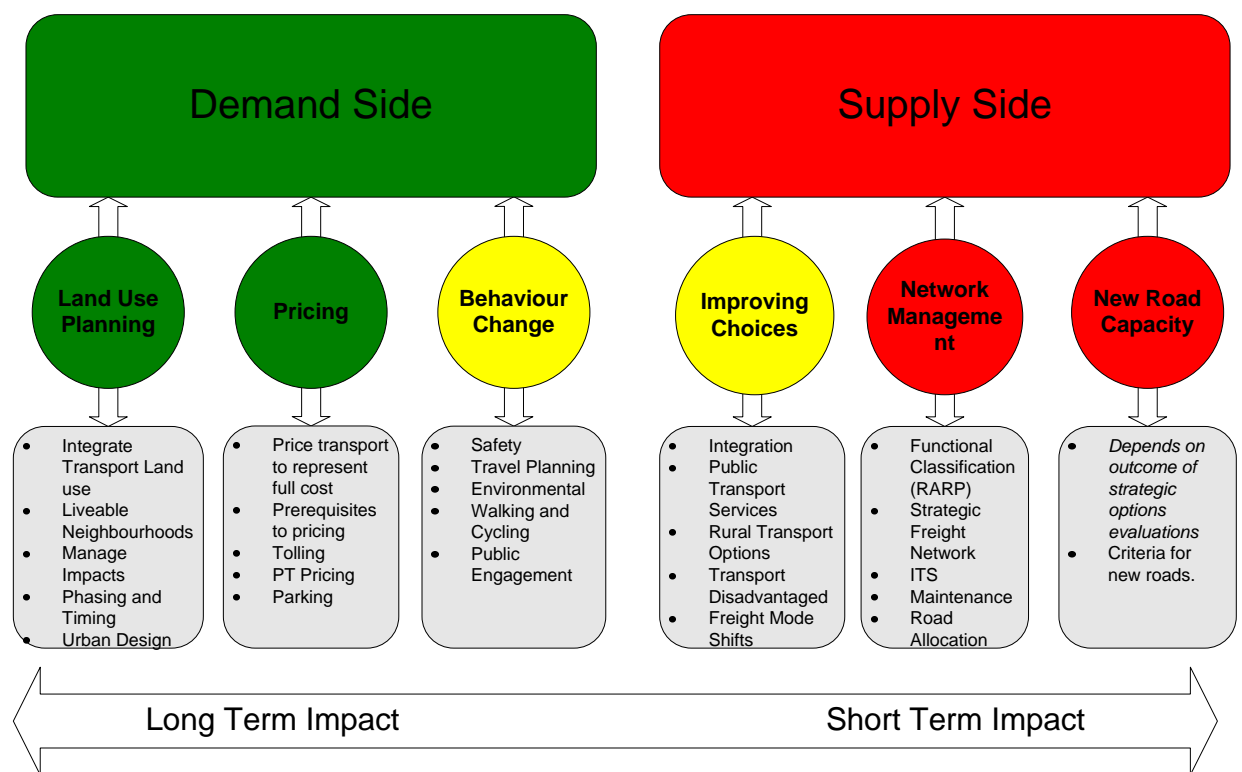


Figure 1: Hierarchy of policies framework

TDM definition

The RLTS 2005 TDM definition is:

“A set of tools to offer people better travel information and opportunities for helping people choose to reduce their need to travel especially by car”.

It is proposed that, considering the RTC support for the hierarchy of policies and the acknowledgement that the TDM Strategy will reflect the three main policy headings, the definition of TDM should closely support this framework.

Therefore a working definition of TDM for the RLTS 2010 has been adopted as follows:

“A combination of land use planning policies, economic measures, application of physical infrastructure and behaviour change tools to reduce the demand for travel, especially by single occupancy vehicles and to encourage modal shift to more sustainable forms of travel”.

The purpose of this paper is to describe the travel behaviour change activities that fit within the demand side of policies, as illustrated in Figure 1, the expected contribution of these activities towards the regional and national targets, and the representation of these activities in the RLTS strategic options modelling process.

Supply side policies are generally being progressed via the development of the RLTS Chapter 5 Policies. However the programme of activities to support walking and cycling activities includes some supply side infrastructure improvements.

3.2 RLTS Demand Management Policies

Chapter 5 of the RLTS is intended to contain all of the policies relating to the demand management strategy. A draft of that chapter is being developed, however a summary of policies relating to land use planning, pricing and behaviour change policies is provided below:

Land Use (DRAFT)

- Ensure that land use development and transport are integrated and mutually supportive.
- Develop the region’s transport system to give effect to the growth concept in the Regional Policy Statement.
- Encourage land use activities to develop in locations that reduce the need for motorised trips.
- Locate economic activity to maximise the efficient movement of goods and services.
- Ensure that design for streets and transport infrastructure contributes to quality liveable environments and takes account of the different roles and character of particular locations.
- Encourage land use activities and urban design that reduce exposure to adverse effects from transport activities.
- Recognise and provide for the multi-functional role of transport corridors, in addition to their transport function.

- Discourage high trip-generating activities from developing in locations where transport options are limited, or where there are adverse effects on the safety and efficiency of the transport network.

Additional information regarding land use is contained within WP19 Land Use and Urban Design.

Economic Measures (DRAFT)

- Provide financial incentives to encourage the use of sustainable transport modes.
- Set public transport fares at a level that encourages mode shift, recognises the needs of the transport disadvantaged, and provides for a financially viable public transport system.
- Manage the pricing and availability of parking so that it is consistent with road capacity and growth centre objectives.
- Support the introduction of road pricing to better reflect the costs and benefits of transport use.
- Ensure that adequate choices are available to enable road users to respond to road pricing or tolling.

Behaviour Change (DRAFT)

- Provide information and education to enable a better understanding of transport choices and promote more sustainable transport options.
- Use education and enforcement to develop a safety culture amongst all transport users.
- Work with schools, businesses and communities to develop and promote more sustainable transport options.
- Promote options that reduce the need to travel.
- Promote options that make more efficient use of private vehicles.

3.3 Integration and the role of education

Clause 5[1] [h] of the Land Transport Management Act (LTMA) requires the RLTS to include “an assessment statement of the role of education and enforcement in contributing to the land transport outcomes”.

This requirement is new and will require the RLTS to include a statement that draws together the various policies and actions related to education and enforcement, and an

assessment of how they are likely to contribute to the land transport outcomes identified in the RLTS⁴.

The RLTS 2005 assumed that all transport modes would integrate over time and it was expected that more trips around the region will be multi-modal for example:

- private vehicle to pedestrian trips,
- pedestrian to bus to train to pedestrian trip,
- pedestrian to ferry,
- private vehicle to public transport to pedestrian, etc.

The ease with which people are able to transfer within and between these modes is very important. Travel planning initiatives are aimed at educating the public on alternative modes of travel and assisting users with changing their method of travelling. Travel planning is also about finding bottlenecks or hotspots where minor improvements can deliver considerable enhancements for neighbourhood accessibility and safety. Travel planners can also assist with personalised travel planning to reduce or modify household trips. For some families this may mean the difference between having one or two cars per household, resulting in significant household savings. These types of activities are outlined in Section 6.3 Community Travel Initiatives.

3.4 TDM and contribution towards assisting economic development

Objective 2 of the RLTS is to assist economic development. This section discusses the contribution of TDM initiatives on economic development and stimulation.

“Economic stimulation refers to policies and investments that increase employment and business activity”⁵. Policies that focus on road investment have different economic impacts than policies that focus on public transport, walking and cycling infrastructure.

Policies that focus on roading transport can expect to have the following aggregate economic impact based on international experience:

- greater per capita transportation expenditures,
- greater fuel expenditure,
- increased road and parking requirements,
- higher per capita traffic crash costs,

⁴ From WP01 Legislative Requirements page 22.

⁵ Section 5 of this report quotes directly from - The Victoria Transport Policy Institute released the report Smart Transportation Economic Stimulation: Infrastructure Investments that Support Strategic Planning Objectives Provide True Economic Development – in the absence of Auckland region specific economic analysis.

- higher costs related to providing services to non-car drivers, such as children or the elderly.

Policies that focus on public transport and walking and cycling infrastructure have the following aggregate economic impact:

- lower per capita transportation expenditures,
- lowered fuel expenditures,
- reduced road and parking requirements,
- reduced per capita traffic crash costs,
- reduced costs related to providing transportation services to children and the elderly.

In North America, Australia and NZ the percentage of city GDP is in the range of 12 to 14 per cent, whereas in Asia and Western Europe the range is between five and eight per cent according to the International Association of Public Transport Millennium Cities Database⁶

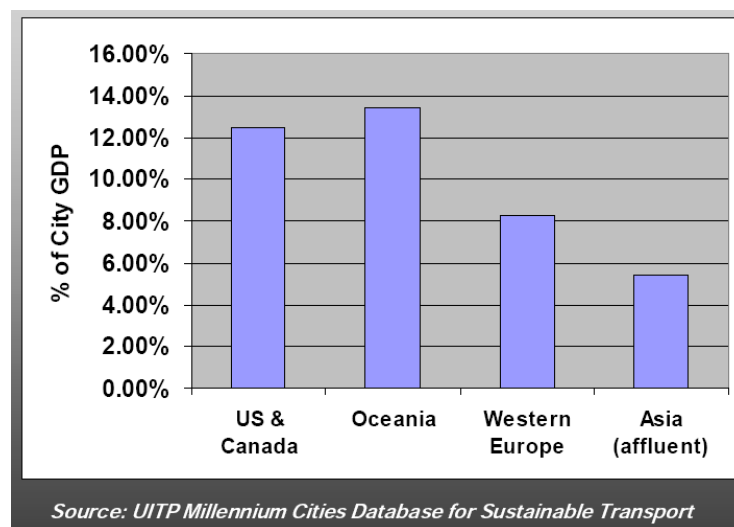


Figure 2: Direct Cost of Transport (UITP)

For employment growth, construction jobs (either on roads or public transport) create approximately 16 regional jobs per million dollars spent, in the USA. In comparison, the same amount of money spent on nursing care creates 36 jobs, arts and recreation creates 30 and education creates 27 jobs. Travel planning should be considered as education, for comparison purposes.

In terms of business activity, highway expansion is not the most cost effective method of achieving economic development objectives. One would expect that additional road infrastructure contributes toward reducing business production costs; however the

⁶ As described in the presentation <http://www.joelcayford.com/Citydevcutdown.pdf>

benefits are often smaller than expected. International empirical evaluation draws attention to the declining marginal economic benefits of each additional unit of road added to the network. In other words, the first road to a region provides significant economic benefit, but each additional lane provides less and less benefit. The following figure illustrates this point.

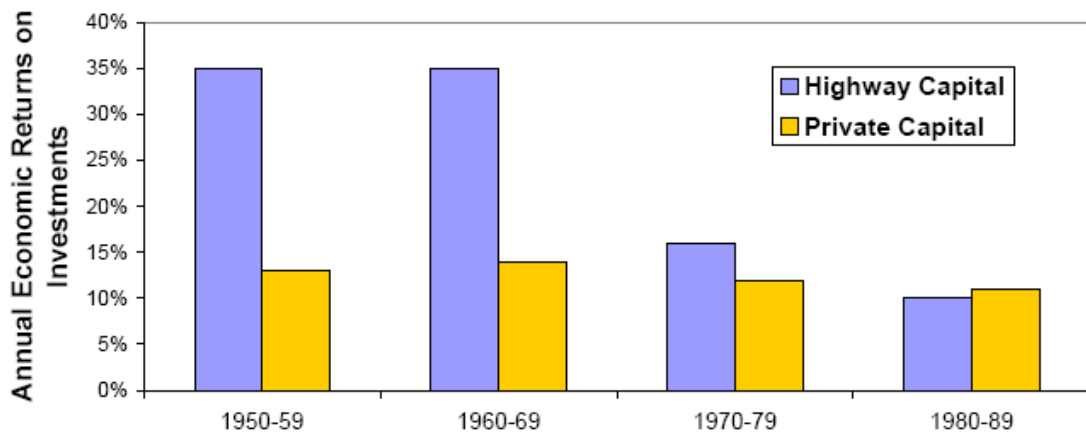


Figure 3: Annual Highway Rate of Return vs. Private Capital Investment (USA)

In the USA, state highway investment returns were high during the 1950s and the 1960s when the interstate system was first developed, but have since declined, and are now below the returns on private capital, suggesting that highway expansion is generally a poor investment of scarce resources. This type of analysis has not been performed for Auckland.

