

10 Urban planning and infrastructure

Key points

- Planning, building and operating essential urban infrastructure is one of the three main rationales for governments to undertake urban planning. This task is challenging, particularly because of the contrast between the unpredictable and dynamic nature of city growth and the long-lived, lumpy, place-specific, inflexible, expensive- and irreversible nature of infrastructure assets.
- Urban planning systems that effectively support the growth and evolution of successful cities:
 - ensure a sufficient supply of development capacity to meet demand;
 - appropriately align land-use rules with the supply of infrastructure (and vice versa); and
 - ensure the mobility of people and freight to and through cities (through a full suite of “city-shaping”, structural and follower infrastructure).
- New Zealand’s current planning system has struggled with all three tasks. Reasons include:
 - legislative arrangements that do not encourage integrated decisions;
 - institutional and governance arrangements for water services that discourage responsiveness; and
 - the absence of formal mechanisms to resolve debates over large city-shaping infrastructure.
- Many of the features proposed for a future planning system elsewhere in this inquiry will help to resolve these problems – particularly greater use of price signals, and changes to the ways in which planning and land-use regulation is done.
- In addition to these changes, the supply of infrastructure in future could be improved by:
 - making spatial planning a formal part of the planning hierarchy, to help provide a high-level overview and direction, and greater collaboration, consistency and certainty over future development; and
 - making greater use of analytical planning tools which reflect uncertainty and retain flexibility, such as real-options analysis.
- Despite weaknesses in existing institutional and governance arrangements, the Commission sees no merit in proposing large-scale structural reforms for water services, because of the fragmented and small-scale nature of water networks in New Zealand, the uncertain net benefits of mergers, and the high costs of setting up alternative institutions.
- Water services could improve through more modest actions, such as clarifying statutory frameworks, performance benchmarking, allowing councils to undertake franchising and other innovative forms of delivery, and greater use of variable pricing for water.

The need to plan, fund, build and operate urban infrastructure is one of the three main rationales for governments to undertake urban planning (Chapter 3). Transport and water infrastructure, which are both largely provided by local governments in New Zealand, are important components of urban development and growth. Other types of infrastructure, including many forms of social infrastructure, matter for the wellbeing of city residents. Supply of infrastructure services is essential for an effective supply of land for housing, for a multitude of business and private services within cities, and for a well-functioning urban labour market. In addition, the better the transport and other links between urban centres within a region, the more these centres will be able to operate as a productivity-enhancing system.

This chapter:

- describes urban infrastructure and why it is important for cities;
- examines issues with the current planning and supply of infrastructure;
- argues that the problems facing the current planning system are the result of statutory and institutional barriers to greater integration and better coordination, political and cultural barriers, funding and financial barriers, and analytical barriers; and
- points to legislative, institutional and planning practice changes that would address these barriers to more responsive supply of infrastructure in urban development.

Chapter 11 discusses funding and financial barriers to the effective and efficient provision of infrastructure, and desirable solutions to these barriers in a future planning system.

10.1 What is infrastructure and why is it important for urban growth?

Urban infrastructure comprises essential facilities, services, and social structures for cities and communities. In Latin *infra* means *below*, and some forms of infrastructure are literally underground (such as water and natural gas supply systems). The 2011 National Infrastructure Plan defines infrastructure as “the fixed, long-lived structures that facilitate the production of goods and services and underpin many aspects of quality of life” (National Infrastructure Unit, 2011, p. 1).

Urban infrastructure includes:

- transport – rail, ports, airports, highways, roads, footpaths and cycleways, and public transport;
- water – water supply (also referred to as “potable water”), collection and treatment of wastewater, and the removal of stormwater (collectively the “three waters”);
- energy – electricity and natural gas production, transmission and distribution;
- telecommunications – fixed line, mobile and internet; and
- social and community infrastructure – eg, public recreation spaces, reserves, libraries, schools and hospitals.

Typology of infrastructure assets

Infrastructure assets vary in their roles. At a high level, there are three main categories of infrastructure assets.

- **Strategic or “city-shaping” infrastructure** is a relatively limited set of mainly transport-related infrastructure (eg, highways or metro rail) that can fundamentally change the accessibility of urban areas. It achieves this by driving the location decisions of households and firms, facilitating agglomeration and improving productivity.

- **Structural infrastructure** is “trunk” infrastructure that provides the skeletal framework for urban development. These infrastructure assets include main roads, the “three waters” as well as social infrastructure. They underpin the economic adaptability and viability of urban areas.
- **Follower infrastructure** is infrastructure assets that provide services into a suburb or neighbourhood once investment in city-shaping and structural infrastructure assets has enabled the development of these areas. The purpose of this type of infrastructure is to service the evolving pattern of urban development. Examples include suburban streets, lighting, parks and community facilities (SGS Economics and Planning, 2014, p. 15).

Why is infrastructure important for well-functioning cities?

Infrastructure assets are not ends in themselves. Their usefulness comes from the services the assets provide. Improvements in infrastructure offer opportunities not only to improve productivity within the economy, but also to achieve social objectives such as public health. Donaghy (2011) highlights the importance of infrastructure to well-functioning cities. Wellman and Spiller (2012) make similar comments.

[C]ities would be inconceivable without infrastructure systems. Streets, bridges, harbour facilities, transit systems, water and sewer systems ... systems of electrical power generation and distribution, and communications systems are what make safe, sanitary, and productive urban living possible. (Donaghy, 2011, p. 81)

Efficient, effective urban infrastructure does not lead in itself to competitive, innovative cities, but the lack of it would strongly impede their development and sustainability. Through infrastructure’s enabling function, complex, dynamic cities come alive. (Wellman & Spiller, 2012, p. 1)

Effective transport infrastructure is an essential component in improving business efficiency, innovation, competition and trade, and facilitating a mobile, connected and flexible labour force.

Infrastructure can be a serious bottleneck in the supply of residential, commercial or industrial development capacity if its delivery is poorly timed or located. Infrastructure provision is therefore a key pathway through which councils are able either to facilitate or hamper development. Local Government New Zealand (LGNZ) emphasises that lack of infrastructure can limit urban growth:

In essence, the availability/future provision of infrastructure is a de facto urban limit ... ultimately, the land is not ‘shovel ready’ until main trunk infrastructure has been extended to a point at which it becomes economical for a developer to meet the cost of connecting. (LGNZ, *Using land for housing*, sub. DR 54, p. 9)

Yet providing infrastructure for new land development is an expensive undertaking for councils and can be risky. Councils that install new infrastructure ahead of demand may find themselves facing high borrowing and depreciation costs, particularly if growth is slower than anticipated.

Given that infrastructure plays such a critical part in land and housing supply chains, and in the effective functioning of urban labour markets, the arrangements through which planning and delivery of infrastructure take place are essential elements of an urban planning and development system.

Important characteristics of infrastructure assets

Urban infrastructure assets have certain economic characteristics that influence their planning and delivery. Seven of them are noted below.

- *Highly capital intensive and typically last for a long time (more than 50 years in some cases)*

Infrastructure assets such as water and wastewater transmission pipelines, wastewater treatment plants and roads typically are expensive and have long lives. They tend to be built with spare capacity based on long-term forecasts, with significant risks if the demand for the infrastructure over that period is uncertain. For some infrastructure assets the “payback” period is long because the returns on investment are relatively low in the initial years and rise only in later years. This is common in telecommunications, for example, where returns to investment in new technology depend on the rate at which consumers adopt the new technology.

- *Valued for the services they deliver*

Infrastructure assets are valuable to households, communities and businesses, not in themselves but for the stream of essential and other services they deliver. Some infrastructure assets are specific to a particular service (such as a gas network), while others provide a platform for multiple services (such as roads and, increasingly, the internet).

- *Subject to economies of scale and scope*

Infrastructure assets often exhibit economies of scale. For example, in the case of pipelines, as diameters increase, construction and installation costs increase less than proportionately, while the carrying capacity increases exponentially. The marginal costs of additional use (eg, running more water through a pipe) are very low until capacity is reached. Then the costs rise sharply, because capacity can usually only be added in large increments. Strong complementarities exist across different infrastructure services for both consumers (eg, residences and businesses need a package of services) and infrastructure providers (eg, roads are natural corridors for pipes and wires). These generate economies of scope and the need for coordination.

- *Often part of a wider network*

Many infrastructure assets have a network structure. In some cases, for example in communications networks, one person's decision to join a network can make the network more valuable to other current or future users. However, once congestion occurs adding an extra user can be to the detriment of existing users. For example, a motorist choosing to use a congested motorway can increase the travel times of other travellers. If individual users do not bear these incremental costs, the result is traffic congestion for all users.

