

Built environment and transportation





Objectives

1. Urban areas, the built environment and transportation systems are developed so that they, and their associated activities, use resources efficiently and demand for the use of finite resources is moderated.
2. The adverse environmental effects that result from the use of urban areas, transportation systems and infrastructure are avoided, remedied or mitigated and in particular, any adverse effects that result from the concentration and scale of activities in urban areas are recognised and provided for.
3. The environmental quality of urban areas is maintained and enhanced.



Doing well

- The Wellington region is the highest user of passenger transport in New Zealand.
- Greater Wellington, the city and district councils, Positively Wellington Business and iwi (through an advisory committee, Ara Tahī), are working together, looking at how the region can grow and sustain our quality of life.
- City and district councils in the region are producing documents that provide guidance on the location and types of infrastructure, urban design, and/or the management of effects in urban growth areas.

Must improve

- Nearly two thirds of commuters in the region still drive their own vehicles to work – traffic congestion is getting worse.
- The region's total energy use continues to increase. Petrol and diesel increased by 8 per cent between 1998 and 2004.
- Air quality in sheltered places, such as Masterton and Wainuiomata, can exceed national air quality standards during calm winter conditions.
- Twelve percent of monitored urban beaches (used for recreation) have poor or very poor water quality. Many of these sites border on Porirua's urban areas.
- Urban streams have some of the poorest water quality in the region.



Setting city limits

In 2002, *The New Zealand Official Yearbook* described New Zealand as one of the most highly urbanised countries in the world. In the 1880s, just under 60 percent of the population lived rurally. Since then, urban areas have grown rapidly and city suburbs have swelled with an influx of people from the rural areas. At first urban areas were concentrated around public transport routes, but the advent of the motor car triggered a sprawl that continues today. Our hunger for energy and raw materials has skyrocketed with it. More and more, we depend on infrastructure such as rail, roads, pipes and power lines for our quality of life. These changes affected the health of the environment, both rural and urban, but good design in the built environment can still give us great places to live, work and play.

This chapter looks at the pressures that change the built environment and transportation, the current state of urban development, transport, infrastructure, and the environmental quality of our urban areas.

The pressures

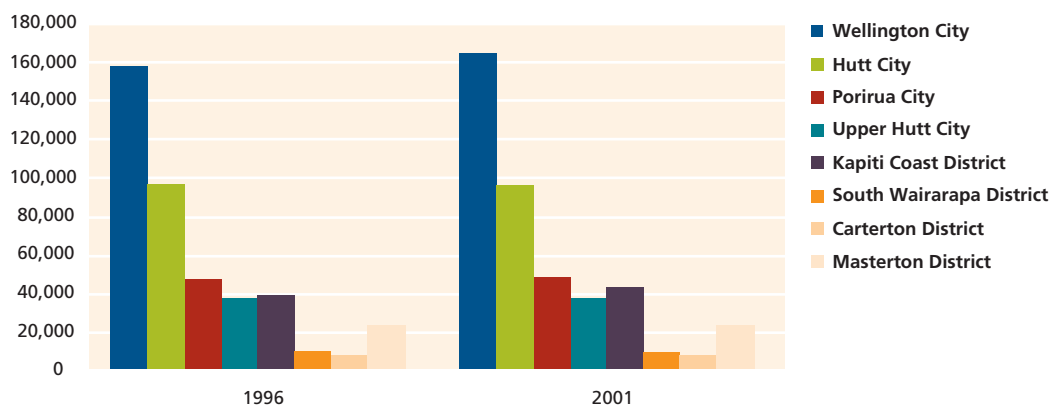
As population, economic activity and transport networks grow, we put more stress on resources, infrastructure and waste management, amplifying our impact on the environment. Monitoring our growth helps us understand the level of demands, effects and management required to achieve the built environment and transportation objectives in the Regional Policy Statement.

Population and economic growth

In 1995, 400,000 people lived in the Wellington region. When the last *Measuring Up* was published in 1999, that figure had risen to 415,000. By last year, according to Statistics New Zealand, there were 456,900 people in the region. This rate of increase – 2.3 per cent – still trailed behind the national average of 3.3 per cent over the last census period – 1996 to 2001.

