Potential influence of Auckland's growth on land use and resource use in the Waikato Region

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Contents

Executive Summary

Auckland and the Waikato region have a strong interdependent relationship and are connected physically, as well as socially, economically and culturally. At present, Auckland is growing and will continue to growth in the future. This report examines how the development of Auckland might affect land use and resource use in the Waikato in the short to medium term. It draws together information from academic literature, international case studies, stakeholder interviews and the Auckland Plan to identify key issues.

The discussion of rural-urban relationships is an emerging theme in academic literature. There is a general recognition that the areas are connected in physical and non-physical ways. For example, urban areas are dependent on rural areas for their natural resources, housing, and tourism, and urban areas offer specialised services, labour markets and education. The interdependent relationship is fluid and may become stronger or weaker as technology develops, the mobility of the population increases, and the political environment shifts.

The report puts forward two international case studies to demonstrate how the interdependent relationship may play out across time. The US case study found that:

- Consumer preference and global trends have a significant effect on rural-urban relationships and as these change, new types of businesses such as niche tourism may establish themselves in non-urban landscape
- Cities with high land prices can push out locally unwanted land-uses into the region, and these industries come with long-term infrastructure costs

The Dublin, Ireland case study focused primarily on housing and transportation infrastructure. It found that:

- The population of a city is mobile and may spill into the surrounding region due to various 'push' and 'pull' factors
- The population movement from cities to the wider region may change the nature of rural areas and smaller towns and increase demand for residential development, office space, and land for industries
- Regions outside a metropolitan area can become 'transportation corridors' which connect several regions. Land-use and transportation planning for these areas is thus increasingly important

The interviews with stakeholders demonstrated that there is a high level of general awareness about change in land use that might occur in the Waikato in the long term. The participants discussed current

changes, such as an increase in demand for industrial and residential land on the fringe of Auckland city, as well as a long term shift in consumer demand, which will alter land-use and resource-use in the long term. However, it was determined that these changes are hard to predict, as they are subject to economic, political and social direction.

The Auckland Plan reflected some of these discussions from the point of view of Auckland. Among other matters, the report found that the Plan focused on the interdependencies between Auckland and the Waikato, specifically in terms of water, electricity, food resources, transportation and infrastructure and tourism. It thus situated the Waikato as a key partner in shaping Auckland into the future, and enabling it to strengthen its position as an export city. Nonetheless, there exists a need for the Waikato to address cross-boundary effects from a Waikato point of view; determining how shared resources will be managed in the future.

Taking into account the literature review, the case studies, interviews and Auckland Plan review, the following themes can be identified:

- Land use in the vicinity of a metropolitan area will continue to be dynamic, and the types of changes occurring may be both visible and invisible.

- Change is likely to occur across a whole region and effects may ignore administrative boundaries, however, the majority of change is likely to be within commuter distance of the metropolitan area.

- The wider area will be affected in different ways than the rural-urban fringe, and because impacts may be indirect, they will be harder to quantify.

- Land use may change and economies may diversify and local economies may shift from purely agricultural to more service based. In the rural urban fringe, this might mean an increase in niche agricultural activities such as hobby farms and wineries.

- Demand for residential land will increase as consumer preference shifts to rural areas that offer lower housing pricing, higher amenity and perceptions of safety. This will put pressure on existing infrastructure in some cases, and stimulate interest for other activities such as offices to locate in the area.

- Traffic movement between urban and non-urban areas may thus increase, resulting in congestion in some areas.

- Metropolitan areas may increasingly rely on non-urban areas for water, food, electricity, waste management and unwanted land uses such as prisons and noxious industries.

The change that will occur in the Waikato region as a result of Auckland growth is highly dependent on the political environment, technological improvements, environmental change and social perceptions. As such, additional research needs to be undertaken to understand the dynamics of rural-urban relationships, and this relationship may need to be monetised and mapped to fully understand how regions might affect each other.

1. Introduction

The purpose of this report is to identify a range of potential impacts of Auckland's growth and development on the Waikato region over the short to medium term. This will aid the general understanding of the effects of city development on an adjacent region, and provide an information base for decision-makers from which further research can be undertaken.