- *Place specific and inflexible*

The demand for most infrastructure assets and related services is located at a specific place, and the infrastructure must physically exist at that place to service the demand. In addition, as part of a network, infrastructure in a specific place cannot exist in isolated pockets – it must connect to the rest of the network. Roads that do not connect are of little value. This can have major implications for land requirements and use. Also, the level of demand for infrastructure can vary significantly at different places and times due to the preferences of local residents and the pattern of business activity. But once infrastructure supply is committed to, the capital is largely sunk and difficult to retrieve.

- *Highly dependent on past infrastructure investment*

Urban infrastructure has a high degree of path-dependency in its development. Past infrastructure investment can either enhance or reduce the efficiency and effectiveness of future infrastructure development. For example, the costs of providing water to a new housing area will be much higher if the bulk-water transmission pipeline to existing areas is fully used. Wellman and Spiller (2012) note that the "longevity and essentially path-determining nature of urban infrastructure investment influences urban development patterns and cost structures for decades" (p. 2).

- *May require some public sector funding*

Given the features of infrastructure assets outlined above, markets and private providers cannot always be relied on to deliver an adequate supply of infrastructure assets and services. For some infrastructure assets, such as local roads, it is technically difficult or costly to charge for use and to restrict access only to those who pay. Private businesses will not provide infrastructure without sufficient revenue to cover costs. Even if it is feasible to charge users, marginal costs can be lower than average costs, creating a conflict between efficient pricing and recovering total costs. Also, major infrastructure investments are likely to involve higher risks than the typical business investment project. All this means that public funding is common for some forms of infrastructure. It also means deciding who should bear the costs of infrastructure. Views about what is an equitable allocation of costs can vary.

F10.1

Infrastructure assets:

- are expensive and long-lived;
- are lumpy;
- are highly place specific and inflexible;
- are irreversible;
- are typically part of a network;
- often need to be coordinated; and
- may require public funding.

Providers of infrastructure are exposed to risks, including that demand may be less than expected leading to underuse and possible stranding of assets. This puts a premium on effective planning, procurement, funding, managing and monitoring of infrastructure assets.

10.2 Current issues with the provision and planning of infrastructure

Urban planning systems that effectively support the growth and evolution of successful cities:

- ensure a sufficient supply of development capacity to meet demand;
- appropriately align land use rules with the supply of infrastructure (and vice versa); and
- ensure the mobility of people and freight to and through cities (through a full suite of “city-shaping”, structural and follower infrastructure).

The current planning system has struggled to deliver these.

Insufficiently responsive supply

Infrastructure supply and, by association, development capacity have struggled to keep pace with demand in New Zealand’s faster-growing cities. The effects of this lack of responsiveness are seen in the rapidly rising urban land prices discussed in Chapters 6 and 8. During its *Using Land for Housing* inquiry, the Commission heard from a number of developers whose ability to deliver housing in a timely manner was constrained by the supply of infrastructure or uncertainty about the adequacy of existing networks:

TGH’s [Tainui Group Holdings] experience working with the infrastructure component of the land supply system has not been positive. Typically, the HCC [Hamilton City Council] will zone areas of land for development, but the planning and delivery of infrastructure does not follow in a timely and coordinated manner. For example, stage one of TGH’s Rotokauri development needs Three Waters infrastructure. HCC has expanded the stage one land area without making any additional investment in the Three Waters infrastructure necessary to service that additional land area. (Tainui Group Holdings Ltd, *Using land for housing*, sub. 53, pp. 2–3)

One of the major barriers to housing development in the sub-region is the ability to fund and deliver network infrastructure. Without infrastructure delivery, the residential development sector will be unable to service the anticipated population growth. (Property Council New Zealand, *Using land for housing*, sub. 33, Annex 7B, p. 1)

It is the inability of Councils to fund infrastructure [that] is the most important aspect of increasing land supply. (Carrus Corporation, *Using land for housing*, sub. DR 78, p. 2)

Evidence presented to the Auckland Independent Hearings Panel (IHP) cited wastewater and transport systems that are at capacity and constraining development. For example, the need to wait for additional wastewater capacity is holding up development in the Dairy Flat, Orewa, Silverdale and Wainui areas. These areas have about 3 203 hectares of future-urban-zone land that could provide 36 095 dwellings and 128 hectares of business land (Auckland Council, 2015c, p. 11; various statements of evidence before the Auckland IHP).

Misaligned land use rules and infrastructure investments

Infrastructure supply is unresponsive commonly because land use rules and infrastructure planning are not well aligned. As noted, infrastructure is not always in place to support zoning provisions. Sometimes it can be the other way around: opportunities provided by the availability of infrastructure go unexploited.

- The New Zealand Council for Infrastructure Development (NZCID, 2016a) noted that the land use controls in the Proposed Auckland Unitary Plan (PAUP) failed to maximise the development potential in areas served by the inner-city rail network⁸⁷:

[S]ignificant land use change around the majority of stations on the isthmus – the area where demand for land is highest and where most growth under a compact model should in theory be accommodated – is not permitted under the Unitary Plan. The type of development activities which would benefit from access to rail, such as residential apartments and town houses, are only substantively permitted around 11 of the 24 stations on the isthmus (indicated in green). Development change is generally prohibited around 6 of the stations (indicated in red) and a further 7 permit some degree of change (indicated by orange circles). (p. 45)

Conversely, development would be permitted in other parts of the city not well-served by public transport:

Somewhat surprisingly, heavy growth is permitted along the Pakuranga Highway corridor which is unserved by the busway. Highland Park town centre could see development of up to six storeys despite the fact that congestion into and out of the area is already an issue and no significant public transport improvements are planned. (NZCID, 2016a, p. 47)

- In Tauranga's east, land rezoned for housing has not been supported by access to nearby roads (Box 10.1).

Box 10.1 Construction standards for the Papamoa East interchange

Tauranga City Council (TCC) rezoned more than 300 hectares of land for residential, industrial and commercial development in Papamoa East. The land is bordered on the south by the Eastern Link motorway – a \$455 million highway completed in August 2015.

To unlock large areas of land for housing in Papamoa East, a new interchange is needed to connect with the Eastern Link motorway. The construction standard for this proposed interchange epitomises the competing interests that can emerge between the New Zealand Transport Agency (NZTA) and local governments.

From the NZTA's perspective, the primary objectives for the Eastern Link motorway are:

- safer and easier travel;
- reduced travel times between Tauranga and Paengaroa;
- more efficient connections for business, industry and tourism; and

⁸⁷ The Auckland IHP recommended rectifying this deficiency in the PAUP of not allowing appropriately greater residential density around transport nodes. The revised plan should: "Enable the centres and corridors strategy in line with the development strategy envisaged in the Auckland Plan. This involves significant rezoning with increased residential intensification around centres and transport nodes, and along transport corridors ..." (Auckland Unitary Plan IHP, 2016c, p 47.)

- supporting regional employment and economic growth (NZTA, 2015a).

To protect the savings in travel time and the safety of the motorway, the NZTA requires that the Papamoa East interchange is built to a high standard (grade separated) at an estimated cost of between \$20 million and \$25 million.

In contrast, TCC suggested that a lower-specified interchange (ie, a roundabout) could be built at significantly lower cost and that the standards set by the NZTA are unnecessarily high:

TCC faces ... the financial consequences of what we believe are unnecessarily high levels of service sought by [the] NZTA for much of the State Highway network in and around Tauranga. We don't believe that these levels are sustainable or affordable... The outcome of these types of levels of service include things like having to build grade separated interchanges to connect local roads to the State Highway network at a cost of 2 to 3 times more than a roundabout would cost. (NZPC, 2015a, sub. 47, pp. 21–22)

In February 2017, TCC reported to the Commission that they are continuing to work through the issue with the NZTA, including potential cost-sharing arrangements and the intensity of nearby development.

Source: NZPC, 2015a; pers. comm., n.d.

Impaired mobility of residents and freight

Cities cannot function well without transport infrastructure that enables the mobility of residents and freight to and through them. Large effective labour markets lie at the heart of the economic success of cities. Yet local authorities have limited tools available to support city-shaping infrastructure. This type of infrastructure can play an essential role in enabling mobility in cities (eg, renewing and expanding rail in Auckland), opening up new development opportunities (eg, as the Auckland Harbour Bridge opened up the potential for the city to grow north) or reinvigorating development and economic activity within established areas (eg, Melbourne's underground rail loop, as discussed in Box 10.2).

Box 10.2 Melbourne's underground rail loop

Legislation to build an Underground Rail Loop (the Loop) was introduced into the Victorian Legislative Council in November 1970 and the Loop was progressively opened between 1981 and 1985.

Melbourne had developed a radial train network, which radiated out from two stations in the Central Business District (CBD). Projections suggested that by 1985 these two stations would be unable to handle the expected number of passengers at morning peak time. The Loop expanded the capacity of the system by adding 12 kilometres of tunnels and 4 stations to the network. Among other things, this eliminated the need for train reversing and provided access to new and existing city stations from as many lines as possible.