Population change has been uneven across the region – numbers have dropped in the Hutt Valley and Wairarapa while increasing in Kapiti Coast.

Figure 11.1:
Resident population by
city and district councils
1996 and 2001.



Percentage Population Change (1996 to 2001)	
Wellington City	3.9
Hutt City	-0.4
Porirua City	1.6
Upper Hutt City	-0.1
Kapiti Coast District	10
South Wairarapa District	-2.2
Carterton District	0.5
Masterton District	-0.6

Table 11.1:
Population Change
1996 to 2001.

The Wellington region produced 12.8 per cent of New Zealand's Gross Domestic Product (GDP) in 2004. While growth has been steady over the last 10 years, the region experienced slower overall growth than Canterbury and Auckland. The trend has changed in the past year, Wellington's growth rate (at 5.5 per cent) has been above the national average (of 3.4 per cent), Canterbury (five per cent) and Auckland (1.8 per cent). Wellington city, as an economic hub, has a strong influence on regional figures, as does the manufacturing stronghold of the Hutt Valley, and the retail centre of Porirua.

Transport growth

Between 1996 and 2001 vehicle ownership per household rose twice as fast as the population did. People in the least-populated areas own the most cars – Wairarapa has the highest car ownership figures, Wellington city the lowest.

State highway traffic volumes in the region climbed by between one and two per cent a year between 2001 and 2004. Last year saw a decrease of one per cent, mostly because there was less traffic between Hutt Valley and Wellington city.

Between 2002 and 2005, "rush hour" (7am to 9am and 4pm to 6pm) passenger trips by bus, train and ferry rose by 664,000. Most trips – nearly 60 per cent – were made on the bus, with rush hour bus passenger trips increasing by 7.5 percent between 2002 and 2005, while rail patronage remained steady. Ferry passengers increased too, though they still account for less than one per cent of rush hour passenger trips. Off-peak volumes rose steadily between 2002 and 2004, with a marked jump in 2005 of 5% or 800,000 total passenger trips.

Where we are now

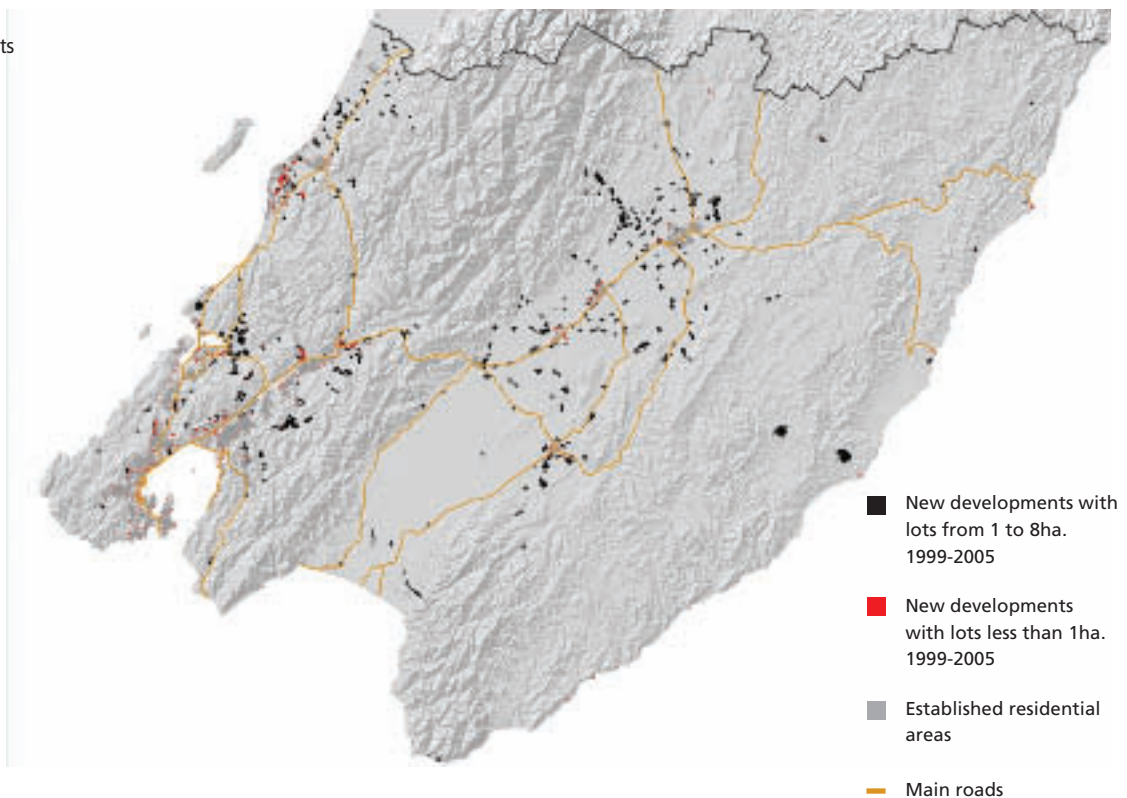
Objective One of the built environment and transportation chapter looks to stem the demand for finite resources through smart, efficient development of urban areas, transport and infrastructure. To see if we're achieving this objective, we measured the volume of waste generated, energy used and water supplied. We also gauge the size of the environmental "footprint" the region leaves as it consumes resources and discharges waste.