Firstly, the report will undertake a literature review; concentrating on academic literature surrounding rural-urban relationships, key drivers of the relationships, and potential effects of these drivers. It will then examine two international case studies, one focusing on the land-use pressures experienced in the United States, and the second case study looking at Dublin, Ireland, and how a growing city affects the wider region. The report will then shift focus to a national context; describing the Auckland-Waikato relationship and interdependencies as it currently stands. It will situate this relationship in present day discussions by outlining key observations of the relationship raised by stakeholders during interviews. Additionally, the report will provide a brief overview of the contents of the Auckland spatial plan, and identify the main issues the Waikato region must consider.

Finally, the report will draw together the conclusions from the case studies, current relationship between Auckland and the Waikato, the matters raised by stakeholders and the issues identified in the Auckland Plan and aim to answer the initial research question. In doing so, it will identify emergent themes and potential drivers of change in the Auckland-Waikato relationship. The report will conclude with recommendations for future research.

2. Methodology

The research and discussion in this paper attempt to answer the following research question:

How might the development of Auckland affect land use and resource use in the Waikato region in the short to medium term?

The purpose of this question is to expand upon the understanding of cross-boundary land-use issues in a New Zealand context. To answer this question, this report will primarily focus on an academic discussion and interpretation of existing international research and examples. The key findings from this exercise will then be applied in the Auckland-Waikato example. The report is divided into five sections:

1. A broad overview of research in the subject area of rural-urban relationships and cross-boundary issues;
2. Two international case studies that situate the research and demonstrates rural-urban relationships may play out across time;
3. An overview of the current understanding and development of knowledge in relation to rural-urban relationships within an Auckland-Waikato context. This includes an interview section with key stakeholders in both the Auckland and Waikato regions;
4. A review of the Auckland spatial plan, which is presently the most comprehensive spatial plan in New Zealand
5. A discussion of emergent themes raised in the literature review, case studies, stakeholder discussions and the spatial plan review.

Data collection

The data obtained for this report is primarily qualitative in nature, but supported by quantitative data in certain cases. The main data sources utilised in this report are:

- Academic journal articles and books;
- Reports and studies undertaken internationally;
- Statistical data obtained from governmental agencies;
- New Zealand and international governmental policy and environmental planning documents;
- Interview transcripts from interviews with key stakeholders.

The research question was approached from several academic standpoints. As such, the literature review drew from a variety of academic disciplines, including geography, science, planning, sociology, economics and agricultural studies. The literature review helped identify international locations with similar characteristics to the Auckland and Waikato region, and from there, two case studies were selected and expanded upon.

Interviews

Fifteen Interviews were conducted with key stakeholders in the Waikato and Auckland regions between October 2013 and mid-December 2013. The stakeholders were selected from a range of professions, including environmental planners, economists and commerce managers, policy planners, transport planners and academics. Individual interviews were carried out over the telephone and group interviews were held in person. The questions posed to interviewees were semi-structured for the purpose of stimulating discussion. These questions included:

- *"In what ways do you think Auckland's growth will affect the Waikato region in the short to medium term?"*
- *"What are some of the current changes you see occurring in the Waikato region?"*

- *"Do you think this issue [Auckland effects on the Waikato] is something that is actively being considered by decision-makers?"*
- *"What are some of the key mechanisms we can use to address the identified effects?"*

Analysis

The analysis approach in the report is qualitative in nature, and focuses on drawing together academic literature, case study findings, the professional opinions of stakeholders and the spatial plan review to produce a body of knowledge. This knowledge is then analysed in an Auckland-Waikato context and some key trends are identified. Rather than predicting what *will* occur in the Waikato as a result of growth in Auckland, the report provides an idea of what *may* happen, depending on the economic, political and social environment. Given the broad subject area, the scope of the report is mainly limited to examining rural-urban relationships rather than relationships between cities. As such, the report concludes with a recommendation section which identifies key areas for future research.

3. Literature Review

The impact of cities on wider regions is an emergent topic in academic literature, and is approached from a range of disciplines including economics, agricultural studies and planning. In general, the literature review found that there is a broad recognition of the interconnections between cities and the wider area, and an understanding that change in one area will directly and indirectly influence the wider region.