One purpose of the Loop was to enhance accessibility within central Melbourne. Before the Loop, development had continued to occur beyond a convenient walking distance of the existing railway stations. Stimulating public transport use was expected to expand the city's capacity to absorb employment, residential and educational growth, so as to improve its global competitiveness.

Several key land-use developments contributed to the Loop's success and to the growth of central Melbourne:

- the relocation of rail stabling yards enabled land on the edge of the CBD precinct to be redeveloped;
- almost the entire city block above the Melbourne Central loop station was redeveloped (funded partly by the sale of development rights to the air space above the station: see Chapter 12); and

- the northern end of the CBD was transformed, with the growth of the City North education precinct.

The City of Melbourne changed its planning scheme in the mid-1980s, increasing plot ratios, parking provisions and sewerage works, to stimulate development specifically around the new Loop railway stations and the northern CBD. This encouraged development and use that supported the significant investment in the Loop.

Source: Fitzgerald, 2016; Metropolitan Transport Authority, n.d.; Rawnsley, Davies, Szafraniec, Ratnam, 2014.

City-shaping projects tend to be very expensive, and arguably beyond the reach of most urban local authorities. They may also have wider spillover benefits, such as the faster movement of people, goods and services through and to urban areas. For Auckland, the lack of clear mechanisms within the planning system to identify such projects and fund them has led to several years of jockeying between local and central government over the size, nature and funding responsibilities of large-scale land transport packages (section 10.6).

Mobility also depends on structural and follower infrastructure. Kelly and Donegan (2015) cite cases of residents in Melbourne's outer suburbs who face prohibitive travelling distances to employment in the inner city because of congested roads and lack of public transport infrastructure and services. Box 2.3 describes the woes of employees of an Auckland firm in travelling to and from work and to meetings. This problem not only damages the city's labour market; it also risks causing deeper social and economic disadvantage and exclusion for poorer and less-skilled households.

F10.2

The current infrastructure planning and provision systems are insufficiently responsive to demand pressures, do not always align infrastructure supply and land-use rules, and lack tools for the provision of city-shaping assets that underpin the mobility of people and freight.

10.3 What is causing these problems?

The problems of inadequate responsiveness and supply, misaligned regulation and infrastructure investment, and a lack of support for city-shaping projects can be attributed to four main causes.

- **Statutory and institutional barriers:** These barriers arise from differences in objectives, responsibilities and processes, and from different agencies being responsible for different aspects of land use and infrastructure planning. Legislation that is fragmented rather than integrated is often the underlying cause of these kinds of barriers.
- **Political and cultural barriers:** These barriers arise from opposition to certain policy approaches and to development more broadly. For example, as discussed in Chapter 10, existing residents of a city may feel threatened by newcomers, particularly if they are concerned that they will bear the cost of the infrastructure required to service those newcomers. These kinds of tensions can undermine attempts for citywide integration of infrastructure and land-use planning.
- **Funding and financial barriers:** These barriers arise from authorities with planning and infrastructure responsibilities facing budget constraints or limitations on the flexibility in how they can collect or use revenue needed for integrated development. These barriers are discussed in Chapter 11.
- **Analytical barriers:** These barriers are sometimes caused by fragmented organisational arrangements, and sometimes by weaknesses in analytical tools, or in the methods or skills needed to undertake cross-discipline analysis.

This chapter deals primarily with statutory/institutional barriers and analytical barriers, and policy responses. Chapter 11 discusses financial barriers, while Chapters 8 and 14 discuss political and cultural barriers.

Legislative arrangements do not encourage integrated decisions

In its *Using Land for Housing* inquiry, the Commission found that the three planning Acts – the Resource Management Act 1991 (RMA), Land Transport Management Act 2003 (LTMA) and Local Government Act 2002 (LGA) – create an overly complex web of regulatory, investment and funding processes. Interaction occurs at a number of points, but without an underlying, coherent legislative design that ensures these interactions are smooth, efficient and effective (NZPC, 2015a).

As outlined in Chapter 5, the current legislative framework assigns roles and responsibilities for land use and infrastructure planning across the RMA (for land use regulation), LGA (for infrastructure planning and provision) and LTMA (for land transport planning and provision). Essentially the Acts mandate three separate decision-making processes that operate on different timeframes and spatial scales for three separate but related purposes.

This legislative complexity makes it difficult for local authorities to develop and implement consistent plans around land use and infrastructure investments. For example, making a particular area of land ready for development – setting planning controls, installing trunk infrastructure, providing sufficient capacity on the road network – requires local authorities to take decisions through at least three distinct processes, each with different timeframes and implementation speeds. Decision-making processes under the LGA and LTMA are generally faster, reflecting the greater flexibility provided in the LGA and LTMA and the prescriptive nature of consultation requirements and access to merits appeals in the RMA. As a result, one process can lag behind another, and the requirements for decisions to support those taken in other processes are patchy.

The downsides are delay, the need in some cases for duplicate consultation processes, and uncertainty about the likelihood and timing of new development capacity (NZPC, 2015a). Councils have highlighted the long timeframes involved in getting plans approved and the costs and delays involved in appeals which, in their view, “[make] it harder to promote large-scale and ambitious projects, and [make] our system slow to respond to emerging trends, new evidence, unintended consequences or new opportunities” (LGNZ, 2015a, p. 27). LGNZ also notes:

LGNZ’s view is that the current planning system (comprising RMA, LGA and LTMA) is unwieldy and not well integrated. There is little alignment between strategies, funding, regulation and decision-making to integrate land use and infrastructure development, set spending priorities, and manage growth. The three planning statutes are not working together as a complete planning system, although there are some connections. (sub. 19, p. 2)

NZCID (2015a) also states:

There is a lack of common purposes and goals across the planning framework and the hierarchy between the RMA, LTMA and LGA plans is unclear... A nationally significant project may be a priority in the Auckland Spatial Plan but have no recognition under the RMA or the GPS [Government Policy Statement] on land transport. Similarly, a regionally significant project may have priority in a RLTP [Regional Land Transport Plan] but not be funded in the local councils Long Term Plan. (NZCID, 2015a, p. 34)

Despite the separate legal instruments and the complexity outlined above, some links between the individual legal frameworks do exist. The following are some examples.

- The RMA contains provisions that help to clarify the relationship between land use and infrastructure. Section 30(1)(gb) of the RMA specifically states that regional councils are responsible for “the strategic integration of infrastructure with land use through objectives, policies and methods”. This provision was introduced in 2005 as a response to a perceived lack of role clarity between regional and local councils in relation to their respective mandates (Ward et al., 2007). At the same time, amendments were made to require regional and district plans to “give effect to” RPSs (sections 67 and 75 of the RMA), placing additional responsibilities on regional councils to ensure integration between land use and infrastructure.

- The LGA sets out an investment process intended to safeguard the interests of ratepayers, and establishes a framework (through long-term plans) for local decision making related to the funding and delivering infrastructure projects. The Act provides sufficient flexibility for local government planning and prioritisation, including for integrated land use and infrastructure planning under long-term community plans. For example, section 79 (3) of the LGA contains a requirement for the process of decision making under other statutes (such as the RMA) to be consistent with any requirements of the LGA, highlighting a need for councils to coordinate and align plans under both statutes.
- The LTMA provides for the allocation of funding for transport infrastructure, which is done in line with the National Land Transport Programme. This, in turn, gives effect to the funding priorities set out by central government in the Government Policy Statement (GPS) on Land Transport. To receive transport funding allocations, regional councils prepare Regional Land Transport Plans (RLTPs), which provide strategic links between transport priorities and activities nationally, regionally and locally. In developing a three-year National Land Transport Programme, the NZTA is required to take into account any relevant national or RPSs or plans that are in force under the RMA (s19A of the LTMA).

While the legal structures appear to be flexible enough to enable integrated planning to take place, the requirement to adopt an integrated system-wide approach is not mandated. In addition, existing links tend to rely on relatively weak legal wording such as “have regard to”, “take account of” and “not be inconsistent with”. Such legal terms are generally regarded as having limited statutory force. For example, in preparing policy statements and plans under the RMA, regional and district councils are required only to “have regard to” any strategies prepared under other planning Acts (sections 61(2), 66(2) and 74(2) of the RMA). While these provisions allow councils to consider other relevant planning documents, doing so is not explicitly required.

A further problem is the different priorities across different plans mandated under the Acts. For example, the priorities under the 2015 GPS on Land Transport (a central government document) are economic growth and productivity, road safety and value-for-money investments. But these priorities for land transport development can be at odds with the priority of boosting land supply for housing in terms of:

- funding from an overall fixed land-transport budget; and
- tension between investing in access to new housing developments and other GPS priorities.