Urban expansion

The last *Measuring Up* noted that urban expansion was not so much the result of major developments as the cumulative effect of many small developments. This is still true today.

Wellington city has seen the most residential intensification through redevelopment and refurbishment of central city buildings. "Filling in" of urban gaps is also happening apace on the Kapiti coast. Expansion along the urban fringe is a common feature of regional development, mostly in north Wellington, Whitby and the Aotea Block in Porirua, the western hills in Hutt, and around Martinborough and Greytown. A growing number of greenfield projects – subdivisions on former farmland – have also occurred in Upper Hutt, Wairarapa and on the Kapiti Coast. Coastal development is a pressing planning issue for Kapiti and parts of the Wairarapa.

Figure 11.2:
Distribution of new lots
(less than 1 hectare
and 1 to 8 hectares)
1999 to 2005.



Transport

Nearly two thirds of commuters in the region still drive their own vehicle to work. A small drop (of 2.7 per cent) in the number of car journeys between 1996 and 2001 could be put down to the appetite for central city living, and road congestion encouraging people to switch to public transport. Teleworking has relieved some pressure by allowing people to work from home, but increasing demand for travel means rush hour journey times continue to lengthen.

Surveys in 2004 showed that 62 per cent of Wellington residents thought congestion had worsened over the past two years, compared with 55 per cent of Aucklanders. Transit New Zealand figures (minutes delayed per kilometre travelled) however, show that congestion in Wellington is around 13 seconds per kilometre less than in Auckland during morning rush hour.

Residents of the Wellington region use more passenger transport – 70 trips per person per year – than those in the Auckland region (40 trips) and the greater Christchurch area (41 trips). They also think passenger transport is easy to use, and that walking and cycling is easy. Despite this, the private car remains our predominant mode of transport, especially in lower density areas.

Infrastructure

Over the last ten years, incremental urban expansion has resulted in extensions to existing stormwater, wastewater, local water, and road infrastructure. Two new sewage treatment plants have been built, one at Moa Point serving most of Wellington city, the other at Seaview, serving the entire Hutt Valley and Wainuiomata. Other treatment plants have been upgraded to improve wastewater management and sewage effluent quality discharges to the environment. A number of new water reservoirs, a smaller number of new pump stations and a new borefield in Waikanae have also been commissioned. Wellington City Council’s programme to eliminate sewage from its stormwater system is improving the quality of stormwater discharged to the beaches.

Five commuter rail services – the Johnsonville line, Hutt Valley line, Melling line, Paraparaumu line and Wairarapa line – service the region, and a long distance passenger service, the Capital Connection, links Palmerston North and Wellington. The Wairarapa-Hutt Valley line and the Paraparaumu-Capital Connection line also carry freight. The last ten years have seen little change in the region’s rail, except for more commuter services on the Wairarapa and Paraparaumu lines.