Simply put, economic stimulation for the Auckland region will be best addressed by improving access to key employment centres; this provides the basis for making improvements to the transport system. This is the basic premise by which the Regional Growth Strategy and the Regional Policy Statements address land use and transport integration and economic development. These concepts are detailed in WP 18 Land Use and Urban Design.

However, in order for the strong CBD focus to be economically successful, accessibility across the central motorway junction for pedestrians, cyclists and public transportation will need to be improved as there is no additional land space for parking or major improvements to the road network. In terms of a polycentric region, economic success will be based on travel to, from and between large employment centres.

Inter-regional connections are also important for economic development, and are addressed in the draft RLTS 2010 Chapter 5.

Further work on economic development opportunities in the Auckland region is described in the Economic Futures for the Auckland Region (April 2009), key contact is Carole Canler at ARC.⁷

3.5 Commentary on managed lanes for priority vehicles

Average vehicle occupancy rates used in regional modelling⁸ are described below.

Home Based Work	Home Based Education	Home Based Shopping	Home Based Social Other	Home Based Other	Home Based Business	Non-Home Based Business	Non-Home Based Other	Total
1.11	1.96	1.39	1.52	1.68	1.19	1.13	1.57	1.44

Table 2: Auckland Region occupancy rates by trip type

The overall aim is to improve these numbers via travel initiatives described in this paper.

The NZTA is undertaking a managed lane study. One of the outputs from this study will be an “ideal candidate” state highway and arterial sections for managed lane implementation. The Auckland State Highway Strategy and the “RARP” will also add to the assessment of corridors by integrating the functional classification to support a priority lane network while not undermining the patronage of the region’s developing public transport network. Further development will take place when individual “Corridor Management Plans” are undertaken and implemented.

For the RLTS 2010, policies relating to priority management of the road space are dealt with under the network operations policies (see Figure 1 Hierarchy of Policies). The proposed policy for inclusion in the RLTS is – Design traffic management systems that give effect to the functional classification by giving priority to public transport, and high occupancy vehicles over general traffic.

Furthermore, results of the 2009 ARC cordon count, taken every three years, and monitoring of the occupancy rates on priority on-ramps will contribute to a better understanding of occupancy rates across the region and future opportunities.

Future proposals aimed at priority or managed lane schemes should involve travel planners to ensure community uptake in the long term.

⁷ http://www.arc.govt.nz/economy/economic-futures/economic-futures_home.cfm

⁸ Auckland Transport Models Project (ATM2) Preliminary studies report. October 2007.

4 National Targets

The New Zealand Transport Strategy sets national transport targets for the year 2041. The NZTS includes the following targets relating to TDM initiatives:

- reduce the kilometres travelled by single occupant vehicles in major urban areas on weekdays, by ten per cent per capita by 2015 compared with 2007,
- increase walking, cycling and other active modes to 30 per cent of total trips in urban areas by 2040.

The regionalisation of these targets is set out in a separate working paper (WP22 Auckland RLTS Update: Development of Regional Targets – Final Report 270309).

The working group supports the intent of the New Zealand Transport Strategy (NZTS) targets but has strong reservations about the ability to measure these particular indicators with the accuracy and frequency required to manage the proposed programme of TDM initiatives. For instance monitoring vehicle occupancy is particularly difficult to gauge accurately.

Regardless, good progress has been made towards achieving the TDM objectives set out in the RLTS 2005. Travel planning initiatives to support walking and cycling have contributed to increasing the numbers of walking and cycling trips. See below.

Mode	1991		1996		2001		2006	
	numbers	%	numbers	%	numbers	%	numbers	%
Drove a Vehicle	258,375	72.7	309,744	74.0	336,650	74.7	396,765	74.9
Passenger in a Vehicle	27,222	7.7	26,358	6.3	24,036	5.3	28,635	5.4
Public Bus	23,670	6.7	23,805	5.7	26,340	5.8	28,563	5.4
Train	1,515	0.4	2,286	0.5	2,418	0.5	5,646	1.1
Cycled	7,092	2.0	5,979	1.4	4,920	1.1	5,013	0.9
Walked/Jogged	18,399	5.2	17,985	4.3	18,747	4.2	24,045	4.5
Worked at Home	19,227	5.4	32,259	7.7	37,527	8.3	40,880	7.7
TOTAL	355,550		418,416		450,638		529,548	
Did not go to work Census Day	39,009		46,089		57,174		59,844	

Figure 4: Mode share for the journey to work (1991-2006)

Further work is needed to compare the overall contribution of TDM initiatives on the regional mode share targets.

5 RLTS 2005 Targets

The 2005 RLTS targeted 20,000 fewer car trips each morning peak by 2016, clarified in the Sustainable Transport Plan (p 6).

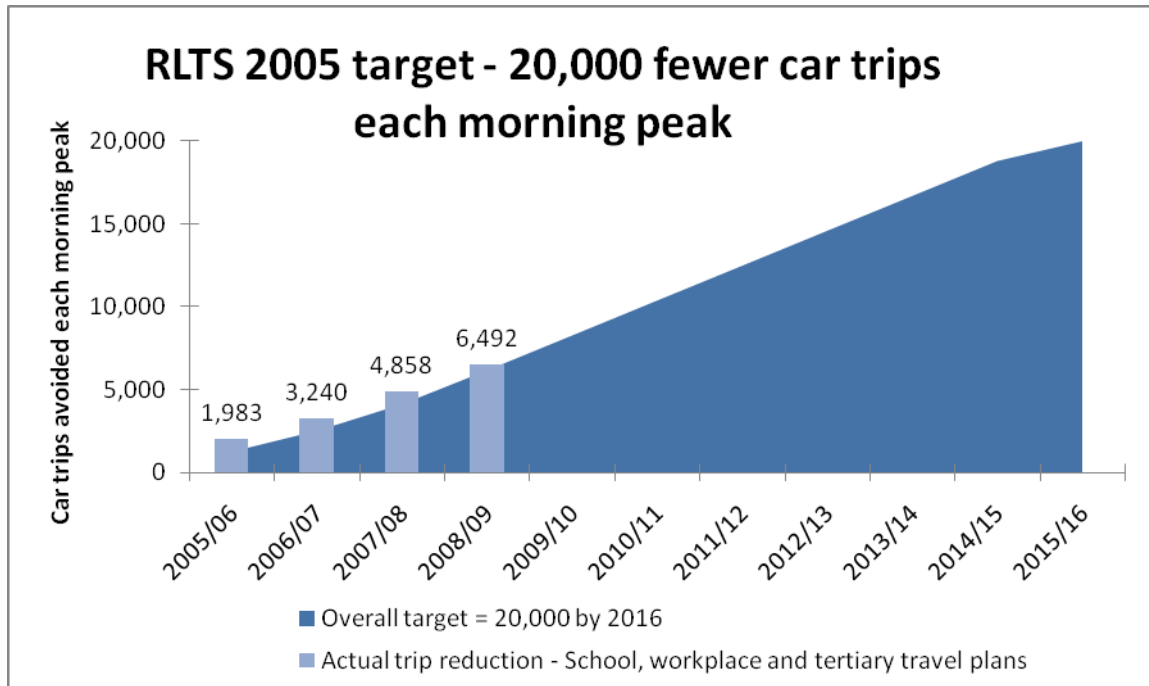


Figure 5: RLTS 2005 TDM targets

The target for the year 2009 has been achieved. Overall this success has largely been due to the implementation of school travel plans and university travel plans. The reductions associated with workplaces are quite low as most workplace projects have just been launched in the last two years and monitoring results are still limited. Monitoring results for Neighbourhood Accessibility Plans were not available for the years 2006-2008 and were not included in the actual trip reduction counts for 2009⁹.

⁹ NAPs are generally monitored against safety targets and not mode shift targets.

6 RLTS 2010 Targets

TDM initiatives that are expected to contribute towards regional objectives are:

- educational travel initiatives,
- work travel initiatives,
- community travel initiatives.

The term “initiatives” has been used to replace the term “plans”. Changing the terminology contributes towards a more flexible approach targeted at transport needs for education, work places and communities. This highlights the need for ongoing initiatives with organisations that have already completed a travel plan. This language is also consistent with LTNZ’s economic evaluation manual.

For each of these TDM initiatives a brief evaluation of past activities is described alongside a description of the main activities and a programme of future activities that are expected to contribute towards achieving the regional targets. The programme of activities rationalises the regional travel initiative targets that are proposed for the years 2016, 2026 and 2041.

Long term activities are difficult to predict, however the TDM sub-working group has used existing monitoring results from Auckland alongside results obtained internationally as a base for future forecasts. These targets have been agreed by the TDM sub-working group as being achievable based on these findings.

It is likely that improvements in technology will play a relative large role in changing the transport network; although this is difficult to model with any certainty. However, the model does have some basic assumptions about improving emissions, fuel efficiency and makes some forecasts.

6.1 Trip types and time periods targeted

It is anticipated that by 2041 the region’s transport network will have to handle over 6.4 million trips, as compared to just over 4 million in 2006. See table below.

Total Auckland Trips in 2041	
Education	595,000
Community (Shopping/Recreation)	2,900,000
Work	1,242,000
Employer's Business	413,000
Non Home Based Other	1,290,000
Total	6,440,000

Table 3: Total Auckland trips by 2041 (person trips)

Education, Community and Work trips are targeted in this report. More specific targets for these trip types have been set using the following trip segment types.

Time periods

The TDM assumptions developed for the RLTS 2010 have been based around 24 hour daily figures. As part of the modelling process these daily figures are then broken down into five different time periods for each different type of trip:

- AM peak (7AM-9AM)
- Interpeak (9AM-3PM)
- School peak (3PM-4PM)
- PM peak (4PM-6PM)
- Off peak (6PM-7AM).

The targets in this paper is based on daily trips that the model spreads across the 24 hour time period based on the following trip types.

Trip types

Education trips – These are trips to or from primary, secondary schools or tertiary institutions. Education trips tend to occur during the AM Peak and School Peak periods.

Home to work trips – These are trips between individual's homes and workplaces. Home to Work Trips are most likely to occur during the AM Peak and PM Peak periods, although significant numbers of trips do occur during the other time periods.

Community trips –Community trips cover personal shopping, recreational travel and socialising. Community trips are most likely to occur during the Interpeak and Off Peak periods.

Walk and cycle trips

Walk and cycle trips are only represented at a very basic level in the ART3 model, with trip numbers generated for each of the zones the city is separated into (the region is divided into 512 zones) but not represented any further in terms of destination or journey route. The number of walk and cycle trips reflects the land use in each zone and is influenced by the degree of mixed use development and the size of the zone. Urban zones are approximately one square kilometre whereas rural zones are approximately 10 square kilometres. The benefits of improved infrastructure, such as walkways or cycle lanes, are not directly represented and so induced demand is not reflected in the targets proposed. Further work on these matters is needed.

The ART3 model also does not discriminate between walk trips and cycle trips, classifying both together as “active trips”. For the purposes of this paper, a split of these total active trips with 75 per cent as walk trips and 25 per cent as cycle trips has been assumed for all years, though it is recognised that this is a simplification.

6.2 Educational travel initiatives (ETI):

The RLTS 2005 aimed to reduce car trips to school by 12,600 by 2016¹⁰.