The next section and Chapter 13 examine how a future planning system could achieve better integration across its different legislative components and their separate purposes and processes – by making greater use of spatial planning. The solution is not to combine the different Acts into one omnibus piece of legislation. It is necessary to recognise that there are limits to how far common decision-making processes can be used across pieces of legislation that have different roles and purposes. As LGNZ argues, it is definitely possible to improve on current arrangements:

While there is benefit to be realised from removing unnecessary duplication between these statutory frameworks, such as through common principles, the challenge is to make them more flexibly empowering so that alignment can be better negotiated at the local or regional level. Attempting to ‘unify’ or standardise them arbitrarily may be undesirable given the spatial scales operating under the statutes can be very different. (sub. DR112 p. 4)

F10.3

Current legislative provisions do not encourage integrated land-use and infrastructure planning. Barriers include different timescales, consultation requirements and decision-making processes. While some links and common processes exist across the Resource Management Act, the Local Government Act and the Land Transport Management Act, improving on these in a future planning system is possible.

Institutional and governance arrangements for water discourage responsive supply

Institutional and governance arrangements for some types of infrastructure – especially “three waters” assets – act against responsive supply.

Water services in New Zealand are almost all provided by territorial authorities and vary widely in scale – from Watercare in Auckland (serving a population of about 1.4 million) to small authorities (serving a few thousand customers). Most authorities operate at well below the size at which international evidence indicates that scale economies become exhausted. Apart from urban exceptions such as Watercare and Wellington Water, provision is fragmented. Yet water is expensive to transport, which discourages fragmented systems from being joined up. Water New Zealand (2011) estimated that in 2011 more than 2 250 separate water supplies existed and around 350 wastewater treatment facilities. The performance of water suppliers in New Zealand is variable. Some perform very effectively, with larger suppliers featuring well in international benchmarking exercises. However, some smaller suppliers struggle to provide adequate services and meet the drinking water standards set by the Ministry of Health (see Chapter 6).

Other factors that contribute to low responsiveness include:

- susceptibility of water pricing to political interference;
- monopoly provision;
- unhelpful legislative restrictions on the use of contracting and franchising arrangements for the delivery of water services, and
- unclear statutory and legal frameworks for water supply, stormwater and wastewater (NZPC, 2015a).

F10.4

Local government political pressures, legal restrictions on supply arrangements, and fragmented and monopoly provision of “three waters” infrastructure act against responsive supply.

No formal mechanisms to resolve debates over large-scale infrastructure

No established process exists for local authorities to test and work through with central government large city-shaping projects that fall outside the scope of existing policy and funding settings (eg, NZTA funding grants) and which could have wider spillover benefits. This lack of clear process stands in contrast to other similar jurisdictions, such as Australian states. Significant infrastructure projects in Australia are agreed with state governments which then partly or fully fund them, and organise their procurement.

10.4 Fixing the problems

Other Commission recommendations will lead to improvements

A number of Commission recommendations in this and earlier inquiries will help to resolve some of the problems discussed in section 10.3.

- The “price trigger” mechanism discussed in Chapter 8, and earlier in *Using land for housing*, will encourage local authorities to respond to demand for development capacity in a timely manner. This is also the intent of the new National Policy Statement (NPS) on Urban Development Capacity (New Zealand Government, 2016).
- Clearer legislative purposes, that recognise the benefits of sufficient development capacity and mobility, will help to give greater weight to the alignment of land use regulation and infrastructure investments. They will also give local authorities a greater ability to reject private Plan changes that would insufficiently value these benefits.

- Better links and more common processes across different pieces of legislation will improve integration and efficiency (Chapter 13).
- The process for making plans using Independent Hearing Panels (Chapters 8 & 13) will provide a quality check on plans (eg, do they provide for sufficient development capacity?) and reduce some of the delays currently incurred (eg, because of merit appeals to the Environment Court).
- Funding tools (described in Chapter 11) should help to make infrastructure investment more financially viable and less risky for local authorities.
- Reforms (described in Chapter 12) will allow private developers greater ability to initiate developments beyond current urban boundaries on condition that they provide for infrastructure needs normally the responsibility of councils (eg, connections for “three waters” and transport).

However, a future planning system will need some additional features and capabilities if it is to deliver a more responsive and better-integrated infrastructure supply. Two key additions are a formal place for spatial planning, and analytical planning tools that better take into account uncertainty and retain flexibility.

Spatial planning would help to provide greater security of supply

The Commission has previously noted that creating a formal place for spatial plans in the planning hierarchy would be beneficial (NZPC, 2015a). This judgement is based on two main grounds.

First, spatial plans are an established (if only semi-formal) practice within a number of New Zealand cities, and participants have argued strongly that they create a range of benefits, including:

- better cross-regional cooperation and understanding;
- more efficient use of existing infrastructure;
- enhanced responsiveness;
- greater certainty; and
- cost savings (NZPC, 2015a).

Second, when properly designed, spatial plans can help contribute to the greater certainty of future land and infrastructure supply, and to more successful cities.

Nearly 30 submitters on the draft report for this inquiry strongly supported spatial planning and the Commission’s recommendation that it should have a formal part in the planning hierarchy. These submitters represented diverse participant types including regional and district councils, planning professionals, iwi, developers, infrastructure providers, industry groups and utility operators. Only a few submitters expressed scepticism (SOLGM, sub. DR107) or wished spatial planning to remain voluntary (LGNZ, sub. DR113; Whanganui District Council, sub. DR95).

What does the Commission mean by spatial planning?

In recommending greater use of spatial plans, it is important to clarify terminology. “Spatial planning” is defined in many different ways, with each implying different roles and scopes for plans. For example, the Royal Town Planning Institute (RTPI, 2007) defined spatial planning as “the practice of place shaping and delivery at the local and regional levels that aims to:

- Enable a vision for the future of regions and places that is based on evidence, local distinctiveness and community derived objectives.
- Translate this vision into a set of policies, priorities, programmes and land allocations together with the public sector resources to deliver them.
- Create a framework for private investment and regeneration that promotes economic, environmental and social well being for the area.

- Coordinate and deliver the public sector components of this vision with other agencies and processes.” (p. 7)

The European regional / spatial planning charter (also known as the Torremolinos Charter) states:

Regional/spatial planning gives geographical expression to the economic, social, cultural and ecological policies of society. It is at the same time a scientific discipline, an administrative technique and a policy developed as an interdisciplinary and comprehensive approach directed towards a balanced regional development and the physical organisation of space according to an overall strategy. (Council of Europe, 1983, p. 13).

In a future planning system, the Commission considers that spatial plans would have the most benefit where they:

- focus on the types and locations of the land-based public assets needed for effective urban development (eg, roads, the “three waters”, public open spaces, rail corridors, ports, airports, reserves, and conservation areas) and natural hazard management (eg, identification of “no development” or high-risk areas, and development of flood barriers);
- lay out a vision for a city’s development over time, so as to enable councils to act ahead of demand to secure essential corridors (see below);
- take into account significant spatial aspects of important social and cultural aspirations (eg provision for schools and health facilities);
- recognise and actively protect sites of significance to mana whenua;
- understand and reflect the topographical, geographic and engineering challenges, and the costs, of installing new infrastructure; and
- inform the strategies, plans and budgets of each local authority with respect to land use and infrastructure.

Because of the uncertainties in the development of cities, spatial plans should not seek to set or predict in detail where private sector activities or services would locate (eg, they should not attempt to set detailed land use rules). Rather, they should make some assumptions about likely future population and business growth, their needs for space and how this could best be met, and the sorts of infrastructure that would be needed to support households and business. In essence, spatial plans should lay out the bones of the city’s future development. The more detailed district plans, council long-term plans, together with the choices and actions of individual developers, residents and entrepreneurs would then fill out the body of the city over time.

The spatial planning process would also provide a forum for discussions with central government about the need for education and health facilities (eg, hospitals), and for possible collaboration (including joint funding) of large, city-shaping infrastructure with national benefits.

Many submitters supported this or similar conceptions of spatial planning.

There are a number of benefits in formalising spatial plans – providing direction and greater focus on key matters, reducing duplication, etc. However, perhaps the greatest benefit is to link land use development with infrastructure in one plan so that the infrastructure needed to support the land use development (and the likely timeframes in which it is required) can be identified and planned for in advance. (Water New Zealand, sub. DR67, p. 10)

The Council agrees that there are benefits to be achieved through the formalisation of structure plans in the planning system and has supported the concept of spatial planning in previous submissions. Council also recognises the need for greater collaboration between central government and local authorities to deliver a much more integrated approach and spatial plan.

Council agrees that spatial plans should be tightly defined and sees their primary purpose as outlining a high-level future urban form, key physical infrastructure and social infrastructure projects, and general development patterns that could be informed by structure plans where they are in place. (Wellington City Council, sub. DR68, p. 16)

Yet a few submitters argued for a broader conception of spatial planning more in line with that expressed in the Torremolinos Charter.

Spatial plans must include a land use and infrastructure development plan and contain a community-wide vision across economic, social, cultural and environmental wellbeing for a range of agencies to implement. (Canterbury District Health Board, sub. DR59, p. 6)

In the Commission's view, allowing spatial plans to have a very broad scope risks making them unrealistically complex and ambitious, at the expense of achieving the main benefits of coordination and direction. Yet, as mentioned, the Commission accepts that the spatial aspects of matters of high cultural or social significance (eg, burial sites, schools, hospitals) are appropriate inclusions.