The regional bus fleet now totals 465, including 60 electric trolley buses. There are more services and better facilities than in 1995. Recent improvements include the new Lambton interchange, Petone station, dedicated bus only lanes in Wellington city, and more frequent services on several routes.

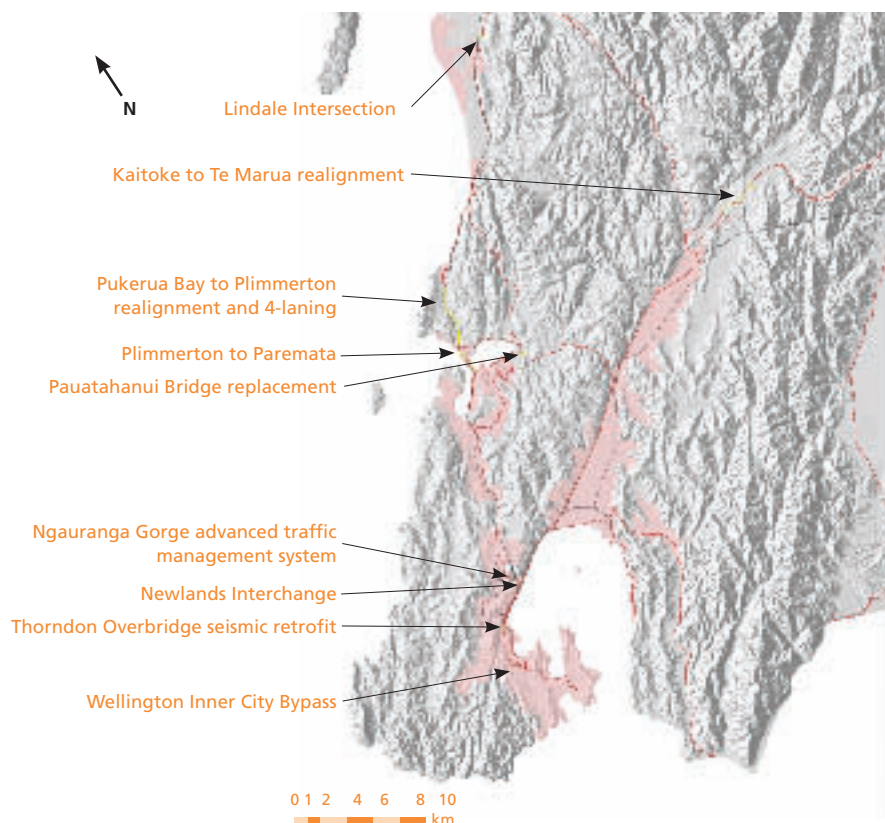


Figure 11.3: Location of major State Highway projects over the last ten years.

Within the region there are four state highways – One, Two, 53 and 58. Over the last ten years there have been a number of major (defined by Transit NZ as a project costing over \$3m) upgrades and improvements, shown in Figure 11.3.

Waste generation

Overall, the amount of waste sent to the region's landfills dropped over the last five years. 2003-2004 figures equate to around 837 kg per person per year - down from about one tonne per person in 1999. For more information, see **Waste management and hazardous substances**.

Every day, 183,135 cubic metres of sewage effluent and industrial wastewater is discharged from sewage treatment plants, almost all to coastal water and rivers. Daily per person volumes of sewage vary throughout the region – the lowest in Otaki and the highest in Masterton – but it's not known why. Changes in the way we gather information prevent a comparison between current volumes and those cited in the last *Measuring up*.

Energy

There is no data available to compare total energy use in the region over time. However, national figures indicate that total energy consumption is increasing at around two per cent a year.

We know that transportation in the region burned 459 million litres of petrol and diesel between 2003 and 2004, compared to 425 million litres between 1997 and 1998. This 8 per cent increase was much less than Canterbury's at 21 per cent, and Auckland's 18 per cent. For more information, see **Energy**.