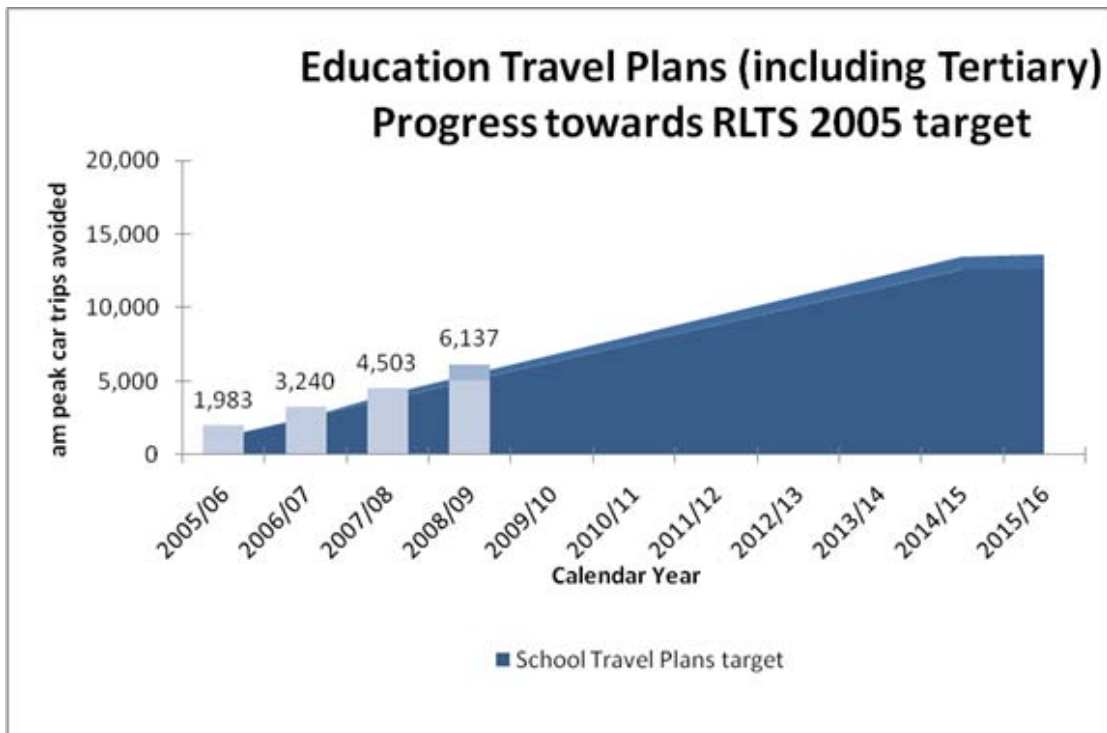


Figure 6: TravelWise schools - progress towards target

¹⁰ Expressed in the RLTS as “Achieve a 9% reduction in car trips to school”

ARTA and local councils have worked together to set up the TravelWise schools programme to prepare and implement school travel plans. Since 2003, 139 schools have developed school travel plans (STP) accounting for 37 per cent of the region's school children. The programme includes initiatives in 1/3 of the region's lower decile schools. This work, and other supporting educational travel initiatives, has resulted in a 3.4 per cent decrease in car usage, a 2.4 per cent increase in active transport and a 1 per cent increase in public transport use for schools with travel plans.

The region is on track to achieve the RLTS 2005 targets. However the rate of decrease in car trips appears to be slowing for schools that have been in the programme for longer than 3 years (though the sample size is low). This may indicate that the benefits are "levelling off" and that achieving the longer term targets in the future years will be more challenging. However, school travel programmes have proven effective at reducing traffic during peak hours and the direct short-term benefits are good value for money that contributes towards public health objectives.

6.2.1 Tertiary travel initiatives

ARTA, Auckland City Council, the New Zealand Transport Agency, the University of Auckland and Auckland University of Technology (AUT) worked together to develop the 10-year TravelWise Universities' Travel Plan for Auckland central, which was launched in September 2007. An integrated package of "soft" measures, such as discounted tertiary PT fares and "hard measures", such as parking management and pedestrian priority and has led to a decrease in car trips to the CBD.

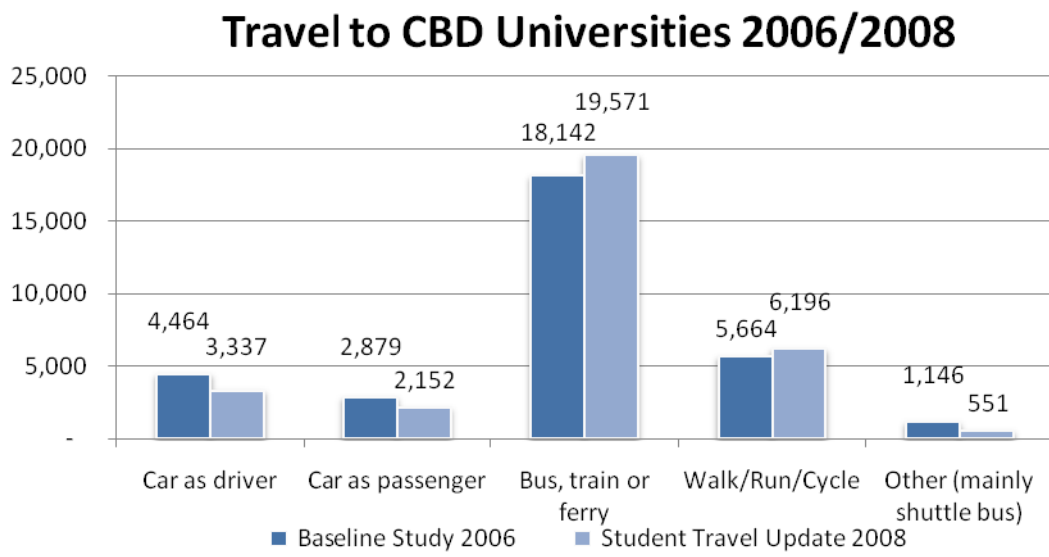


Figure 7: Travel to CBD Universities 2006/08

Additionally, Auckland City is leading construction of the Central Connector, which will result in faster bus travel to the learning quarter, and a much improved pedestrian

environment. Auckland Regional Transport Authority (ARTA) will monitor student travel again, following completion of this project.

AUT Akoranga is currently implementing a travel plan and the Manukau Institute of Technology is actively preparing a travel plan, and Massey University and Auckland University Tamaki Campus have expressed interest in joining the programme. Further work on the development of targets specifically aimed at universities is needed as the patterns of trips generated from universities are different to those associated with primary or secondary educational facilities. However, for the purposes of this report, tertiary travel targets have been included in the educational travel initiatives (ETI) targets.

6.2.2 ETI 2041 targets

The following table sets out the educational travel initiative targets out to 2041. Overall by 2041 it is anticipated that ETI can reduce the daily number of people making trips by car by 45,000 by 2041.

Education Travel Initiatives Future Targets				
	2006 Base Year	2016	2026	2041
Total Education Trips	467,000	504,000	540,000	595,000
Car Person mode share no ETI	52.7%	51.8%	50.9%	49.9%
Car Person mode share with ETI	n.a.	49.7%	46.8%	43.4%
Total Trips Shifted to PT or Active Mode		13,000	26,000	45,000
See Appendix 3 ART3 TDM Full Modelled Results for additional numbers.				

Table 4: Educational travel initiatives (ETI)

With the addition of ETIs it is expected that car person mode share is targeted to decline to 43 per cent from 49.9.

6.2.3 ETI 2041 Proposed Programme of activities

In order to reach these targets the following list of example activities is recommended:

Proposed activities to 2016

- Ninety percent of all Auckland schools will have been approached with the opportunity to develop travel plans or other travel related programs.
- School travel planning and walking school bus programmes will continue.
- Local councils will increase spending on road safety infrastructure around TravelWise schools to the levels envisaged in the 2005 RLTS.

- The regional school TravelWise steering group will develop tools to better support ongoing behaviour change in schools with completed travel plans.
- Schools that choose to develop travel plans will continue to have access to current programmes (such as walking school bus and feet first) and to new programmes as they are developed.
- Advocate to the Ministry of Education for the inclusion of a school travel plan as part of the Education Review Office (ERO) report.
- New primary schools will be located at the hub of the communities they serve, connected via a safe walking network. These features will be preserved and restored for existing schools.

Proposed activities to 2026 and 2041

- By 2026 all schools that wish to have a travel plan are provided with the resources to develop one.
- New primary schools will be located at the hub of the communities they serve, connected via a safe walking network and these features will be preserved and restored for existing schools.
- Intermediate, secondary and tertiary institutes will be linked to the cycle network, where appropriate, and schools will encourage cycling as a mode of transport.

The list of activities outlined above is an example only. They should not be read as an implementation plan but is acknowledged as an example of activities and initiatives that should contribute to the overall TDM targets. For example, activities not listed, such as new and developing initiatives, are likely to be incorporated into implementation plans alongside listed activities. Further work is anticipated via an update to the Sustainable Transport Plan after the completion of the RLTS 2010.

6.3 Work travel initiatives (WTI)

The RLTS 2005 workplace travel plan target is to achieve a 12 per cent average reduction in peak period car trips to participating work and study organisations by 2016. Tertiary targets are included in ETI. This equates to 2,500 trips (based on participating work and study organisations).

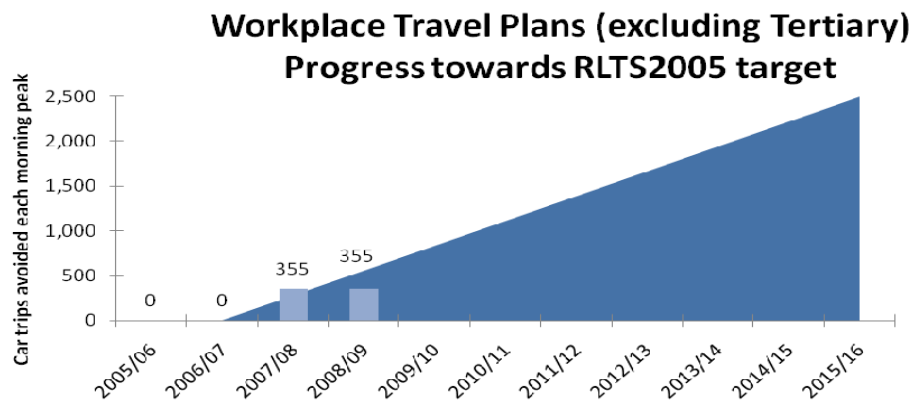


Figure 8: Workplace travel plans (excluding tertiary) progress towards RLTS 2005 targets

Trips to work make up just over half of morning peak trips and are the most significant contributors to congestion, with an average car occupancy rate of just 1.11 people per car in 2006. This creates traffic and parking problems for employers as well as for employees and visitors. Work travel initiatives aim to reduce car trips to work by expanding on the Workplace Travelwise programme of activities.

The reductions associated with workplaces so far are quite low as most projects have just been launched in the last two years and monitoring results are still unavailable. However, the Workplace Travelwise programme is in the middle of a significant expansion of work and widening of scope. A regional steering group has just been established; terms of reference agreed and the group is in the process of developing a three year implementation programme. The proposed activities identified in this paper will be subject to the input of that group, but are generally intended to illustrate the types of activities that are likely to contribute towards the overall regional TDM targets. The types of activities taken forward by the Workplace Travelwise programme should be cost effective initiatives that contribute towards achieving these targets.

In order to assess the impacts of work travel initiatives in the Auckland region the trips were assessed based off the following four trip categories:

- overall work force participation (potential work trips),
- work trips to the Central Business District (CBD),
- work trips to Regional Growth Strategy (RGS) centres,
- work trips to non-RGS areas, including rural areas.

The table below has been provided to illustrate the base number of possible work trips in the Auckland Region. It is not a target.

<u>Workforce participation</u>				
	2006 Base Year	2016	2026	2041
Total number of possible work trips*	780,000	950,000	1,120,000	1,380,000
Did not work (10%)	78,000	95,000	112,000	138,000

Table 5 Workforce participation

Trips to work are 10 per cent lower than theoretically possible to account for those who did not work that day due to sick or annual leave.

The following section describes in detail the main work travel initiatives anticipated to address work trips.

Teleworking

The Ministry of Economic Development aims to increase teleworking to 16.9 per cent. The Auckland region currently has between 6.9 and 7.7 per cent rate of teleworking. This is supported by Part 6AA of the Employment Relations (flexible working arrangements) Amendment Act 2007; “from July 2008, after six months’ employment workers can request flexible working arrangements (including teleworking)” (Digital Strategy – Teleworking website). The Department of Labour has developed “Flexible working arrangements – a guide for employers and employees” for further information. The region’s ability to meet this target depends on access to broadband.