From the literature studied, three key themes were identified and are discussed in this report. These themes are:

1. The definition of the terms rural, urban and regional
2. The relationship between urban and rural areas
3. Contemporary change in the rural-urban relationship

The definition of the terms rural, urban and regional

Identifying the impacts of cities on their wider regions requires an understanding of the terminology used to distinguish between the areas. The literature review found that this terminology is a heavily debated area between academics. Literature often describe cities as "urban" areas, and areas beyond cities as "rural". The definitions of these terms are of particular importance to statistics and the national census, as they have a direct impact on statistical analysis and census outcomes, and thus an indirect impact on policy decisions. Despite this, the definitions of 'urban' and 'rural' vary greatly

between countries. Typically, the definitions take into account population numbers of an area as well as population density to determine whether an area is urban or rural. For example, the US defines 'urbanised areas' as areas with at least 50,000 people, and a population density of 1,000 people per square mile, whereas 'rural areas' are areas with 2,500 inhabitants or less (Dabson, 2007). Certain countries, for example England and Wales, have several categories under which a rural area can be classified, including towns, villages, and hamlets.

The literature studied questioned the usefulness of these definitions from an academic standpoint. The main issue discussed was that defining areas as 'rural' or 'urban' implies that these areas are mutually exclusive (Dabson, 2007). In other words, these areas do not overlap and should be considered separate. As a result, the interdependent relationship between rural and urban areas is overlooked in planning and policy development.

By critiquing the use of 'urban' and 'rural', academics have aimed to take account of this interdependent relationship. As a result, there has been an increase in usage of phrases such as such as 'urban periphery', 'rural-urban fringe' and 'peri-urban area'. These phrases describe areas on the outskirts of the main city beyond the suburbs (Dabson, 2007). The rural-urban fringe may contain activities normally associated with rural areas, but still maintaining a close relationship to the urban area in terms of employment, services and infrastructure. This discourse allows rural and urban areas to be considered on a continuum rather than being thought of as mutually exclusive (Dabson, 2007).

However, it is important to understand that the interdependent relationship extends beyond the rural-urban periphery into the wider area. The term 'area' is used rather than 'region', as the term region often refers to the region as it is defined for regulatory purposes. Relationships may not confine to the regulatory boundaries of a specific area or regions. Areas can be connected through interests, biophysical properties, economic factors or proximity. Seltzer & Carbonell (2011) thus emphasise the importance of planning for these connections and relationships, rather than planning for urban areas, rural areas or regions as they are defined for statistical or regulatory purposes. Dabson (2007) supports this point, stating that there should be "more focus on **systems** and less on **sectors**" (p.6).

The aim of this report is not to re-define the terms "urban" or "rural", or critique the methods of planning for cities, rural areas and regions. Rather, it aims to examine the dynamics between cities and the areas beyond, and therefore the discourse surrounding terminology forms a critical part of the discussion. However, for the purpose of this report, the terms are used largely interchangeably.

The rural-urban relationship

The interrelationships between urban and non-urban areas are often implicit in literature rather than explicitly defined. These linkages are both physical and non-physical (Caffyn & Dahlstrom, 2005). In a physical sense, there is a flow of people and goods between urban and non-urban areas. Non-physical

links include the flow of information and culture between places (Caffyn & Dahlstrom, 2005, p. 285-286). Dabson (2007) formalises this relationship; identifying 7 linkages between urban and rural areas:

1. **Food** – Food production is a key output of rural regions. There is also an on-going interest in alternative small agricultural practices, including organic production.
2. **Energy** – Rural environments provide space for the development of both non-renewable and renewable energy sources and the outputs of these developments are primarily consumed within metropolitan regions.
3. **Workforce & office space** – Workforces are provided to urban areas through the migration of young workers to metropolitan areas. Additionally, rural land with strong transportation linkages provides space for companies to locate offices at lower cost.
4. **Stewardship** - Rural areas contain ecosystem services that affect and regulate water, air and soils.
5. **Provision of land for large scale land-uses**– Rural areas often house 'less desirable' activities such waste management, electricity generation, military training grounds and prisons that require large areas of land which cannot be provided in urban areas.
6. **Lifestyle** – People may relocate to the rural-urban fringe for a range of reasons, including amenity, social reasons, housing choice, or better value for money.
7. **Experiences** – The physical and cultural attributes of rural places often attract national and international tourists, provide space for recreational activities and settlements for second homes (p. 10-12).