Water supply

We have been unable to get figures for water demand across the whole region over the last decade. However, we do know the amounts supplied to the four southern local authorities – Upper Hutt, Hutt City, Porirua and Wellington.

Overall there was a gradual increase, though it lagged behind population growth. The water supplied dropped by an average of 0.3 per cent each year, with summer reductions of 0.5 per cent annually. We can't trace these downturns to any single cause, but they do follow publicity about water conservation and efficient garden watering.

Ecological footprint of the region

An ecological footprint is an accounting tool – it calculates the land needed to provide the resources we consume and absorb the waste we discharge. Expressed in hectares, ecological footprints allow us to measure the load each of us places on the environment.

The Ministry for the Environment's (MfE) 2003 report, *Ecological Footprint of New Zealand and its Regions*, found a deficit in the Wellington region of 305,820 hectares, revealing that we place a greater load on the environment than our land area and resources can sustain. Our region's footprint is the fourth largest in New Zealand, making up ten per cent of the combined national total.

The quality of our natural environment

The second objective for built environment and transportation chapter requires that we avoid, remedy or mitigate the environmental impacts of urbanisation, transport and infrastructure. As indicators of those impacts and how we are managing them, we look at the quality of our air, coastal recreational sites and urban streams.

Urban air quality in the region over summer is usually good. However, contaminants (mostly from domestic solid fuel fires) tend to linger in calm winter conditions, polluting air quality in sheltered places like Masterton and Wainuiomata. Occasionally, such pollution exceeds national environmental standards, posing a health risk. Vehicle emissions are another culprit, and air quality around busy roads is often poor. For more information see **Air**.

Two thirds of coastal recreational sites where water quality is monitored enjoy good or very good quality. However, 12 per cent of sites rate as poor or very poor. Water quality at these mostly urban beaches is monitored because they are popular with swimmers, surfers and boaties. Unsurprisingly, water quality is poor near stormwater outlets and small streams. Stormwater and streams can be contaminated by sewage overflows and overland rural runoff. All but one, of the poor or very poor sites, border on Porirua's urban areas.

Urban streams suffer some of the poorest water quality in the region. Runoff from sealed surfaces like roads, car parks and roofs delivers a host of contaminants to streams and the coast. Some - like heavy metals - are very harmful to stream life and our preliminary studies show they are building up to lethal levels in the beds of urban streams. For more information see **Fresh water**.

The environmental quality of our urban areas

Objective Three of the built environment and transportation chapter looks to preserve or improve urban environmental quality. This can be done through good design, high public amenity and the presence and health of natural resources in urban zones.

To measure urban design, we looked at four aspects; character, connectivity, density, the calibre of the public realm.



Everything that goes down the drain ends up in a stream or at the beach. It's not the place to wash out paint brushes or tip soapy water after washing the car.

A place's **character** is a unique combination of built form, landscape, history, people and their culture. A number of regional centres have a strong and distinctive flavour – the vibrant CBD in Wellington, the historic settlement of Aro Valley, the coastal suburbs of Plimmerton, Titahi Bay, and Eastbourne, the pioneer character of Petone, the church centres of Pacific Island communities in eastern Porirua, Naenae and state housing areas, to the thriving wine settlement of Martinborough and historic rural service towns in the Wairarapa. Although we have no measures of change in regional character over time; there are locations, such as central Wellington city, where character has noticeably improved.

Wellington in the early 1990s was a city where people hurried home from work in early evening as shops and cafes closed their doors. Many were unaware or unmoved by a harbour hidden behind drab, empty waterfront buildings. Visitors and tourists didn't linger.

In 2005, Wellington is a compact, vibrant city of cosmopolitan shops and restaurants with a hectic events schedule and easy access to a stunning harbour and waterfront walks. It's the home of Te Papa – the Museum of New Zealand – the "Cake Tin" and the Hurricanes. The native birds are back thanks to the eco-pioneering Karori Wildlife Sanctuary and tourists are staying longer to enjoy our many other natural attractions.