Economic analysis, via the Economic Futures for the Auckland Region Part 2: Scenarios for Economic Development (April 2009), indicate that occupations such as legislators, administrators, managers, professions, technicians and associated professionals are anticipated to increase in the Auckland region by 2031. These occupations are favourable to teleworking.

The 16.9 per cent teleworking target (phased in over the years 2016, 2026 and 2041) has been included within the work travel initiative targets.

Institutional travel plans

ARTA have developed a draft Institutional Travel Plan guideline for working with large institutions. The public, educational and health sector represent the majority of institutional users in the Auckland region and future travel planning in these sectors may result in significant modal shift opportunities. Most major public institutions in the Auckland region have engaged in travel planning initiatives

Area plans

Area Plans, refers to the numerous types of travel demand management plans that may be applied to specific geographic locations. As opposed to workplace travel plans (WTP) or school travel plans (STP) which are tied to an organisation, area plans focus efforts on a

specific geographic area and may include smaller businesses, households and or individuals.

Currently the regional Travelwise programme is working with retail centres (such as Sylvia Park), office parks (such as Smales Farm), and industrial Parks (such as Highbrook). Travel Management Associations are increasing in importance for the Auckland region. The first transport management association (TMA) in New Zealand is the North Harbour industrial area in North Shore City which was established in late 2008.

Most of these programmes are still in the development phases and results of their efforts are not available. International experience suggests that significant modal shifts can be achieved by consolidating travel demand management initiatives in geographic locations. Area planning efforts may be further leveraged in areas where planned passenger transport infrastructure is expected. Area travel planning can be integrated with future land use redevelopment, intensification or the development of a Comprehensive Parking Management Plan (CPMP). CPMP are described more fully in the Auckland Regional Parking Strategy 2009.

For local communities, neighbourhood accessibility plans (NAPs) are more commonly applied. NAPs will continue to play an important role as a travel planning tool and are further discussed in Section 8 Community Travel Initiatives (CTIs).

Carpooling, rideshare and integrated park and ride schemes

Carpooling initiatives targeted at commuters and the general public benefit from infrastructure such as park and ride locations and or car pool software. Carpool software is currently being tested or implemented with other organisations such as Take-a-mate in Rodney District Council and Greater Wellington Regional Council is trialling software with similar capabilities. ARTA is also developing a Park and Ride Strategy for the Auckland region. This and the development of a regional priority or HOV strategy will provide further clarification on these matters (See Section 5.2 on Priority Lanes for High Occupancy Vehicles).

6.3.1 WTI 2041 targets

6.3.1.1 Work Trips to central business district

It is estimated that work travel initiatives, will reduce daily person trips by car to the CBD by 11,600 in 2041. This is a relatively small amount as educational or promotional activities are likely to have minimal effect in the long term¹¹ because the mode split for work trips to the CBD is already relatively good due to existing parking restraints and good access via public transport (as compared to mode splits in sub-regional growth centres). In the short

¹¹ Why would you educate a person on a train system that they used to get to the workplace to begin with?

term however, work travel initiatives are expected to boost patronage and educate users on the availability of improved services. See below.

Reductions in car person trips to work (WTI): CBD*				
	2006 Base Year	2016	2026	2041
Total work trips to CBD	95,200	131,000	167,000	220,000
Car person mode share no WTI	56.3%	41.6%	33.2%	25.9%
Car person mode share with WTI	n.a.	41.0%	31.7%	22.8%
Total trips shifted to PT or walk/cycle	n.a.	3,300	6,700	11,600
*These changes include the benefit from increased levels of working from home in addition to other workplace travel initiatives.				
**These trips are shifted to active modes or public transport. See Appendix 3 ART3 TDM Full Modelled Results for additional numbers.				

Table 6: Reductions in daily person trips by car to work: CBD

6.3.1.2 Work trips to regional growth centres

Work trips to Regional Growth Strategy (RGS) Centres are expected to reduce by 44,600 by 2041. It is anticipated that WTI will reduce person trips by car to work in RGS centres by 44,000 by 2041. See below.

Reductions in car person trips to work: RGS centres*				
	2006 Base Year	2016	2026	2041
Total trips no WTI	102,000	150,000	199,000	271,000
Total trips with WTI	n.a.	143,000	183,000	244,000
Total car person trips without WTI	86,900	115,000	143,000	184,000
Total car person trips with WTI	n.a.	102,000	117,000	140,000
Car person mode share no WTI	85.2%	76.7%	71.9%	67.9%
Car person mode share with WTI	n.a.	71.3%	63.9%	57.4%
Total trips shifted to PT or walk/cycle	n.a.	13,000	26,000	44,000
*These changes include the benefit from increased levels of working from home in addition to other workplace travel initiatives.				
**These trips are shifted to active modes or public transport. See Appendix 3 ART3 TDM Full Modelled Results for additional numbers.				

Table 7: Reductions in daily person trips by car to work: RGS centres

By 2041 there will be more work trips to regional centres than the CBD. However the high cost of providing high frequency, good quality public transport service across multiple centres is represents a serious regional challenge.

6.3.1.3 Trips to Rural areas or non-RGS centres areas

Reductions in car person trips to work: Rural or non-RGS centres*				
	2006 Base Year	2016	2026	2041
Total trips no WTI	456,000	515,000	573,000	661,000
Car person mode share no WTI	90.6%	88.5%	87.1%	85.3%
Car person mode share with WTI	n.a.	87.4%	84.6%	81.3%
Total trips shifted to PT or walk/cycle	n.a.	24,000	49,000	86,000
*These changes include the benefit from increased levels of working from home in addition to other workplace travel initiatives.				
*These trips are shifted to active modes or public transport. See Appendix 3 ART3 TDM Full Modelled Results for additional numbers.				

Table 8: Reductions in person trips by car to work: Rural or Non RGS centres

Person trips by car to work in non-RGS centres and rural areas are estimated to be reduced by 73,000 trips 2041 by WTIs. This is an ambitious yet achievable target for the Auckland region by implementing the following programme of activities.

6.3.2 WTI 2041 proposed programme of activities

In order to reach these targets the following list of example activities is recommended:

Proposed activities to 2016

- Identification and assessment of area travel plan initiatives for CBD and other key employment and growth centres.
- Investigate opportunities to include travel planning initiatives in district plans.
- Teleworking is included in all workplace travel plan promotional activities where it is identified as a feasible travel alternative.
- Regional park and ride scheme is adopted and park and ride locations are identified and integrated in local council transport strategies.
- The regional Rideshare software is in full operation.
- Seventy five percent of public institutions have travel plans developed.
- All private and public institutions with over 5,000 daily trips are provided with support from the regional Travelwise programme.
- All other organisations or businesses that wish to have a work place travel plan are provided with appropriate resources.

- Workplace Travelwise steering group to develop an implementation programme to achieve the targets identified in this report.
- The region develops a high occupancy vehicle (HOV) or Priority lanes Strategy. This is likely an activity for the new regional transport authority with supporting contribution from the Travelwise programme. The HOV Strategy to develop regional occupancy targets.
- Advocate for more extensive development of broadband or other new technologies to support teleworking and other technology initiatives to achieve the WTI targets.
- Use Integrated Transport Assessment (ITA) guidelines to integrate WTI into new developments and redevelopments.

Proposed activities to 2026

- Ninety per cent of sub-regional centres have developed area plans and the majority have made significant progress towards the identified regional targets.
- Regional Park and Ride locations are built and in full operation, supported by work travel planning initiatives and linkages with high occupancy priority lanes, where appropriate.
- The regional rideshare project has at least 10 per cent of the region's workers enrolled (as identified in work force participation Table 5) and is contributing towards the regional occupancy targets.
- 100 per cent of public institutions have travel plans and new or moved institutions are integrated with high quality public transport and surrounding land uses.
- High speed internet and other technological improvements are used to support the WTI target.
- Continue the use Integrated Transport Assessment (ITA) guidelines to integrate WTI with new developments and redevelopments.

Proposed activities to 2041

- Transport infrastructure improvements that are identified in various area plans have been built and are contributing towards the regional TDM targets.
- Regional Park and ride locations are reviewed for conversion to RTN stations based on improved demand and long term increases in occupancy rates.
- Technological improvements continue to contribute to the teleworking target.
- Continue the use of Integrated Transport Assessment (ITA) guidelines to integrate WTI into new developments and redevelopments.

The list of activities outlined above is an example only. They should not be read as an implementation plan but is acknowledged as an example of activities and initiatives that should contribute to the overall TDM targets. For example, activities not listed, such as new and developing initiatives, are likely to be incorporated into implementation plans alongside listed activities. Further work is anticipated via an update to the Sustainable Transport Plan after the completion of the RLTS 2010.

6.3.3 Freight TDM for the Auckland regions

The efficient movement of freight is critical for the Auckland region to supply the population with day to day goods and to support the region's economy. However, congestion caused by the movements of the general population can reduce this efficiency. The concepts of TDM applied to the freight industry – as well as applying the concepts to all transport movements – can assist the better movement of freight.

There are many issues that face the movement of freight, particularly in moving around urban areas such as: congestion; stopping and starting at intersections; social effects; and environmental effects. Additionally freight forwarders face issues when choosing what mode to use, which includes the imbalance in paying for the true costs of each mode.

The Auckland Regional Freight Strategy is a good starting point for improving the efficient movement of freight within the region. There are many actions listed within the strategy that are TDM related, and extending a few of them would increase their effectiveness. In particular, the establishment and facilitation of freight industry groups by a dedicated resource to help address some of the actions would be a good first initiative. This resource could also champion the development of a National Freight Strategy which would help the region plan and develop actions that improve inter-regional and international freight movements.

The ARC is considering the role of freight in the RLTS 2010 via two technical papers; GPS and freight demand movements in the Auckland region and via the Strategic Freight Network where the role of different types of modes ie sea and rail freight is considered.

Furthermore the current NZTA TDM Manual lists some types of measures and activities that can assist freight movement management:

- dedicated traffic management,
- dedicated lanes,
- freight specific signage,
- parking and rest facilities,
- freight bypasses,
- engineering features to reduce freight vehicle impacts,

- road space allocation measures to reduce freight vehicle impacts.

In Auckland, the Grafton Gully freight bypass lane is a good example of a freight priority lane. The Wiri Inland inter-modal port is an example of a multi-modal freight hub.

Additionally, new concepts in fleet best practice, including the use of new technology, and the use of urban consolidation centres (UCCs) can also help improve the efficient movement of freight.

Additional options for considering TDM for freight are outlined in Appendix 3: Freight TDM (provided by Andrew Edgars from NZTA National TDM office).

6.4 Community travel initiatives (CTI)

“The RLTS [2005] sets a target that 18 town centres will be made more walkable by 2016. There is also a target to achieve a three per cent average reduction in car trips made by 60,000 households through targeting marketing initiatives¹².” The targets have been difficult to monitor.

It was envisaged that this target would be achieved via Neighbourhood Accessibility Plans. At the time of writing, limited evaluation information on NAP’s have been acquired. NAPs are generally assessed against safety targets and not mode split targets. Furthermore, a key issue for NAPs has been the lack of follow up funding for infrastructure improvements.

Community travel initiatives need to be tailored to meet the various requirements of the local neighbourhoods. Community travel initiatives may include personalised journey planning aimed at households. For some households the availability of good public transport may enable a household to reduce the need from two cars to one, reducing household expenditure on transport considerably.

Educating the public on the availability of travel choices will be most effective if targeted at households and communities most apt to respond. Community based social marketing (CBSM) is suggested as an overall framework for evaluating future community travel planning ideas. CBSM is based upon research in the social sciences that demonstrates that behaviour change is most effectively achieved through initiatives delivered at the community level which focus on removing barriers to an activity, while simultaneously enhancing the activity’s benefits. This involves four basic steps:

- identify the barriers and benefits to an activity,
- develop a programme that utilises tools that have been shown to be effective in changing activity patterns,
- piloting the programme,

- evaluate the programme once it has been implemented across a community.

By following these basic steps it is envisaged that a number of different types of programmes, ranging from bike safety for kids programmes to personalised journey planning, will effectively reduce the length and number of car trips made. It is not necessary to list all programmes that could be used but rather to suggest an overall framework within which future ideas can be turned into successful projects. For a glimpse at the type of projects that are being progressed, please see the Auckland TDM conference papers (2009).