Good spatial planning well in advance helps to ensure adequate supply in the future

In his book, *Planet of Cities*, Angel (2012) expands on what constitutes the "bones" of the future growth of cities and stresses the importance of governments providing them. Angel urges national and city authorities and communities to take a realistic view of the additional land that will be needed for streets, other public infrastructure networks, and public open spaces as fast-growing cities expand. It is highly desirable that this land is planned and secured well in advance of development for financial reasons alone. Once the land is in use for urban activities its value soars, placing an extreme burden on public authorities if they decide to buy it. The advance action will also reduce uncertainty and is the only realistic way to enable the infrastructure and public amenities that residents of those future urban areas will need for their quality of life.

Authorities can secure the land for future city growth by purchasing property, or more commonly by placing "designations" on land titles to secure and reserve essential infrastructure corridors. To reduce the risk that authorities do not misuse the power to designate future corridors, they should be required to offer to buy the affected land, once identified, at its market value before it was identified.

These land and infrastructure spatial plans do not specify the detail of development – but they create valuable future options for that detail. Once established and signalled, they create a platform for the private and public planning of many other components of city development – residential, community, commercial and industrial – as well as decisions on investment in specific infrastructure. Market forces and decentralised individual decisions ought to be allowed to play a large role in this "follower" land-use planning.

R10.1

Fast-growing cities should plan realistically for the large land areas required to accommodate future growth. They should decide and signal its location two to four decades in advance, and secure infrastructure corridors, public open spaces and conservation areas.

Making spatial plans a formal part of the planning hierarchy

Although a number of local authorities have already prepared spatial plans using the LGA, problems with translating decisions across the other planning statutes and processes have hampered their effectiveness. Spatial plans currently lack strong legislative backing and must be translated into regulatory plans through additional consultation requirements and processes before being implemented.

This lack of legislative weight can cause frustrating duplication. For example, a council may have consulted widely on developing a spatial plan, but then has to run a further consultation process to incorporate the substance of the spatial plan into its RMA regulatory plans. Translating spatial plans into LGA and LTMA processes can also be challenging, particularly where the operational and budget plans of local authorities are not obliged to reflect the objectives of spatial plans.

Still more challenging is translating spatial plans into the RMA regulatory plans. While spatial plans can be effective in highlighting the need for the trade-offs necessary to give effect to an overall integrated vision, the actual making of the trade-offs, which takes place at the regulatory-planning and operational-planning stages, remains difficult and controversial. In addition, because only the RMA plans involve a right of appeal against council decisions, disconnects can arise between the vision articulated in spatial plans and the compromised reality outlined in district or unitary plans under the RMA. Disconnects have been evident in

Auckland, where commitments to a denser urban form in its spatial plan (the Auckland Plan) were put at risk of not being given effect in the Auckland Unitary Plan (Box 10.3).

Box 10.3 The tensions between the vision and implementation – the Auckland experience

As part of the amalgamation of local government in Auckland in 2010, the Local Government (Auckland Council) Act 2009 required the Auckland Council to prepare a spatial plan (the Auckland Plan) that set out the high-level, long-term strategy (20–30 years) for Auckland’s growth and development. Auckland’s Unitary Plan is then the key tool for implementing the targets and objectives of the Auckland Plan.

The Auckland Plan promoted an ambitious intensification target, noting that Auckland’s population is expected to increase by one million people over the next 30 years. Some equate that to 3 or 4 people “arriving” in Auckland every hour. Under the Plan, the majority of the expected 400 000 new dwellings (about 60%–70%) were to be built within the existing urban footprint. The Plan set out a number of objectives and targets for these dwellings, such as:

- 100 000 new dwellings between 2012 and 2022; 170 000 new dwellings between 2022 and 2032; and 130 000 new dwellings between 2032 and 2042;
- deliver greenfield growth in a sequenced way over the next 30 years, with an average of 7 years unconstrained development capacity at any point in time;
- undertake development in accordance with the Urban Centres hierarchy, which classifies areas according to their existing and future role and function;
- focus growth on nine existing compact urban areas served by existing infrastructure;
- note the expected “design-led” approach to development, aimed at meeting the principles of good design (as detailed in the Auckland Design Manual);
- encourage increased density and commercial activities in and around urban centres, and limit out-of-centre retail and development; and
- encourage the supply of affordable housing as part of development proposals within urban centres.

While the Plan provided general direction as to where Auckland’s new housing might be located, it was silent on how the Auckland Council would ensure sufficient development capacity, or “ready to go” land, for housing in the locations identified. The Plan left that level of detail to the Unitary Plan – the regulatory rule book for land use.

Auckland Council developed and publicly notified its PAUP. It naturally consulted with local communities on their aspirations for their areas and their views on the intensification proposals. A number of inner-city communities (in desirable areas to live and work) expressed strong opposition to any form of intensification. This led Auckland Council to retreat from some of its proposals to up-zone parts of eastern and central Auckland suburbs (as well as parts of South Auckland) to allow the building of more, mostly two-storey, townhouses and apartments.

The Auckland IHP (Box 5.2) recommended a number of changes to the PAUP aimed at doubling the feasible enabled residential capacity to exceed 400 000 dwellings and meet demand for the next 30 years. These changes included expanding the Rural Urban Boundary, removing density controls in residential zones, reducing or removing requirements for on-site parking and deleting demolition controls on buildings constructed before 1944. Auckland Council accepted most of the IHP’s recommendations, but a number of appeals by resident groups are still in process and require resolution before the Auckland Unitary Plan comes fully into force.

Source: Auckland Council, 2012.

Many of the changes to the planning regulatory system described in Chapters 8, 9 and 13 will help to deal with the problems of translating longer-term spatial plans into land use regulations. These changes include, for example, simplifying the plan-making process by having only a single merits-assessment stage. Indeed, the Commission favours a comprehensive merits assessment of the whole suite of land-use plans in a region by an IHP. IHPs would assess the suite of district plans for consistency with the spatial plan and integration across them. Chapter 13 describes how this comprehensive plan-making process might work in practice.

Submitters pointed to other importantly desirable features of spatial plans in a future planning system.

- **Scale and level of spatial plans:** Most submitters agreed that spatial plans should be regional but with provision to incorporate cross-regional issues where appropriate. Regional Councils would be responsible for leading the development of spatial plans, but all councils in a region would “own” and sign the spatial plan. Most submitters also agreed that spatial plans should be high-level, strategic, direction-setting documents. For this reason, the Commission favours calling them *Regional Spatial Strategies*.
- **Broad participation:** All the important players should be around the spatial planning table at some point. They include all councils in the region, mana whenua, relevant central government agencies, the district health board, developers and infrastructure investors and operators.
- **Status:** Because of the strategic and vision-setting characteristics of spatial planning, most submitters favoured it coming under the LGA rather than a reformed RMA in a future planning system. The Commission is open minded on this question. Yet to remove any doubt about the status of spatial plans / strategies, they should be a formal part of the planning hierarchy and have clear and strong legislative weight in regulatory, budgeting and land transport processes.

In line with the Commission’s recommendation for clear and separate purposes for the built and natural environments, regional spatial strategies (RSSs) would focus on development of the built environment (including setting aside, for example, public open spaces and reserves). Regional policy statements for the natural environment (RPS-NEs) would focus on managing and protecting the natural environment (Chapter 9). Above both the RSS and the RPS-NE at the national level would sit a new resource management Act, as well as NPSs and National Environmental Standards. The RSS and RPS-NE in each region would be required to give effect to these (Chapter 13).

In turn, the RSS and RPS-NE would set the parameters for land use rules and infrastructure provision in the district, unitary, long-term, and land transport plans at the territorial level. This would mean that planners and infrastructure providers would be obliged to take into account the provisions of the RSS and RPS-NE when later making their specific infrastructure investment plans.

R10.2

Spatial plans or strategies should be a standard and mandatory part of the planning hierarchy in a future system. They should:

- be region-wide, led by regional councils yet owned by all councils in a region;
- be high-level and directional, yet open and flexible about the details of future development;
- focus on issues closely related to land use, in particular the corridors for water and transport infrastructure, land for community facilities (eg, schools, hospitals, recreational spaces, and conservation areas), protection of high-value ecological and cultural sites, and natural hazard management;
- enable all key stakeholders to participate and share information, including iwi, central agencies, developers and infrastructure providers and operators; and
- be the platform for a suite of plans in a region covering both land use regulation (district and unitary plans) and operational and budgeting plans (eg, council long-term, annual and infrastructure plans).