Connectivity is a measure of how effectively networks, streets, railways, walking and cycling routes, services and infrastructure knit together. The way our urban areas link up gives a snapshot of how the region connects as a whole. The region's strong north-south ridgelines and valleys have confined urban *centres* to three corridors; southern (Wellington City), north-western (Ngauranga to Kapiti) and north-eastern (Hutt to Wairarapa). This linear, relatively compact form makes for efficient transport, but it also means snarl-ups if a corridor is blocked. It also puts a premium on flat land, and developers are quick to build on any that presents. This is apparent on the Kapiti Coast, in the Wairarapa and, to a lesser extent, in Upper Hutt. A number of developments in the region have compromised connectivity with a surfeit of cul-de-sacs and difficult pedestrian access. Such poor planning creates a dependency on private vehicles.

Kapiti Coast District Council held sessions with sectors of the community on good design for Paraparaumu Beach town centre. Together they worked out open space areas, footpath upgrades, parking, where different types of development would occur and design concepts for the main street.



Often, the most **densely populated** urban areas have the greatest vitality, offering facilities, opportunities and choices that would not exist without a critical mass of people. Central Wellington city has the second highest resident population density (behind Auckland) in the country at 1,381 people per square kilometre. Less populous centres in the region still have a similar sense of energy, such as Jackson Street in Petone, Greytown and Martinborough.

The “**public realm**” describes public space and buildings, and those parts of private development that impinge on public space – the setting for community life. No information exists on the quality of the region’s public realm, but the 2004 report *Quality of Life in New Zealand’s Largest Cities*, by Gravitas Research and Strategy Limited, surveyed residents in Wellington, Porirua and the Hutt to gauge the sense of pride they took in their cities’ look and feel. Wellington residents came out on top, while Porirua’s and Hutt city residents were less enthusiastic.

The report also gave us a measure of public amenity. It found that fewer Wellington, Porirua and Hutt city residents considered air quality and rubbish to be a problem than respondents from elsewhere in the country. However, many felt that noise was an issue. Compared with the rest of New Zealand, Porirua and Hutt cities had slightly fewer residents who considered access to local parks or open space was easy. Wellington city residents were among those least likely to describe access as easy.

Figures 11.4 and 11.5 give us an indication of the public’s perception of the state of the natural environment in our urban areas and how this compares to five years ago.

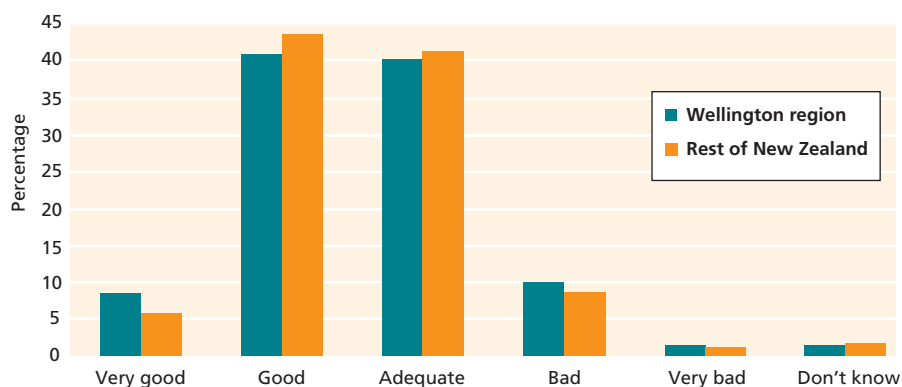


Figure 11.4: Perceived state of the natural environment in towns and cities, 2004.