The list below identifies projects with proven track record (either in NZ or internationally) of achieving mode shift targets. Many of the following proposed initiatives may be implemented in conjunction with other TDM packages:

- neighbourhood Accessibility Plan,
- car clubs,
- park and ride promotion,
- public transport promotion,
- personalised travel planning techniques (see below),
- major regional social marketing campaign,
- community carpooling and ridesharing promotion,
- use of technology to reduce the need to travel eg internet shopping,
- demand responsive transport (DRT) see below.

Demand responsive transport (DRT) in rural areas

Demand Responsive Transit has the potential to provide improved transport choices for residents of rural and urban areas. "Demand-Response Transit Service is comprised of vehicles operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations. A demand response operation is characterised by the following: (a) the vehicles do not operate over a fixed route or on a fixed schedule except, perhaps, on a temporary basis to satisfy a special need; and (b) typically, the vehicle may be dispatched to pick up several passengers at different pick-up points before taking them to their respective destinations and may even be interrupted en route to these destinations to pick up other passengers.¹³" It is anticipated that DRT initiatives can contribute to TDM targets in rural areas.

¹³ <http://www.cflhd.gov/ttoolkit/flt/FactSheets/Transit/DEMAND%20RESPONSIVE.htm>

Personalised journey planning

Personalised journey planning has achieved mixed results locally. However as experienced in Adelaide personalised journey planning can be successful and there are lessons to be learned from the extensive evaluation of the TravelSmart: Households in the West 2009 project. Households in the West was a community based project that helped households develop personalised journey plans in a growing neighbourhood in Adelaide, Australia (approximately 14,000 people). Based on an evaluation of that programme using global positioning surveys and odometer surveys:

- “Participants reduced car travel both on weekdays and weekends by an average of 10.4 km per household per day, representing a very significant 18 per cent reduction.
- Non-participants increased vehicle kilometres travelled (VKT) while participants decreased VKT.
- Participants exceeded the greenhouse gas abatement target of the [Australia] national travel behaviour change project. Collectively over the life of the project participants save a total of 86,000,000 VKT and 28,000 tones of greenhouse gas emissions.
- Participants learnt to take fewer trips. The decrease in car trips for participants over the evaluation waves was 5 per cent, while non-participants increased the number of trips made by 3.8 per cent.
 - Participants learned to travel more efficiently, indicated by reduced travel times in global position system surveys.
 - Significant household savings in fuel were an additional benefit. The 22,103 households made a collective fuel saving of \$11.6m (based on average fuel prices over this period of \$1.20/l.¹⁴”.

Based on these results the Government of South Australia “has committed to an expansion of the travel smart voluntary travel behaviour change programme in households, workplaces and schools.”

This programme illustrates the best case scenario for positive results from a community travel initiative for a population that is similar to that of the Auckland region. Other programmes have been known to achieve less. As such the CTI targets that are proposed are lower than the amount achieved in Australia but ambitious for the Auckland region.

6.4.1 CTI 2041 targets

The CTI target for 2041 is to reduce daily person trips by car to shopping or recreation by 290,000 trips across the region.

¹⁴ <http://www.transport.sa.gov.au/environment/travelsmartsa/index.asp> page 23.

Community travel initiatives*				
	2006 Base Year	2016	2026	2041
Total community trips	1,820,000	2,130,000	2,430,000	2,900,000
Car person mode share no CTI	87.9%	87.8%	88.1%	87.6%
Car person mode share with CTI	n.a.	84.0%	80.7%	77.6%
Total trips shifted to PT or active mode		80,000	170,000	290,000
*Trips not relating to shopping, recreation etc. Those trips shifted from car are moved to public transport or active modes. See Appendix 3 ART3 TDM Full Modelled Results for additional numbers.				

Table 9: Community travel initiatives

6.4.2 CTI 2041 proposed programme of activities

In order to reach these targets the following list of example activities is recommended:

Proposed activities to 2016

- DRT is investigated to determine applicability. It is likely that van pools are an appropriate tool for TDM in rural areas.
- National promotional campaigns are integrated with local programmes that support and can fully capitalise on the increasing awareness.
- Investment in regional promotional “travel smart” campaigns is continued and integrated with an expanded public transport system, additional walking and cycling improvements and rural carpooling and DRT activities.
- Personalised travel programmes are delivered in targeted communities.
- Assess the need, on a regional basis, for community travel initiatives and or neighbourhood accessibility plans by focusing on communities that are most apt to change or have access issues that could be addressed through these programmes
- Local promotional campaigns and or celebrations are linked to the completion and opening of walking, cycling or public transport infrastructure.

Proposed activities to 2026

- A combination of van pools, DRT, or expanded car pooling is implemented.
- Personalised travel programmes are rolled out across the entire region.
- Community travel initiatives or neighbourhood accessibility plans are developed in transit oriented developments or areas near public transport.

- Community travel initiatives and or neighbourhood accessibility plans are developed in those communities most likely to change, those near good quality public transport or have access issues that could be addressed through these programmes.
- Promotional activities continue to raise awareness associated with the expanded public transport systems, additional walking and cycling improvements and rural carpooling activities.
- Local promotional campaigns and or celebrations are linked to the completion and opening of walking, cycling or public transport infrastructure.

Proposed activities to 2041

- Continue the expansion of van pools, DRT or car pooling schemes.
- Promotional activities are expanded to support expanded transport options available across the region in both urban and rural areas.
- Personalised travel programmes are expanded to 30 per cent of the population, and uptake of public transport and walking and cycling trips are supported by improved infrastructure.
- Regional database of transport users, transport providers and employers is developed and used to focus services and support to those most likely to change modes. Technological advancements are used to contribute towards targets.
- Local promotional campaigns and or celebrations are linked to the completion and opening of walking, cycling or public transport infrastructure.

The list of activities outlined above is an example only. They should not be read as an implementation plan but is acknowledged as an example of activities and initiatives that should contribute to the overall TDM targets. For example, activities not listed, such as new and developing initiatives, are likely to be incorporated into implementation plans alongside listed activities. Further work is anticipated via an update to the Sustainable Transport Plan after the completion of the RLTS 2010.

7 Expected Results

Parallel to the delivery of the demand management initiatives described earlier it is necessary to implement complimentary supply side initiatives to support the expected increasing numbers of pedestrians, cyclists and public transport users. For instance, it is not helpful to encourage people to take public transport, walk or cycle when that infrastructure is either unsafe, lacks capacity or is not available. Therefore it is necessary to outline a long term programme of infrastructure enhancements to support achieving the TDM targets.

The cumulative impact of the travel initiatives described earlier is summarised in expected mode split results for walking and cycling and public transport trips. A programme of activities was generated to support the walking and cycling results. The expected results for walking and cycling do not include additional demand for walking and cycling infrastructure associated with providing new infrastructure, instead reflecting only increases in travel planning initiatives.

Therefore these expected results do not include the induced¹⁵ or latent demand for walking and cycling trips that can be expected to occur after the implementation of infrastructure improvements. It can be argued that the walking and cycling results could be updated to include higher targets associated with improved infrastructure. However the evidence on these matters is not well understood when applied to a large regional package of walk/cycle infrastructure. It is suggested that additional work be carried out to understand the amount of additional walking and cycling trips that can be expected in association with hard infrastructure improvements.

7.1 Walking and cycling shifts

Walking is the most sustainable form of transportation as pedestrians do not use fossil fuels. Walking also has the greatest capacity to contribute towards all of the objectives set out in the NZTS 2008, including public health targets. A high proportion of Auckland motor vehicle trips are less than two kilometres, see figure below. These short trips are the most polluting per kilometre travelled because the distances are too short for engines to warm up to their most efficient temperature and are better suited as walking or cycling trips. Other matters relating to Environmental Sustainability and Public Health policies are included in RLTS WP20.

¹⁵ "When a new transport facility or service becomes available the users of the transport system can alter their behaviour in a number of manners; change their route, change mode, change destination to one easily reachable using the new system, change their trip making frequency, change the time of travel. Additionally, the transport project may result in altering of land use patterns." Part of Toolkit for the Economic Evaluation of World Bank Transport Projects <http://www.its.leeds.ac.uk/projects/WBToolkit/Note6.htm>

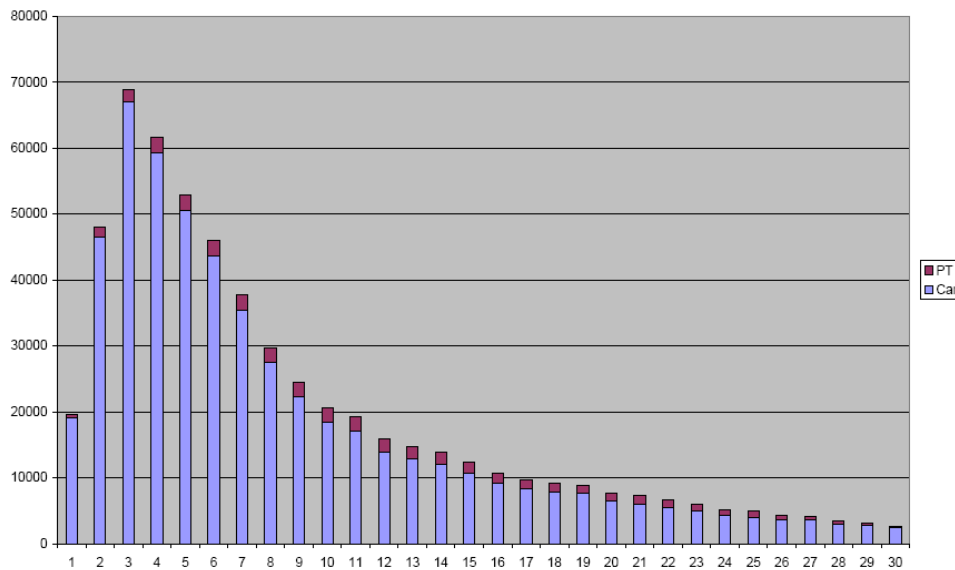


Figure 9: Trip lengths by mechanised mode (2006 morning peak period in Auckland)

The distribution of trip lengths in Auckland is positively skewed towards short trips indicating that policies and actions aimed at trips less than 7kms are an appropriate response to reducing morning peak hour congestion for the entire transport system. Walking trips are generally less than 1km, whereas cycle trips can be expected for distances less than 7kms. Improving the region’s walking and cycling environment is an integral component of an integrated and sustainable transport system.

The RLTS 2005 targeted walking improvements in the CBD and 17 other town centres and it is expected that 15.5 per cent of trips by 2016 to town centres will be by pedestrians or cyclists. The journey to work mode share in 2006 was 4.5 per cent walking and 1 per cent cycling.

Journey to work mode share is different than the walking trip leg target set out in the NZTS. The NZTS targets for walking and cycling include trips to and from bus stops and, depending on the distance between parking location and final destination, may include legs between car park and destination as well. Targets in this document are indicated in trips, not trip legs.

Since the completion of the 2005 RLTS every council in the Auckland region has developed walking and cycling strategies and these are leading to the construction of walking and cycling infrastructure. See Appendix 3 Walking and Cycling Strategies for a complete list. These were developed under the appropriate NZTA guidelines and regional objectives set out in ARTA’s Sustainable Transport Plan.

Walking

An adopted regional walking network does not exist (as compared to regional cycle network). Implementing local walking strategies is a sensible approach to developing walking infrastructure in the absence of a regional walking network.

It will be important to use good urban design practices to provide good walking infrastructure in new developments.

Providing appropriate facilities and incentives to encourage walking is paramount to the development of a successful sustainable transport network. Actively integrating walking links with good urban design and land use development will ultimately provide a safer and more pleasant environment for pedestrians. The RLTS WP18 Urban Design and Land Use describe these matters in greater detail.

Cycling

Cycling currently accounts for around one per cent of all morning peak trips. Cycling is a good alternative to car use, particularly for short or mid range trips (2-7 km). For instance, two per cent of school trips are cycle trips, but this could improve with a safer road environment. The RLTS 2005 aims to complete 50 per cent of the regional cycle network by 2016. By the end of 2009 it is estimated that 19 per cent of the network will be completed and by 2012, subject to council support, 31 per cent of the network will be completed. The 2016 regional cycle network target is on track for completion.