It may be thought that making spatial planning a formal and mandatory part of a future planning system risks adding to the system's overall cost and complexity. Given the focus of RSSs on high-level infrastructure and transport planning, opportunities will be available to partially or fully replace the infrastructure-strategy requirements of the LGA and the RLTP requirements of the LTMA. The new system would also see the current Regional Policy Statements (RPSs) narrow their focus to managing and protecting the natural environment (in the form of RPS-NEs). Above all, the formal status of RSSs in the planning hierarchy, and the effect of the IHP process as a quality and consistency check across a whole suite of plans in a region, has the potential to reduce duplication, enhance certainty and cut costs across many dimensions and for many players.

Analytical tools that better take into account uncertainty and retain flexibility

A key benefit of spatial planning is to provide a high-level picture of how the expanding populations of cities and towns will be accommodated. A spatial strategy provides a single "song sheet" that all interested parties – public and private – can use as a guide when they make their individual investment decisions and choices. As noted, it is vital that major infrastructure investments are planned well in advance to secure the connected land corridors essential to their network function.

Decisions about land use and infrastructure require difficult choices among alternative options. Options include:

- Should a route be an arterial road or a motorway?
- Should city water supply be taken from a river or artesian wells?
- Is extending commuter rail or improving the bus network the better public-transport option?

Using the right analytical tools to help make these decisions can yield real cost savings and other benefits.

Cost-benefit analysis

The decision tool of choice among economists and policymakers is cost–benefit analysis (CBA) because it provides a rational means of weighing up the social costs and benefits of each options in a short list of options and choosing the option that offers the highest net benefit. Every business case for a major infrastructure investment should contain a CBA. In practice, CBA is complex and requires a lot of skill to do well. Even then, it is only a guide to assist decision makers. Many handbooks exist for how to carry out CBA, such as *Treasury's Guide to Social Cost Benefit Analysis* (New Zealand Treasury, 2015b) and the more specialised New Zealand Transport Agency's *Economic Evaluation Manual* (NZTA, 2016).

The Commission strongly supports the requirement for high-quality CBA to be used to help decide on major infrastructure and land-use projects. That said, CBA has limitations.

One is the risk of a fragmented analysis, which can happen if a CBA's scope mirrors the fragmented structure of the organisations concerned. For example, if a transport agency undertakes the analysis from its perspective only, it may ignore the broader costs and benefits of the policy or project being considered. Or the transport agency may take them into account but use different assumptions for key values (such as the value of life), which can alter the ranking of different projects. The Treasury publishes standard values on its CBA website to help users of CBA avoid this problem (New Zealand Treasury 2015b, p. 48).

A more serious limitation when using CBA in urban planning is that it has difficulty accounting for cities as complex, adaptive systems in which a single change can set off various feedback loops and system-wide effects. CBAs often adopt a partial approach that does not take into account the system-wide effects of a proposal. This will not matter in the case of small projects for "follower" infrastructure. It is more of an issue for larger projects, and particularly for city-shaping infrastructure. Using a general equilibrium model can sometimes address the CBA's partial approach. That type of model considers the changes that occur throughout the economy when a project is large enough to have economy-wide impacts. Yet general equilibrium models assume a given set of economic relationships. So they may not capture the effects of city-shaping infrastructure that has the capabilities to restructure urban economies. Such capabilities include,

for example, enabling greater access by residents to existing centres, increasing the effective size of markets, and creating new opportunities for entrepreneurship and competition.

Finally, another important weakness in using CBA in urban planning is that it tends to be used deterministically. Users do not build in the flexibility to modify decisions as more information comes to hand. This happens largely because CBA is geared to taking a decision at a point in time and making the best use of information on costs and benefits available at that time. It ignores the value of options that enhance the ability to take later decisions with the benefit of information not currently available. It is also often used out of sequence, to test or justify a decision, rather than informing the development of, and decisions over, multiple options.

Real-options analysis

A complementary decision tool – *real-options analysis* – is a form of CBA suited to situations of high uncertainty, but where decision makers also have the flexibility to preserve or create options to make later decisions when better information becomes available. A current decision under this approach might be to invest in actively acquiring better information, and to delay the substantive decision until that information becomes available. The value of preserving or creating options in this way can be very high.

Real-options analysis is suited to the characteristics of growing cities (Chapters 2 and 3). As complex, adaptive systems, cities are best left to mostly evolve organically in line with individual households and businesses making and realising their own plans. Yet as noted, a need exists to make provision (decades earlier) for future infrastructure networks on which cities depend. Even so, decisions on specific layouts and assets should be delayed to retain flexibility to respond to the later information about the scale and nature of the organic growth. This is why the corridors secured well in advance of development in RSSs should be “real options” rather than particular infrastructure types.

The real-options approach, compared to deterministic versions of CBA, has the potential to redirect decision makers – from looking for answers to the wrong questions, to looking for answers to the right questions given the unavoidable uncertainty.

Box 10.4 is an example of the potential use of real-options analysis for planning urban infrastructure.

Box 10.4 Applying real options analysis in practice – the prospect of driverless vehicles

The potential for driverless vehicles to become widely used has significant implications for decisions about investing in transport infrastructure. The technology is expected to radically change the way that roads are used, and reduce some of the social costs that arise from vehicle use. For example, driverless vehicles could reduce the need for private vehicles, increase the efficiency of vehicle use, and reduce the amount of infrastructure required to meet a city’s transport needs. Many commentators speculate that driverless technology will be available within the next 10–20 years.

Yet, the timing of driverless technology and its uptake, and its impact on the need for additional transport infrastructure are uncertain. Making decisions about investing in infrastructure is therefore difficult. On one hand, a council of a growing city could commit to a large-scale investment in public transport, and later regret having a “white elephant” if driverless technology greatly increases the efficiency of vehicle use in the near future. On the other hand, deciding not to invest risks congestion reaching serious levels and reducing the city’s connectivity.

A real-options approach could help deal with this kind of uncertainty. The council could choose to impose congestion charging to encourage more efficient use of the existing transport capacity. This would delay the need to decide whether to invest in the expensive public transport system until new information is available about the uptake and impact of driverless technology. That way, the council would preserve its options to either invest in the public transport system if it turns out it is still needed, or not invest in the case that driverless technology removes the need for a traditional public transport

system. In the latter case, the council (and ratepayers and taxpayers) will have avoided the large costs of an investment that turns out not to be needed.

Source: David Campbell Workshop Notes, 2016.

F10.5

Real-options analysis is a useful tool for planners making decisions about infrastructure and land use because it builds in flexibility to cope with the uncertain evolution of urban spaces over time. It can help planners reduce the risk of worse-than-expected outcomes and take advantage of upside opportunities as they emerge.

Applying real-options analysis to spatial and other land-use planning will require local authorities to raise their capability. In Chapter 13, the Commission concludes that central government needs to take a more active and engaged role in operating the planning system in future. Such a role should include providing advice and support to councils carrying out their statutory roles. Rather than councils trying individually to build their own knowledge and capability, central government should establish a centre of excellence or resource that councils can draw on for advice and training to conduct both real-options analyses and CBA in infrastructure and land-use planning. The centre should build awareness of the value of these tools and encourage wider use.

R10.3

As part of the transition to a future planning system, central government should establish a centre of excellence or resource that councils could draw on for advice and training in using real-options analysis and CBA in infrastructure and land-use planning.

10.5 Can the institutional arrangements for water services be improved?

The problems with the institutional arrangements for water services outlined above raise whether alternative arrangements could make those services more responsive. Some stakeholders have argued that restructuring both water infrastructure and the delivery of water services is needed in a future system to improve performance (NZCID, sub. 20; Water New Zealand, 2011). It is also notable that other infrastructure services delivered through the private sector (eg, telecommunications and electricity) do not appear to suffer from the same problems of delays and inadequate provision. These private sector infrastructure services operate under a different set of institutional and governance arrangements.

Different institutional arrangements for providers of urban infrastructure

A significant proportion of infrastructure assets are owned and provided publicly because they are natural monopolies. Privately owned monopolies have well-known problems that are difficult to mitigate. Chapter 3 described the relevant considerations and concluded that the logic for public provision of some infrastructure is sound, and that providing such infrastructure constitutes one of three main rationales for urban planning.

However, some natural monopolies (electricity and telecommunications lines) are provided through commercial enterprises. The development of these enterprises is a result of a long period of economic reform, which separated the earlier council- or state-owned power and telephone departments into competitive and monopoly components. The competitive components (telecommunications service providers and electricity generators and retailers) operate in the general marketplace, and are disciplined by the ability of customers to change provider if dissatisfied.

The monopoly components (the transmission and distribution networks) are disciplined in a different manner – through regulation. The main electricity grid operator, Transpower, is a regulated State-Owned Enterprise. Local electricity distribution companies are also regulated under Part 4 of the Commerce Act 1986. In

addition, the Electricity Authority supervises the electricity market to ensure market rules are kept and that competition works. In telecommunications, the network operator Chorus is a privately owned company but regulated under the Telecommunications Act 2001.