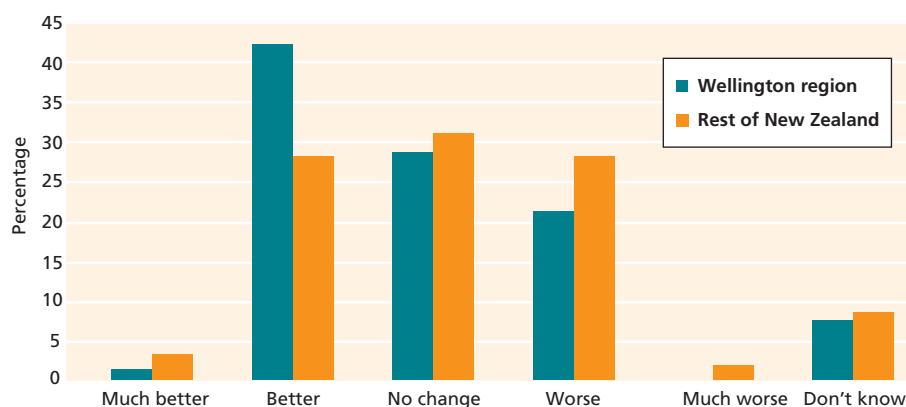


Figure 11.5: Perceived state of the natural environment in towns and cities compared to five years ago.

What's being done

Nationally

The last ten years have seen a proliferation of national guidelines on urban design and sustainable development. MfE has published *People + Places + Spaces: An Urban Design Guide for New Zealand* (2002), *Creating Great Places to Live + Work + Play: Livable Urban Environments* (2002), *The New Zealand Urban Design Protocol* (2005), and most recently, *The Value of Urban Design* (2005).

In 2003, the Government's Sustainable Development for New Zealand Programme of Action targeted "Sustainable Cities" as one of four key focus areas for central government.

Standards New Zealand introduced guidelines and standards for land development and subdivision, aiming to boost urban environmental quality. *SNZ HB 44:2001 Subdivision for People and the Environment* encourages creative design, while *NZS 4404:2004 Land Development and Subdivision Engineering* specifies engineering design requirements for land and subdivisions and encourages the use of new techniques.

Aspects of transport policy have changed over the past few years. A government review late in 2004 set out to encourage more integrated decision making in the transport sector. It also made changes to help deliver the stated aim of the New Zealand Transport Strategy – "An affordable, integrated, safe, responsive and sustainable transport system for New Zealand by 2010".

A number of other documents fit under the mantle of the Transport Strategy, looking to curb the use of private vehicles – thereby easing demand for fossil fuels – and to tackle the environmental impacts of transport, particularly air pollution. These include the National Rail Strategy 2005, *Getting there – on foot, by cycle* (2005), a Vehicle Fleet Emissions Control Strategy which introduced a 10-second visual check for smoky vehicles, and an emission standard for new and used vehicles entering New Zealand. In 2004, the Ministry of Transport also proposed a Vehicle Emissions Screening Programme. This proposal was withdrawn the following year, citing screening problems. Two other measures will replace it – a visual smoke test, conducted as part of the warrant/certificate of fitness check, and a ban on tampering with emissions control equipment on vehicles. These will arrive in late 2006 and 2007 respectively.

The Energy Efficiency and Conservation Authority is another player, producing travel planning workshops, a tool for auditing commercial vehicle fleets, energy-wise programmes and an energy-wise rally to promote biofuels and energy efficiency.

In 2004, MfE introduced a National Environmental Standard for air quality, the first under the Resource Management Act, 1991 (RMA). It set limits on airborne contaminants – carbon monoxide, fine particulates, nitrogen dioxide, sulphur dioxide and ozone – emitted by transport and the built environment.

Regionally

Greater Wellington has a number of plans and programmes aimed at maintaining and improving urban quality and protecting natural environments. They include regional plans and the regional Pest Management and Land Transport strategies. Non-statutory programmes like *Be the Difference* raise awareness and encourage personal action.

Take Charge helps businesses with pollution problems and offers options for dealing with business waste, recycling, energy efficiency and air emissions. A number of strategies (such as the Riparian Strategy), booklets (*Mind the Stream, Restoration Planting, Managing your Bush Block*), and programmes like the community environmental programme *Take Care* and pest control initiative *Key Native Ecosystems* all aim to bolster ecosystem health in urban areas.

Greater Wellington's guiding transport document is the Regional Land Transport Strategy. The current Strategy, adopted in 1999 and updated by the Western Corridor Implementation Plan the following year, states the vision of "a balanced and sustainable land transport system that meets the needs of the community".