The perception of cycling as an unsafe mode of transport needs to be addressed through education campaigns, information and infrastructure improvement. Over half of Aucklanders believe it is usually unsafe, or always unsafe, to cycle. Road safety concerns may have led to a decline in cycling as a percentage of total trips. To reverse this trend, as with walking, reducing traffic volumes, traffic speed and the provision of appropriate facilities is vital. This means providing cycling specific facilities that are coherent, direct, attractive, safe and comfortable. Additionally improving cycle parking will be necessary. Methods for improving cycle parking are described in the Regional Parking Strategy.

In spite of the challenges facing cyclists, regional cycle counts for the last two years have remained steady. Local counts with the most significant increases occurred on the North Shore following the construction of cycle lanes. This proves that in Auckland improved cycle infrastructure does increase numbers of cyclists. Anecdotal evidence suggests that campaigns to celebrate the opening of cycle facilities or public outreach activities may alleviate the perceived delay drivers may assume be related to the new cycle lane. Travel planners can play a leading role on these matters.

7.1.1 Walking and cycling 2041 targets

The walking and cycling targets summarise the number of walking and cycling trips that can be expected from the cumulative impact on the travel planning initiatives described earlier.

Expected results: Walking and cycling*				
	2006 Base Year	2016	2026	2041
All Auckland trips	4,430,000	5,140,000	5,850,000	6,910,000
Total trips with TDM initiatives	n.a.	5,000,000	5,580,000	6,440,000
Total walk trips				
Total walk trips no initiatives	320,000	370,000	420,000	490,000
Total walk trips with initiatives	n.a.	441,800	564,000	747,000
Total cycle trips				
Total cycle trips no initiatives	107,000	123,000	140,000	160,000
Total cycle trips with initiatives	n.a.	147,300	188,000	249,000
Total walk/cycle trips				
Total walk/cycle trips no initiatives	427,000	493,000	559,000	657,000
Walk/cycle mode share no initiatives	9.6%	9.6%	9.6%	9.5%
Walk/cycle mode share with initiatives	n.a.	11.8%	13.5%	15.5%
Total trips shifted to walk/cycle	n.a.	96,000	193,000	339,000
*The Walk/cycle split is calculated externally to the model and is assumed to be 25 per cent cycle/75 per cent walk. This constant split, regardless of external factors is recognised as a simplification. See Appendix 3 ART3 TDM Full Modelled Results for additional numbers.				

Table 10: Expected results walking and cycling

7.1.2 Walking and cycling proposed programme of activities

In order to reach these targets the following list of example activities is recommended¹⁶:

Proposed activities 2016

- Improve the urban environment for pedestrians in residential and retail areas¹⁷.

¹⁶ It was recommended by the TDM sub-group that the programme for activities be separate for walking and cycling. However, this is difficult as the regional budgets lump walking and cycling activities together. Furthermore, for regional modelling purposes, walking and cycling trips are represented in one group termed 'active modes'.

¹⁷ Please refer to RLTS TP 17 Assessing Future Regional Road Safety Investment for additional matters relating to safety and vulnerable road users.

- Develop and maintain a regional count pedestrian database in order to monitor against regional targets.
- Develop methodology for assessing 'improvements to town centres'.
- Implement 25 per cent of local walking and cycling strategies starting from 2009.
- Audit major public transport stations to improve active mode amenities such as shelters, pedestrian connections, bicycle network connections and bicycle parking.
- Incorporate guidelines, such as the pedestrian planning and design guide, into regional standards for walking into transport planning, design and management activities.
- Complete 50 per cent of the regional cycle network, which includes linking half/all regionally significant destinations to the network.
- Continue bike and walk promotional activities such as Bike Breakfast.
- Continue the use of Integrated Transport Assessment (ITA) guidelines to integrate future development into public transport, walking and cycling networks¹⁸.
- Introduce bikes on buses across the Auckland harbour bridge.
- Continue regional cycle monitoring counts and install a network of automatic cycle counting devices.

Proposed activities 2026

- Implement 75 per cent of local walking and cycling strategies.
- Audit minor public transport stations to improve active mode amenities such as shelters, pedestrian connections, bicycle network connections and bicycle parking.
- Residential and retail centres have improved pedestrian amenities via lowered speed and or other improvements, as necessary.
- High quality walking and cycling amenities at all RTN stations.
- Complete 100 per cent of the regional cycle network.
- Review network to identify missing connections and links to local network.
- Introduce bikes on buses on the QTN.
- Continue bike and walk promotional activities such as Bike Breakfast.
- Continue regional cycle and pedestrian monitoring.

Proposed activities 2041

- Complete 100 per cent of local walking and cycling strategies.

¹⁸ The use of travel planning as a condition of consent in RMA processes is considered by some as less beneficial than working with voluntary organisations or individuals.

- Continue bike and walk promotional activities such as Bike Breakfast.
- Continue regional cycle and pedestrian monitoring.
- Provide high quality walking and cycling amenities along QTN network.

The list of activities outlined above is an example only. They should not be read as an implementation plan but is acknowledged as an example of activities and initiatives that should contribute to the overall TDM targets. For example, activities not listed such as new and developing initiatives are likely to be incorporated into implementation plans alongside listed activities. Further work is anticipated via an update to the Sustainable Transport Plan after the completion of the RLTS 2010.

7.2 Increasing public transport usage

It is anticipated that achieving the travel initiatives targets will result in an increase in public transport usage described in the table below:

Expected results public transport trips				
	2006 Base Year	2016	2026	2041
Total Auckland trips	4,430,000	5,140,000	5,850,000	6,910,000
Total trips with initiatives	n.a.	5,000,000	5,580,000	6,440,000
Total PT trips no initiatives	141,000	209,000	277,000	379,000
Total PT trips with initiatives	n.a.	222,000	303,000	425,000
PT mode share no initiatives	3.2%	4.1%	4.7%	5.5%
PT mode share with initiatives	n.a.	4.4%	5.4%	6.6%
Total trips shifted to PT	n.a.	140,000	270,000	470,000

Table 11: Expected results public transport trips

The number of trips that will shift to public transport as a result of travel planning initiatives is expected to be reasonably accommodated by, and supportive of, planned expansions of the public transport system. Travel planning initiatives can play a key role in introducing the community to improved infrastructure or service improvements, thereby improving patronage in the early stages. For further information on the programme of activities related to the public transport see ARTA's Passenger Transport Network Plan.

7.3 Environmental impacts

It is anticipated that the cumulative impact of these initiatives will contribute towards the reduction of greenhouse gas emissions by approximately 4 per cent.

Expected results: Reduction in CO ₂ per day (tonnes)				
	2006	2016	2026	2041
Without TDM	4,500	6,000	7,500	9,700
With TDM	n.a.	5,900	7,200	9,300
Change	n.a.	-1.9%	-3.0%	-4.0%

Table 12: Expected results: Reduction in grams of CO₂ reduction per day

8 Monitoring

Monitoring reports relating to educational travel initiatives, work travel initiatives and regional cycle counts have been used to form the basis of future targets. It is expected that annual monitoring reports will continue to be developed to assess the progress towards meeting the targets set out in this report.

Walking and community travel initiatives and neighbourhood accessibility plans are the areas where results from the Auckland region were not available. Evaluation results from international experience were used to rationalise the associated targets. Further work is needed, and was identified in the walking and cycling programme of activities, to develop monitoring tools to assess progress towards achieving the active mode targets.

The RLTS 2005 included 34 indicators which the RLTS annual report was expected to monitor. Unfortunately 11 of those indicators did not have an established methodology and have not been monitored as expected. The RLTS 2010, via Chapter 7 Monitoring, is under review and it is anticipated that the monitoring programme of the entire RLTS will be modified to provide clearer linkages between RLTS and LTMA objectives thereby providing better links between expected outcomes and monitoring data availability.

9 Next Step and Summary

It is anticipated that the overall expected reduction in trips to active or public transport that is associated with these TDM initiatives is 686,600 trips per day.

Trips shifted to active modes or PT by 2041	
Education	45,000
Community	290,000
Work (including teleworking)	351,600
Total	686,600

Table 13 Total trips shifted to active and PT by 2041

Despite current political and economic conditions, TDM initiatives continue to deliver value for money by providing the region with low cost transport alternatives tailored to the needs of local communities. As described in the Section 7 Economic Stimulation, investment in travel planning is likely to result in creating more jobs than investment in infrastructure.

The next step is to develop a full implementation plan via an update to the Sustainable Transport Plan and evaluate the benefits and costs via a standard BCR methodology based on the latest updates from the LTNZ Economic Evaluation Manual.

TDM initiatives are expected to address over 15 per cent of the total amount of trips in the Auckland region¹⁹. The TDM targets identified are challenging, yet sensible, and will continue to be assessed against other transport options via the RLTS strategic transport options modelling work. However, TDM initiatives, taken together, represent a regional significant package that has a greater likelihood of contributing to regional objectives than any other transport package being tested. This is an “order of magnitude” amount and addresses more trips than any one major traditional road or public transport project (including SH20 Waterview Connection) in the year 2041 (as determined by the RLTS 2010 Strategic Options Components testing).

¹⁹ Total Trips Shifted via all Travel Initiatives (686,600)/[2041 Base Trips (6.4 Million)- 2006 Base Trips (4.4 Million)] = 15%

10 Appendix 1: Review of TDM in previous ARLT's

The 1993 RLTS established a policy to “Reduce the growth in demand for vehicle travel in congested areas and corridors” via the use of land use management, parking controls, increased pedestrian and cycle links. Furthermore the strategy identifies the need to investigate requiring new developments to institute traffic demand management programme.

The 1995 RLTS described the need for a different approach. “A different approach is required from simply building more roads to meet the ever increasing demands for vehicle travel. This should take into account the very high capital, environmental and social costs that would result from short term, reactive planning and investment decisions.”

The 1999 RLTS introduced TDM as “the term used to describe the package of measures which is designed to change the need for travel or the time or form of travel. These measures can relieve the need to construct roads or provide more passenger transport services.” The TDM elements expected to feature strongly at that time were road pricing, flexible working arrangements & teleworking, parking policies, ridesharing and education.

The 2003 RLTS introduced a TDM Strategy which largely featured the same elements as the 1999 RLTS, but introduced transportation management associations (TMAs) and Integrated Traffic Management. TMA's have taken a bit longer to establish as the first TMA was established in 2008 at North Shore. Whereas Integrated Traffic Management, sometimes known as Intelligent Transport Systems (ITS), has been more successful with the current roll-out of ramp signals and priority lanes on the state highway network and the development of the joint traffic management unit.

The 2005 RLTS contained the TDM strategy as a separate chapter. As required by legislation at that time, three TDM options were considered and a medium level of TDM was adopted. Integrated traffic management (such as ramp metering) was not included as a TDM component but included in other sections of the RLTS ²⁰2005, as ramp metering does not directly contribute towards helping people choose to reduce their need to travel. The 2005 RLTS introduced travel planning as a tool to influence travel choices and has achieved considerable success.

²⁰ This subtle shift, of moving ramp metering to a non-TDM section, has resulted in some confusion regarding the purpose of ramp signalling as a TDM initiative. Ramp signalling improves the efficient movement of vehicles along the state highway and perhaps encourages drivers to use the state highway network at different times of the day, but is not necessarily considered an effective tool to actually reduce the demand for travel as any efficiencies gained are quickly filled by additional demand driven by population or economic growth.

11 Appendix 2: TDM Sub-working Group

The group met six times between 16 September 2008 and 12 January 2009 to discuss key issues, identify the key categories, agree the target trip reductions for the key categories and agree on TDM policy direction. The TDM sub-working group reports to the Regional Transport Committee's, Technical Advisory Committee.

Currently there are approximately 22 other supporting RLTS 2010 technical papers.