The institutional and governance arrangements for the energy and telecommunications industries are elaborate and costly to set up and maintain. They require regulated companies to regularly collect and provide information, and government regulators to analyse that information. In 2014/15, the direct costs of overseeing regulated monopoly urban services⁸⁸ were \$14.3 million and the costs of maintaining a competitive electricity market were \$71.1 million.⁸⁹ The justification for these costs derives from the benefit to customers from having a choice of suppliers (at least for the non-network parts of the services). This choice creates competitive pressure on firms to be efficient and innovative. The benefits depend partly on the scale of the networks in these industries and the ability of providers and retailers to compete “over the top” of these network platforms.

The costs of large-scale reform for urban water are likely to be very high

In theory, it could be possible to reorganise the delivery of water services to provide greater competition and choice along the lines of energy and telecommunications. In New Zealand, the water industry body Water New Zealand has outlined a vision for water reform that would include:

- consolidating the sector into fewer providers;
- establishing an economic water regulator;
- retaining public ownership of providers, but with directors appointed on merit;
- obtaining funding directly from customers via fees for service; and
- setting network pricing to help fund deferred investment and lift service levels in smaller communities (Water New Zealand, 2011).

Other jurisdictions have arrangements for water services partly along these lines. For example, water and wastewater services in England and Wales have been fully privatised since 1989. Private operators are responsible for managing water systems, and also own the water assets. An independent regulatory agency, specific to the sector, oversees the water providers. Management of water services in France is awarded to private companies through public tenders. The subsequent contracts set out the rights and obligations of those private companies. The public sector continues to own the water assets. Most countries that follow this model have also created regulatory agencies that supervise the quality of water services and can intervene to resolve conflicts and respond to unforeseen circumstances.

The problem with moving to alternative models is the cost of changing, which can be very high. Indeed, the cost may exceed any likely long-term benefits. The Australian Productivity Commission (APC) assessed the case for moving to a competitive market in the urban water sector and recommended against it. The APC considered that water regulators should move away from price regulation towards price monitoring, and rely more on public owners, operating as active shareholders, to manage the issues associated with natural monopoly provision. The APC considered that the largest gains were likely to come initially from establishing clear objectives, improving the performance of institutions with respect to roles and responsibilities, governance, regulation, competitive procurement of supply, and pricing (APC, 2011b).

The New Zealand Productivity Commission has already considered some of the models used in other jurisdictions, and noted the conclusion of Marques (2010) that no “perfect” model exists, and that each model has virtues and some problems (NZPC, 2015a). The Commission also noted that mergers to achieve scale economies need to be carefully assessed on a case-by-case basis because mergers in other countries have not always increased performance or efficiency (NZPC, 2015a).

⁸⁸ Expenditure for electricity lines services, telecommunication and natural gas pipelines (Commerce Commission, 2015).

⁸⁹ 2014/15 total expenditure for the Electricity Authority.

In addition, the water sector has some special characteristics that heighten community sensitivity about changing institutional arrangements.

- The provision of safe drinking water and the effective disposal of wastewater have strong external benefits, for people (public health) and for the environment.
- The provision of urban water services is a “merit good” in the sense that many people consider these services should be available, irrespective of a person’s ability to pay.
- Wastewater management has some “public good” characteristics in that, once provided, many members of society benefit. At the same time, it is difficult to exclude individuals from enjoying the benefits of a cleaner, healthier environment once the decision is made to collect and treat all wastewater in a community.

Low population density in New Zealand, the high cost of transporting water, and fragmented and small-scale water networks owned by councils make a weak case for merging networks and running a competitive model of urban water supply with a network regulator. So the Commission sees no merit in proposing ambitious reform for urban water services.

F10.6

In New Zealand the case for merging networks, and running a competitive model of urban water supply with a network regulator, is weak. This is due to the fragmented and small-scale water networks, the high cost of transporting water, the uncertain net benefits of mergers, and the high costs of setting up alternative institutions.

Improvements can be gained through more modest actions

Considerable scope exists, however, for improved performance in the delivery of water services. This assessment of the Commission was supported by submissions on its draft report (NZ Institute of Surveyors, sub. DR121, p. 4; Sir Geoffrey Palmer and Roger Blakeley, sub. DR122, p. 19). The Commission continues to support modest actions to improve water governance and regulation along the lines it recommended in its *Using land for housing* report (NZPC, 2015a). These include:

- improving the clarity of the statutory and legal frameworks for water supply, wastewater and stormwater, and improving the alignment between planning objectives of councils and those of council-owned water enterprises;
- reducing the susceptibility of the provision of water services and water pricing to political interference, through developing a clear high-level purpose statement for the sector, improving the discipline and transparency around pricing and connection charges, and through better performance benchmarking and monitoring;
- investing in common national standards for quality, data collection and analysis to support transparency and benchmarking;
- acting to ensure that the council controlled organisation (CCO) model is fit for purpose, including learning and applying best practice from the State-Owned Enterprise model (such as board appointments and other aspects of governance);
- encouraging councils to collaborate through joint CCOs to achieve scale and specialist capability where doing so is cost effective; and
- permitting councils to use a broader range of franchise and public-private partnership (PPP) delivery models for water services.

R10.4

While the Commission sees little merit in a large-scale structural reform for urban water services, the Government and councils should seek improved performance in the delivery of water services. Initiatives to achieve this include:

- improving the clarity of the statutory and legal frameworks for water supply, wastewater and stormwater;
- acting to ensure that the council controlled organisation (CCO) model is fit for purpose;
- investing in common national standards for quality, data collection and analysis;
- greater transparency and benchmarking; and
- encouraging councils to collaborate through joint CCOs to achieve scale and specialist capability where doing so is cost effective.

Greater use of pricing for water services, and reduction of political interference in its use, are particularly important elements of any future planning system, especially for areas facing high rates of population growth. Increased use of pricing – both for connections to the water network and for the use of water – helps to send accurate signals about the costs of delivery. It also encourages more efficient decisions about where to develop, and discourages wasteful use of water. Issues around pricing, contracting and procurement are covered in Chapter 11, including PPPs and joint arrangements with other councils to achieve scale and efficiency.

10.6 Making provision for city-shaping projects

As discussed above, few mechanisms within the existing planning system easily identify, assess and agree on large city-shaping projects. Such projects are typically transport-related, since transport and land use are fundamentally linked. Changes in the supply of transport infrastructure may affect the level of economic activity; conversely, the level of economic activity can affect the demand for transport. This section discusses the performance of existing transport institutions, the emergence of a process for resolving large-scale transport issues in Auckland, and provisions for collaboration in a future planning system.

Existing transport institutions and governance work reasonably well

Alongside responsibility for the “three waters”, local transport is the other key responsibility of councils for network infrastructure that is critical for urban development. Central government plays a key role in funding and in planning capacities. Governance and funding arrangements for transport infrastructure work reasonably well, but scope exists to improve prioritisation and coherence for urban planning and development. As previously noted, the GPS on Land Transport sets national priorities and the NZTA works with local authorities to translate the priorities into regional and local land-transport plans and investment. Central government, drawing on the National Land Transport Fund, pays the total cost of state highways and about 53% of local transport costs.

The Commission has heard positive comments from council staff, developers, and construction firms about the quality of NZTA processes in relation to planning, funding and procurement. NZTA staff participate constructively and collaboratively in developing spatial plans, RLTPs and local plans under the RMA and LGA. Yet the processes are complex because of the multiple players and multiple plans that make coordination difficult for councils – as described in section 10.3. To illustrate this,

Table 10.1 lists the functions and responsibilities in relation to urban transport infrastructure in the Wellington region.

Many of the emerging transport planning and coordination challenges are in the upper North Island, particularly in the area referred to as the “Golden Triangle”. This area has many local authorities (unitary, regional and territorial) and a group of important and fast-growing urban centres, the three main cities being

Auckland, Hamilton and Tauranga. Each smaller city is within 200 km by road from Auckland. Freight values and volumes between the three cities are already among the highest in New Zealand. The Golden Triangle will likely be home to 45% of New Zealanders by 2043 (Chapter 5).

Governance challenges spring from the transport network crossing many different territorial and regional authorities, and the Auckland unitary authority, and serving multiple large freight users such as ports and airports. In the case of freight, another challenge exists to coordinate the investment plans of the independent (although government-owned) rail operator, KiwiRail, with those of the road authorities (NZTA and the local and regional councils).

As the Commission noted in its *International freight transport services* report, the joint planning process for this region, mostly led by the NZTA, is an example of a “facilitated discussion”. An important component relates to freight and the “Upper North Island Freight Story”. This Story is a collaboration between central and local government organisations that aims to improve the efficiency of freight transport in the region.⁹⁰ The Story’s two key elements are:

- establishing a list of issues that participants agree are critical to the efficiency of freight transport in the region; and
- establishing a shared evidence base to support future discussions and decision making (NZPC, 2012b).