It addresses transport's impact on the environment by promoting the reduction of emissions. It also encourages efficient transport choices to wean us off single occupant vehicles, and supports passenger transport, walking and cycling. It also advocates co-ordination between land and transport planning to reduce the need to travel. A review of the strategy spawned several subsidiary documents, such as the Regional Travel Demand Management, Pedestrian and Cycling Strategies.

Greater Wellington, the city and district councils, Positively Wellington Business and iwi (through an advisory committee, *Ara Tahi*), are collaborating on a growth framework – the Wellington Regional Strategy. A discussion document, released in August 2005, looks at growing the regional economy but also aims to improve "regional form and systems".

Locally

District plans contain aims and policies providing for the sustainable use of resources. They also advocate sensitive land use to minimise environmental damage. Strategies and programmes are also used, including:

- Walking, cycling and/or bridle path strategies
- Water use strategies
- Waste minimisation/management plans
- Energy-wise programmes.

District plans also focus on the environmental quality of urban areas through provisions that manage built character and amenity. Design guides and character guides are now commonplace, and their success is evident in Jackson Street in Petone, and Thorndon, Cuba Street and Mt Victoria in Wellington.

All city and district councils use guides or codes of practice as part of the subdivision approval process. The engineering standards they specify are typically strict, leaving little room for innovation. This stifles the use of new techniques like low-impact designs to manage stormwater discharge. It's now generally accepted that subdivision and development design needs to be more sensitive to the environment, using novel ways to ease impacts and demands on infrastructure. Kapiti Coast District Council is the first territorial authority to review their code of practice – a revamped framework that adopts new national subdivision and development standards, at the same time retaining rules specific to Kapiti.



Almost two thirds of people say if it were easier to get information on public transport they would use it more.



Community groups and residents, with the help of city or district councils and Greater Wellington, are restoring areas of bush, parks and streamside areas around the region. Their work is not only improving the local amenity of their neighbourhoods, it is extending habitat to increase the abundance and variety of native birdlife.

It's become increasingly clear that case-by-case assessment of resource consents can't deliver good urban design and environmental safeguards alone, so some city and district councils have come up with non-regulatory documents giving guidance on infrastructure, urban design, and/or management of effects. These documents allow for alternative development and strategic planning, exemplified by Wellington City's Northern Growth Management Framework, Porirua City's Aotea Block Development Plan and Kapiti Coast's Paraparaumu Town and Beach Town Centres.

The degree of environmental protection afforded by district plans varies across the region, and not all recognise outstanding landscapes, significant ecological sites or areas of the coast with high natural character. Kapiti Coast District Council is the only territorial authority to have scheduled and mapped significant ecological sites on private land.

Where to from here?

As the region's population grows, we consume more and more resources, all the while expecting the natural environment to deal with the waste from our urban lifestyle. By 2016, the region is forecast to have 26,000 more people and 44,000 more vehicles than in 2001, and we will make 37,000 extra private vehicle trips.

It's assumed that the recently announced \$885 million central government transport funding package will speed progress on transport issues over the next decade. Greater Wellington has suggested improvements to the passenger transport system, including rolling stock replacements, station upgrades, bus replacements, integrated ticketing and real-time information. Road capacity and safety upgrade proposals include a Petone to Grenada link road, western corridor improvements, a western link road in Kapiti, and roading improvements through the Wellington City Central Business Corridor. Transport system efficiency is expected to improve with more travel planning, awareness campaigns, and network information and management advances.

The region's local authorities are now looking together at regional form and systems through the Wellington Regional Strategy. The Regional Land Transport Strategy review was delayed so that it could progress alongside the Regional Strategy – a realignment to better integrate land use and transport management. However, before it assumes statutory weight under the RMA, it will need to be melded still further with the Regional Policy Statement and district plans.

Over the next decade it will be increasingly important to develop the built environment, transport and associated infrastructure with greater sympathy for the environment, creative solutions and good urban design. Only then will we maintain and improve on the quality of our built environment and transport.

More Information

Woods, Tami; Guscott, Susannah, 2005. *Built environment and transportation – background report*. Greater Wellington.