The membership of the TDMS Working Group is as follows:

- Melanie Alexander Auckland City Council
- Roberta Robles Auckland Regional Council
- Anna Percy Auckland Regional Transport Authority
- Sandy Mills Waitakere City Council
- Claire Covacich Auckland City Council
- Coralie O'Brien New Zealand Transport Agency (Auckland)
- Andrew Edgar New Zealand Transport Agency (National Office)
- Steve Patton Manukau City Council
- Belinda Matheson Rodney District Council
- Adi James North Shore City Council

12 Appendix 3: RLTS 2010 ART3 TDM Modelled Results

Education travel initiatives future targets				
	2006 Base Year	2016	2026	2041
Total education trips	467,000	504,000	540,000	595,000
Education car person trips	246,000	261,000	275,000	297,000
Education car person trips with ETI	n.a.	248,000	249,000	252,000
Car person mode share no ETI	52.7%	51.8%	50.9%	49.9%
Car person mode share with ETI	n.a.	49.7%	46.8%	43.4%
Change in mode share per cent	n.a.	-2.1%	-4.1%	-6.5%
Trips shifted to PT or active mode		13,000	26,000	45,000
Total vehicle trips reduced		6,430	12,900	22,500

Community travel initiatives future targets*				
	2006 Base Year	2016	2026	2041
Total community trips	1,820,000	2,130,000	2,430,000	2,900,000
Total community car person trips no CTI	1,600,000	1,870,000	2,140,000	2,540,000
Total car person trips with CTI	n.a.	1,790,000	1,970,000	2,250,000
Car person mode share no CTI	87.9%	87.8%	88.1%	87.6%
Car person mode share with CTI	n.a.	84.0%	80.7%	77.6%
Change in mode share per cent	n.a.	-3.8%	-7.3%	-10.0%
Trips shifted to PT or active mode		80,000	170,000	90,000
Total vehicle trips reduced	0	59,500	119,000	08,000

*Trips relating to shopping, recreation, etc. Those trips shifted from car are moved to public transport or active modes.

Walking and cycling expected results*				
	2006 Base Year	2016	2026	2041
All Auckland trips	4,430,000	5,140,000	5,850,000	6,910,000
Total trips with TDM initiatives	n.a.	5,000,000	5,580,000	6,440,000
Total walk trips no initiatives	320,000	370,000	420,000	490,000
Total walk trips w/ initiatives	n.a.	441,800	564,000	747,000
Total cycle trips no initiatives	107,000	123,000	140,000	160,000
Total cycle trips w/ initiatives	n.a.	147,300	188,000	249,000
Total walk/cycle trips no initiatives	427,000	493,000	559,000	657,000
Total walk/cycle trips w/ initiatives	n.a.	589,000	752,000	996,000
Walk/Cycle share no initiatives	9.6%	9.6%	9.6%	9.5%
Walk/Cycle share w/ initiatives	n.a.	11.8%	13.5%	15.5%
Total trips shifted to walk/cycle	n.a.	96,000	193,000	39,000

*The Walk/Cycle split is calculated externally to the model and is assumed to be 25% cycle/75% walk. This constant split, regardless of external factors is recognised as a simplification.
*Walk/Cycle expected results from work related to travel initiatives does not include induced demand associated with improving walk/cycle infrastructure.

Workforce participation				
	2006 Base Year	2016	2026	2041
Total possible work trips*	780,000	950,000	1,120,000	1,380,000
Did not work (10%)	78,000	95,000	112,000	138,000

Public transport trips expected results				
	2006 Base Year	2016	2026	2041
Total Auckland trips	4,430,000	5,140,000	5,850,000	6,910,000
Total trips with initiatives	n.a.	5,000,000	5,580,000	6,440,000
Total PT trips no initiatives	141,000	209,000	277,000	379,000
Total PT trips with initiatives	n.a.	222,000	303,000	425,000
PT mode share no initiatives	3.2%	4.1%	4.7%	5.5%
PT mode share with initiatives	n.a.	4.4%	5.4%	6.6%
Total trips shifted to PT	n.a.	140,000	270,000	470,000

Working from home targets				
	2006 Base Year	2016	2026	2041
Base work from home level	48,400	59,000	69,600	85,400
% of working from home no WTI	6.9%	6.9%	6.9%	6.9%
Worked from home with WTI	n.a.	94,600	141,000	210,000
% of working from home with WTI	6.9%	10.2%	13.2%	16.9%

Work from home rates are assumed to be constant at 2006 levels without WTIs. This is recognised as a simplification.

Working from home is also modelled as applying equally to all types of employment and location, another recognised simplification.

This WTI increase in Working from home numbers is consistent with the figures used in the New Zealand Digital Strategy.

Future targets reductions in car person trips to work (WTI): CBD*				
	2006 Base Year	2016	2026	2041
Total CBD trips	95,200	131,000	167,000	220,000
Total trips with WTI	n.a.	125,000	154,000	199,000
Total car person trips without WTI	53,600	54,500	55,500	56,900
Total car person trips with WTI	n.a.	51,200	48,800	45,300
Car person mode share no WTI	56.3%	41.6%	33.2%	25.9%
Car person mode share with WTI	n.a.	41.0%	31.7%	22.8%
Total trips shifted to PT/walk/cycle	n.a.	3,300	6,700	11,600
Total vehicle trips reduced	0	3,010	6,030	10,500

*These changes include the benefit from increased levels of working from home in addition to other workplace travel initiatives.

**These trips are shifted to active modes or public transport. Does not include induced demand associated with improvements made to the public transport system or walking and cycling infrastructure improvements.

Future targets reductions in car person trips to work (WTI): RGS centres*				
	2006 Base Year	2016	2026	2041
Total trips no WTI	102,000	150,000	199,000	271,000
Total trips with WTI	n.a.	143,000	183,000	244,000
Total car person trips without WTI	86,900	115,000	143,000	184,000
Total car person trips with WTI	n.a.	102,000	117,000	140,000
Car person mode share no WTI	85.2%	76.7%	71.9%	67.9%
Car person mode share with WTI	n.a.	71.3%	63.9%	57.4%
Total trips shifted to PT/walk/cycle	n.a.	13,000	26,000	44,000
Total vehicle trips reduced	0	11,400	22,900	40,000
*These changes include the benefit from increased levels of working from home in addition to other workplace travel initiatives.				
**These trips are shifted to active modes or public transport. Does not include induced demand associated with improvements made to the public transport system or walking and cycling infrastructure improvements.				

Future target reductions in car person trips to work (WTI): Rural or non-RGS centres*				
	2006 Base Year	2016	2026	2041
Total trips no WTI	456,000	515,000	573,000	661,000
Total trips with WTI	n.a.	494,000	532,000	588,000
Total car person trips without WTI	413,000	456,000	499,000	564,000
Total car person trips with WTI	n.a.	432,000	450,000	478,000
Car person mode share no WTI	90.6%	88.5%	87.1%	85.3%
Car person mode share with WTI	n.a.	87.4%	84.6%	81.3%
Total trips shifted to PT/walk/cycle	n.a.	24,000	49,000	6,000
Total vehicle trips reduced	0	22,300	44,700	8,200
*These changes include the benefit from increased levels of working from home in addition to other workplace travel initiatives.				
*These trips are shifted to active modes or public transport.				

General Notes:

-Due to the modelling process and rounding error some of the above changes in trip rates may be slightly different to those specified by the TDM-Subgroup specifications. This is an expected reporting issue and not a case of incorrect implementation of measures or calculation of results. The exact method for which modelling adjustments were made in ART3 are specified in a memo by David Young *TMD used in Modelling 10/08*.

13 Appendix 4: Freight TDM

Auckland freight

Reasons for freight movement	Freight needs to be moved to simply meet the daily needs of the population. It also needs to be moved to support our import and export businesses and therefore maintain and grow New Zealand's economy.
Vehicles	Although heavy vehicles are the most obvious vehicles that move freight on the roads, there are also light trucks, vans – notably courier vans - and even cyclists, particularly around the urban areas. Trains and ships will generally move freight inter-regionally, although inland ports can be used to consolidate loads and rail them through urban areas to sea ports.
Ideal	The ideal is to be able to have freight moving on or between the chosen modes without impediment – that is, the transport network in the Auckland region does not impede the movement of freight.
Increasing freight task	Indications are that the freight task will double by 2020 with an increase in heavy vehicle kilometres of 85 per cent between 2005 and 2010 (<i>Prediction of new Zealand's freight growth by 2020</i> , TERNZ 2006). Most operators recognise that to simply increase the amount of freight vehicles is not the answer.
RLTS 2010 freight related papers	ARC is addressing the role of freight in the RLTS 2010 via two technical papers: GPS and Freight Demand Movements in the Auckland region; and a Strategic Freight Network for the region where the role of different types of modes is considered.
NZTA TDM guidance for freight	<p>Transit New Zealand, now the New Zealand Transport Authority (NZTA), has provided guidance in their TDM Manual (2008). The TDM objective for freight is to ensure that the "state highway network supports and provides for the cost-effective and sustainable movement of freight within New Zealand. The types of measures and activities that will be considered in formulating Transit's position on freight movement management are:</p> <ul style="list-style-type: none"> • dedicated traffic management, • dedicated lanes, • freight specific signage, • parking and rest facilities, • freight bypasses, • engineering features to reduce freight vehicle impacts, • roadspace allocation measures to reduce freight vehicle impacts." <p>Example: The NZTA has implemented a freight bypass lane in Grafton Gully.</p>
TDM for people and freight	The Auckland region has previously regarded travel demand management projects as ways to enable people not to make trips, to make more efficient trips or to make trips using different modes.

	Freight too can be moved more efficiently on road and by other modes via the use of travel demand management.
Similarities	<p>Similarities exist in reducing the demand for private trips and freight trips:</p> <ul style="list-style-type: none"> • Acknowledgement in various policies plans etc that good land use planning can have significant positive impact. • Creating realistic options (different modes) can be a long term intervention. • There are gains to be made in the short term by introducing trip efficiencies in the current mode chosen. • Markets may be adjusted over time to reflect the true cost of travel.

Issues

Introduction	The issues that stop the transport system reaching the ideal are discussed below.
Congestion	Congestion affects the time taken to move freight or alters the time of day when freight is moved.
Intersections	Intersections create stop/start conditions that particularly delay heavy vehicles as they take longer to slow down and regain speed.
Social effects	<p>The social effects associated with heavy vehicles, especially travelling through residential areas, include:</p> <p>Slower speed limits.</p> <p>Interaction of heavy vehicles with other vehicles and people.</p> <p>Heavy vehicles can be difficult to manoeuvre if other drivers or people behave unexpectedly.</p> <p>Conversely, people may find heavy vehicles intimidating.</p> <p>Noise and pollution (particularly PM10) can cause health problems.</p>
Environmental effects	The environmental effects of freight movements include: pollution (CO2) and spills. Some spills, although not hazardous to humans, may be hazardous in the general environment (for example, milk).
Modal choice	<p>Poor integration between modes can be a deterrent for a freight forwarder, particularly:</p> <ul style="list-style-type: none"> • access to and from modal interchanges, • freight handling procedures, and • transfer of paperwork.
Cost differences	The prices paid for the different modes do not cover similar cost and profit requirements meaning some modes can be artificially more attractive.

Choosing modes

Introduction	There are a number of decisions a freight forwarder must make when deciding what mode to use for deliveries. There are trade offs and overall commercial forces that must be taken into account.
Tradeoffs	When making a decision between modes there are a number of tradeoffs that are made including: cost, travel time, time of pick up, time of delivery, reliability and quality.
Commercial forces	However, commercial forces are also at play, both for choosing a mode and providing the mode. All parties are looking to make a profit, even if it is just to pay for upgrading and maintaining the service (for example, Kiwi Rail). Hence, decisions can be made that are beneficial for the provider that may cause difficulty for the receiver – particularly when there is little competition. For example, a logistics company may choose a mode that provides the best price for moving goods for a supplier, but the delivery time for the receiver of the goods is not convenient even though they cannot afford to be without the goods.