F10.7

Facilitated discussions involving central government, local government and private sector organisations can be effective in developing a shared understanding of land-use demand and associated infrastructure needs, and in prompting desirable investments.

Facilitated discussions across a range of parties are just what the Commission envisages should occur in a future planning system during the process of developing RSSs. This process may be only the start of a conversation – in many cases specific infrastructure decisions will necessarily be further down the track. But it is an important start.

Table 10.1 Responsibility for land transport functions in Wellington

Function	Primary Responsibility	Comments
Strategic planning	Regional	The Regional Transport Committee prepares the RLTP. The Committee is made up of representatives from Greater Wellington Regional Council (GWRC), territorial authorities, and the NZTA.
Public transport services	Regional	GWRC plans and procures the bus, rail and ferry services. Transdev is contracted to provide rail services. Private providers are contracted to provide bus and ferry services.
Rail infrastructure	National (KiwiRail)	KiwiRail owns and maintains rail infrastructure as part of the national rail network.
Other public transport infrastructure	Regional and Territorial	GWRC owns or controls railway stations, park and rides, and major off-street interchanges. Territorial authorities are responsible for other public transport infrastructure (such as bus stops) that is located within the road reserve.

⁹⁰ Members of the collaboration are the New Zealand Transport Agency, Auckland Transport, KiwiRail, and the Upper North Island Strategic Alliance (UNISA). The seven members of that Alliance are the Northland, Waikato and Bay of Plenty Regional Councils and the Whangarei, Auckland, Hamilton and Tauranga City Councils.

Function	Primary Responsibility	Comments
State highways	National (NZTA)	The NZTA operates Wellington's motorways and state highways as part of the state highway network.
Local roads	Territorial	Territorial authorities are responsible for all roads other than state highways.
Walking and cycling	Territorial	Territorial authorities are responsible for most walking and cycling infrastructure.
Travel demand management	Regional and Territorial	GWRC plans, promotes and provides training for travel planning programmes, while territorial authorities are responsible for implementing the programmes.

Source: CityScope, 2014.

Ultimately the councils decide on the RSS, but with the benefit of the shared information and discussions with various other public and private agencies and organisations. The infrastructure providers will then be obliged to take into account the RSS when later making their specific infrastructure investment plans.

The Upper North Island Freight Story is untypical in covering the land area of three regional councils and many more territorial authorities. Yet the importance of early engagement, information sharing and discussion among the relevant parties remains the same as for a single regional council area.

The emergence of a partnership between central and local government on city-shaping projects in Auckland

Sometimes city development calls for unusually large expenditures on city-shaping infrastructure that neither the NZTA nor local councils can fund from their normal budgets. These large investments may have both national and local benefits, so a case exists for central government to contribute towards their cost. A situation along these lines has unfolded over the last decade in Auckland. With Auckland's rapid increase in population and historical under-investment in road and rail infrastructure, its transport system has steadily become inadequate and congested. Despite large investments in recent years, projections see demand continuing to increase faster than planned capacity as congestion worsens (Auckland Transport Alignment Project (ATAP), 2016a). For several years, Auckland Council and the Government disagreed over the way forward. Auckland Council pushed its preferred road and public-transport schemes and argued in public for Government funding. On its side, the Government was undertaking substantial fiscal consolidation and giving substantial funding to the Christchurch rebuild following its earthquakes. It was also not convinced that the Council schemes were the right solutions, or offered best value for money.

The Auckland Transport Alignment Project

Until 2015 no formal institutional arrangements existed to enable effective collaboration between the Government and the Council. Then in September 2015 the parties created the Auckland Transport Alignment Project (ATAP). The broad details are as follows.

- The parties recognised that planning, funding and developing Auckland's transport system is one of the biggest transport challenges for both central and local government.
- Auckland Council identified the need for additional funding from 2018 onwards to deliver its preferred future transport network. The Government recognised Auckland's need for significant investment in its transport system in the coming decades to provide for its forecast growth. Yet the Government will provide Auckland with additional funding or funding tools only if it is confident that the investment will address the region's transport challenges and provide value for money.
- The Government and Auckland Council have agreed to work together to identify an aligned strategic approach for developing Auckland's transport system that delivers the best possible outcomes for Auckland and New Zealand.

- ATAP set up a governance structure under which officials from the Ministry of Transport, Auckland Council, Auckland Transport, the NZTA, the Treasury and the State Services Commission work together to improve alignment between the parties about the way to develop Auckland's transport system.
- The ATAP parties broadly agreed to test whether better returns from transport investment were achievable in the medium- and long-term, measured against a set of objectives. These objectives were to:
 - support economic growth and increased productivity by ensuring increased access to employment and labour (relative to current levels) as Auckland's population grows;
 - reduce congestion (relative to predictions) – in particular, reducing travel time and increasing reliability in the peak period and ensuring congestion does not become widespread during working hours;
 - improve public transport's share as a mode of travel (relative to predicted results), where this will help to reduce congestion; and
 - ensure any increases in the financial costs of using the transport system deliver net benefits to users of the system (ATAP, 2015).

A priority in the early work of ATAP was to compile, research and agree on a set of data and models that could become a common basis for transport planning. ATAP released a foundation report in February 2016 (ATAP, 2016b) and an interim report in June 2016 (ATAP, 2016a). The final report, published in August 2016, recommended an aligned strategic approach, including an indicative package of transport investment for the next 30 years. Box 11.2 in Chapter 11 briefly describes aspects of the interim report, such as the use of congestion pricing.

F10.8

The Auckland Transport Alignment Project was an effective institutional innovation to enable the council of a major city and central government to work together and consider a central funding contribution for a major programme of urban infrastructure with national spillover benefits.

Provisions for collaboration in a future planning system

- ATAP was an effective institutional innovation that enabled the council of a major city and central government to work together when a major programme of urban infrastructure has national spillover benefits. Even so, the Commission sees greater merit in the relationship and discussions between the two parties beginning much earlier through the RSS process. In a future planning system, central government should sit at the regional, spatial-strategy table and participate in discussions about the design, benefits and funding of major programmes of urban infrastructure investment with wider spillover benefits. This would be the best starting point for collaborations on these projects.

R10.5

In a future planning system central governments and city councils should work together through the regional spatial-strategy process and subsequently, to assess and agree on the design, benefits and funding of major programmes of urban infrastructure investment with wider spillover benefits.

10.7 Conclusion

When cities grow and develop, a vital task that falls to local government in New Zealand is to invest in the infrastructure needed to service the land to make it fit for purpose. This task can be challenging, in particular because of the contrast between the highly unpredictable and dynamic nature of city growth and the long-lived, lumpy, highly place specific, inflexible, expensive and irreversible nature of infrastructure assets.

Urban planning systems that effectively support the growth and evolution of successful cities:

- ensure a sufficient supply of development capacity to meet demand;
- align land use rules with the supply of infrastructure (and vice versa); and
- ensure the mobility of residents and freight to and through cities (using a full suite of “city-shaping”, structural and follower infrastructure).

New Zealand’s current system has struggled with all three tasks.

Among the causes of these problems are legislative arrangements that lack clarity and do not always encourage integrated decisions, institutional and governance arrangements for water services that discourage responsiveness, and a lack of tools to resolve debates about large city-shaping projects. Proposed features of a future planning system outlined elsewhere in this report (especially changes to the regulatory system for land use noted in Chapter 8) will help to resolve some of these problems. The Commission also sees a need for additional changes to help improve planning and infrastructure provision.

The first change is to give well-conceived RSSs greater legal status in LGA and RMA plans and policies. This is because spatial planning can enable:

- a high-level overview and coordination among those responsible for supplying the various different sorts of infrastructure;
- those responsible to plan well ahead and deliver sufficient land for residential and business expansion; and
- many other public and private parties with an interest in city growth and development to make better, more timely decisions.

Spatial planning is important as a means to work through difficult trade-offs. With greater status, compromises reached will be less vulnerable than now to being unpicked at later stages. Spatial planning of future land use and infrastructure should be developed with analytical tools that take account of uncertainty and preserve flexibility, such as real-options analysis.

The current institutional and governance arrangements for water services have some weaknesses owing to natural monopoly characteristics of water and wastewater infrastructure, and to the small, fragmented nature of pipe systems. Even so, the Commission does not see merit in proposing ambitious reform for urban water services. Yet scope exists to clarify objectives, upscale, bring in a more commercial approach and improve the governance of water entities. Efficient pricing of infrastructure services can be an important driver of integration and coordination, and greater use of variable pricing in water services would help to improve performance. Pricing is considered in Chapter 11.

Fast-growing cities may sometimes need large, costly city-shaping pieces of investment that neither the NZTA nor local councils are able to fund or finance from their normal budgets. If these investments have wider benefits, as they sometimes do, then a partnership approach with central government is called for. While ATAP proved an effective model in Auckland’s recent history, a future planning system would see the parties discussing and negotiating jointly agreed approaches in the course of developing regional spatial strategies.