Auckland Regional Freight Strategy

Introduction	The 2006 Auckland Regional Freight Strategy has been a good starting point for addressing freight issues in the region.
Starting basis	The starting basis for consideration of TDM for freight is contained in the Auckland Regional Freight Strategy section 5.4 Demand Management and Freight where it is noted that “constraining the demand for freight is likely to result in outcomes contrary to the growth objectives and employment policies for the region”.
Actions	<p>The following actions are from the strategy. With the exception of group 6, most actions will either assist with the development of freight related TDM activities or will have a direct effect on the efficient movement of freight.</p> <p>1. Improve information and communications</p> <p>1.1 Prepare Freight Data Acquisition Plan. 1.2 Develop Freight Transport Modelling Tools. 1.3 Develop and Implement a Communications Plan and Establish an Industry Reference Group (IRG).</p> <p>2. A supportive funding and regulatory framework</p> <p>2.1 Review of Public Sector Investment Criteria for Freight Transport. 2.2 Review Adequacy of OW and O/D Control. 2.3 Review Potential for Selective Permitting of Higher Mass and Dimension Vehicles. 2.4 Strengthen Commercial Vehicle Regulatory Enforcement.</p> <p>3. Relief of congestion for road freight</p> <p>3.1 Advocate Completion of the Strategic Road Network. 3.2 Reduce Congestion on Strategic Freight Routes by TDM.</p> <p>4. Strategic freight network</p> <p>4.1 Identify and Develop an SFN and Encourage Alternative Modes. 4.2 Develop Supportive Land-Use Planning to Support the SFN. 4.3 Inland Port Terminals served by Off-peak Road or Rail Transport and the Use of Terminals Connected to Rail or Water for Bulk Commodities. 4.4 Goods Consolidation and Hubbing.</p>

	<p>4.5 Investigate Freight Priority Measures on Strategic Routes.</p> <p>5. Local area freight management</p> <p>5.1 Develop Guidelines for LAFMP.</p> <p>5.2 Identify and Promote Preferred Local Road Freight Access Routes.</p> <p>5.3 Facilitate Best-Practice Design for Freight Routes and Site Layout.</p> <p>5.4 Management of Freight Loading.</p> <p>5.5 Encourage Flexible Delivery Hours.</p> <p>6. Clean, quiet and safe freight system</p> <p>6.1 Promote Safe Operators, Drivers and Practices.</p> <p>6.2 Encourage Safe Vehicles.</p> <p>6.3 Promote Development of Safe Infrastructure.</p> <p>6.4 Support Safe Rail Freight.</p> <p>6.5 Reduce Environmental Impacts of Freight Routes.</p> <p>6.6 Mitigate Impacts of Freight on Adjacent Land Use.</p> <p>6.7 Encourage Low Emission Freight Vehicles and Clean Fuels.</p> <p>6.8 Minimise Packaging and Waste.</p>
Positive and negative effects	From a strategic perspective, activities promoting reduction in private vehicle trips can be assumed to improve the capacity of freight movements on the road network. Some benefit can therefore be inferred for the movement of freight across the region. Conversely, some activities contained in this document to promote passenger rail usage may limit the capacity that is available for rail freight.
Dedicated resource needed	To complete actions committed to over the next two years, and those planned to finish within 5 years, a dedicated resource needs to be identified and engaged.
Resource requirements	The resource would preferably have expert knowledge of the freight industry to ensure the work is completed effectively. This expert resource would greatly speed up the delivery of some activities, as the need for knowledge of the industry described as being developed within some activities will already be within the resource.
Resource location	This resource may be established within ARC or ARTA, or may be already available within another relevant agency such as the NZTA, or a consultancy.

TDM actions

Extend Freight Strategy actions	Some of the Auckland Freight Strategy actions could also be extended to improve the movement of freight in the Auckland region.
Difficult to evaluate	Since there is relatively little guidance available to describe and evaluate the economic impacts of freight TDM or the impact of TDM initiatives on freight movement in New Zealand it is difficult to fully evaluate them in this report.
Action 1.3 Communications plan and IRG	<p>Action 1.3 should be extended to include the establishment and facilitation of industry groups that will engage together to further TDM objectives, particularly modal shift. Such groups are likely to be in the best position to identify projects that are likely to get the biggest impact.</p> <p>Example: Producers of products that could be moved by coastal shipping or rail, and their logistic partners should be brought together with port operators and shipping companies to determine what their</p>

	needs are and what issues exist that need to be overcome to enable modal shift to occur. Where possible, the group would then work through these issues. In some cases there may not be any major issues, the parties only needing to get together and talk to make the change possible.
Single industry groups	Single industry groups, such as couriers, could also be established to determine whether there are any programmes that could achieve more efficient movement of freight.
Identify TDM activities	Action 3.2 and Action 4.5 should be extended to include the identification of TDM activities aimed at freight that are relevant for the Auckland region. These activities could then be discussed with the industry groups to determine the activities that would be the most effective and beneficial to the region.
Support National Freight Strategy	A National Freight Strategy needs to be developed with input from the Auckland region. Such a national strategy would further assist with the identification and promulgation of modal shift activities, particularly where there is specific national support for these activities.

Ways to reduce freight movements

Introduction	<p>There are three main ways to reduce freight movement on the roading network:</p> <ul style="list-style-type: none"> • move freight onto rail, • move freight onto sea, • reduce freight movement on the roading network through “fleet best practice”.
Moving freight off the road network	The “Transport Network Optimisation” paper (commissioned by NZTA, 2008) suggests: “Pricing measures applied to the road network have significant effects on freight transport. Internalising road user costs such as road wear, congestion and traffic crashes by applying distance-based charges can make road freight transport more expensive and therefore rail and shipping become more commercially attractive modes.” The paper also acknowledges the overlap with private vehicle movement, suggesting that if private vehicle movement was reduced (also through pricing), freight transport efficiency would increase.

Fleet Best Practice

Inefficient heavy vehicle use	There are indications that heavy vehicles run empty for a portion of their total distance travelled (as modelled for RUC etc), and information from NZTA weigh in motion sites has shown the loadings of heavy vehicles by axle weights is by no means optimised. Anecdotal evidence suggests six to ten per cent of heavies run at maximum payload.
A reason for inefficient heavy vehicle use	<p>One of the more recent reasons for inefficient vehicle use is that regional production and distribution centres have been closed and consolidated to major centres to reduce inventories and this has impacted on the ability of operators to balance freight flows.</p> <p>Example: reviewing one organisation in 2004 showed a 3:1 imbalance of freight volumes between Auckland and Wellington.</p>

Fleet best practice	<p>The two main ways to make gains are:</p> <ul style="list-style-type: none"> • reducing empty running, • increased payloads. <p>The two main methodologies to achieve this have been identified as:</p> <ul style="list-style-type: none"> • use of technology in the review, planning and execution of transport tasks, • Use of urban consolidation centres (UCCs).
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Use of technology

Use of technology	<p>To enable an operator to reduce empty running and increase payloads, the uptake of intelligent transport systems and services (ITS) such as GPS monitoring linked to back office freight and route optimisers must start to gain momentum, along with utilisation measurement systems (benchmarking etc).</p>
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Present use of technology is limited	<p>Although there are operators that use recent technological developments their use is limited to using GPS for, eg, driver performance monitoring. This technology has not been fully utilised (from lack of scale and understanding) for, eg, integrating the information with optimising tools.</p>
Reasons for changing technology use	<p>Technology use and optimisation is on the increase due to reasons such as:</p> <ul style="list-style-type: none"> • Aggregation in the freight market place with large non asset based logistics providers contracting a host of smaller operators and using technology to mix and match loads to best effect. • Reduction in technology costs and suppliers with a track record in the heavy vehicle sector. • Potential increase in electronic compliance monitoring for safety and revenue management. • Ongoing demand from service users to keep their transportation costs down through the use of technology as has occurred with total supply chain optimisation. • Transition of transport service providers from an openly adversarial business approach to a more collaborative information sharing lowest total cost and best returns approach.
Availability of literature	<p>The range of international literature relating to best practice for transport operations needs to be increased and be made available to operators with significant emphasis on the use of technology and measurement systems.</p>
Some references	<p>Reports, case studies and best practice literature, as found in the links below, while not exhaustive, show the potential efficiency benefits to operators:</p>
<p>http://www.iru.org/index/cms-file-system-action?file=en_Publications/bip04.E.pdf</p>	

<p>http://www.mpimet.mpg.de/fileadmin/projekte/nestor/Leonardi-CO2efficiencyRoadFreight-TRD-2004.pdf</p> <p>http://www.freightbestpractice.org.uk/default.aspx?appid=1960&cid=40</p> <p>http://cordis.europa.eu/telematics/tap_transport/intro/benefits/30_4th.htm</p>	
Possible target	<p>By targeting larger freight companies (eg, those that own or control fleets of 50 HCVs or greater), possible targets by 2016 are:</p> <ul style="list-style-type: none"> • A five per cent reduction in kilometres travelled; and • A five per cent increase in payload (excluding those who may operate under a mass and weights scheme).
Continued reduction in kilometres travelled	<p>Further reduction in kilometres travelled and payload increases would be expected as this efficiency focus becomes the norm with operators and their key decision making staff (dispatch planners etc).</p>
Work with industry	<p>Work with wider supply chain participants to look for freight aggregation and balancing initiative opportunities is also needed to ensure the success of these reductions.</p>

Use of Urban Consolidation Centres (UCCs)

Warehouses on wheels	<p>The more recent supply chain management practices of lean inventory and the use of just in time deliveries to allow this method of control has been very effective in creating “warehouses on wheels”. Certainly, overall supply chain costs have been reduced.</p>
Trade offs difficult	<p>The downside of this practice is an inefficient service due to urgency of delivery. It is extremely difficult to trade off time critical deliveries against time intensive load building to make best use of the transport asset. This is especially the case in urban areas.</p>
Reduce impact via urban consolidation centres	<p>One way of overcoming this impact and encouraging efficiency is the use of urban consolidation centres. For New Zealand this requires a longer term change in thinking (land use planning, potential use of PPPs for non infrastructure projects and applying public transport type tenders to freight routes e.g. franchising) and is therefore likely to be in the 2030 – 2040 timeframe. The potential benefits however are significant.</p>
DfT report	<p>The Urban Freight Consolidation Centres Report prepared for Department for Transport, UK (DfT) in 2005 stated:</p> <p>“In these 17 UCC evaluation studies, reductions in vehicle trips were calculated to range from 30-80%, reductions in vehicle kilometres ranged from 30-45%, improvements in vehicle load factors ranged from 15-100%, and reductions in vehicle emissions ranged from 25-60%. All of these results refer only to the change in transport activity associated with goods handled by the UCC (i.e. a comparison of the transport activity from the UCC to the receivers when the UCC is used and when it is not for those goods flowing through it) rather than the changes in total freight transport operations and impacts in the area</p>

	<p>covered by the UCC or the entire town/city".</p> <p>We could use some of these figures as a guide for targets and at the lower end of each range to provide a safety margin.</p>
Fleet impact	<p>How much of the heavy fleet will be impacted by these efficiencies is difficult to determine, but targeting 15 per cent of heavy vehicles between 6t and 14t GVM is likely to capture most vehicles operating in areas where UCCs' would have the greatest impact.</p>
Transport Network Optimisation paper	<p>The "Transport Network Optimisation" paper commissioned by NZTA proposes developing a freight transport system 'co-operative' and suggests consolidating pick up points, hubs and time windows. The paper also supports the need to increase payloads but acknowledges that the potential downside of this change is an increase in maintenance costs.</p> <p>The paper concludes: "Appropriate, enforceable regulations regarding freight access to cities by location, time of day and vehicle type, for example, are seen as important. Freight utilisation can be improved by combining different modes and creating collaborative hub networks where goods are transferred between these modes."</p>

14 Appendix 5: Walking and Cycling Strategies in the Auckland region

- Auckland City Council, Auckland City Cycling and Walking Framework and Implementation Plan 2008.
- North Shore City, Cycling is for everyone – North Shore City Implementation Plan (2004-2014).
- Manukau City Council, Manukau City Council Cycling and Walking Strategy 2005-2015.
- Manukau City Council, Flatbush Cycleways and Walkways Master Plan.
- Waitakere City Council, Way to go Waitakere City Transport Strategy 2006-2016.
- Waitakere City Council, Waitakere City Council Walking and Cycling Strategy (Eco City and Waitakere City Council).
- Rodney district Council, Rodney District Council Walking and Cycling for Sustainable Transport Strategy.
- Papakura District Council Walking and Cycling Strategy.
- Franklin District Council Draft Walking and Cycling Strategy.
- ARTA's Regional Cycle Network.
- Auckland Region Walking and Cycling Strategy for State Highways (New Zealand Transport Agency 2008).

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