It must be noted that the relationship between urban and rural areas is mutual. Dabson (2007) further outlines how rural areas depend on their urban counterparts:

1. **Markets** – Rural areas produce goods which are then marketed. Given the size of cities, city populations make up a large consumer base for both general and niche goods.
2. **Jobs** – Potential for workers to migrate to larger cities increases economic opportunity for rural areas. Additionally, urban populations are sources of labour during seasonal periods, and thus positively contribute to rural development.
3. **Specialised services** – Rural areas may not have the resources nor the population to support specialised medical, educational or financial services.

Although the interdependent relationships between urban and non-urban areas vary in scale and complexity, the abovementioned factors provide a starting point for discussion and is further explored in the case studies.

Changes in the rural-urban relationship

The interdependencies between urban and non-urban areas are influenced by economic, social, environmental and cultural factors, and may therefore change across time. Dabson (2007) stated that "over time, as connections between places and activities change, what might have begun as a closely aligned set of systems in a shared territory loses the definition and meaning associated with a single place" (p. 2). As such, connections may get stronger or weaker across time. An example of a connection getting stronger is the reliance of growing urban areas on non-urban areas in terms of resources, housing, recreation and agriculture. This relationship has deepened due to greater mobility of the population; allowing for the easy transportation of goods and services, and for city dwellers to access the wider region.

Greater mobility has also contributed to the phenomena known as counter-urbanisation. Counter-urbanisation is defined as the movement of people from an urban core to non-metropolitan areas beyond the fringes of a city, or, in other words, "suburbanisation of the countryside" (Gkartzios & Scott, 2010, p. 26). Lichter & Brown (2011) determined that counter-urbanisation is a key driver of change in rural-urban relationships. Although the effect of counter-urbanisation can be seen across a region, the effects are particularly visible in the rural-urban fringe. As city populations grow, there is increasing pressure to accommodate the population through greenfield development (Lichter & Brown, 2011). This results in the counter-urbanisation push towards the periphery; altering residential supply and demand, agricultural land-use on the fringe, and the demand for infrastructure and services. The counter-urbanisation push is intensified by recent technological improvements. Technology has enabled rural areas to form part of the global economy, improved the movement of goods to and from the city, and therefore increased the attractiveness of the hinterland for potential residents (Lichter & Brown, 2011, p. 568).

These changes have occurred slowly over time, thus making them difficult to plan for (Overbeek & Terluin, 2006). Furthermore, the effects of counter-urbanisation are viewed both in a positive and negative light, depending on the make-up of the rural community and the types of change occurring (Overbeek & Terluin, 2006, p. 22). Given this, it is argued that the spatial and non-spatial boundaries between urban and non-urban areas are continuously shifting, and therefore the rural-urban fringe should no longer be considered a "temporary zone", but rather an "identifiable territory" in its own right (European Regional Development Fund, 2012, p. 10).

4. Case Study 1: California & Colorado, United States

4.1 Introduction

The first case study focuses on the United States of America. The US shares three key characteristics with New Zealand. Firstly, the US is a primary producer and consumer of agricultural goods. Its main outputs are crops and livestock, which made up around 88% of total agricultural goods produced in the 2000 to 2009 period (Organisation for Economic Co-operation and Development, 2011, p. 14). Given its comparative advantage in agricultural goods, the US is highly reliant on export markets. This is similar to the New Zealand economy. In 2012, 70% of goods exported from New Zealand were primary products (Statistics New Zealand, 2013).

Secondly, while land-use varies considerably between states in the US, historical land-use development and trends are similar to that of New Zealand. The US has a long history in relation to urbanisation. Cullingworth & Caves (2003) contend that urbanisation in the US was driven by a "dynamism of enterprise, mobility, experimentation and exploration" (p 29). One of these ways was the outward spread of population and housing in the post-World War II period (Cullingwood & Caves, 2003). This outward push intensified as both mobility and transportation infrastructure improved across the country (Cullingworth & Caves, 2003).

Lastly, the US has cities with comparable population numbers to Auckland. These cities are found in several states, including Texas, California, Indiana, Ohio and North Carolina. Some of these states contain land-uses similar to those found in the Waikato region, with growing cities that need to be planned for. The US case study draws from a broad range of research, including economic studies, policy development and sociological research.

4.2 Literature Review

A review of US literature found that there has been some attempts at identifying the interdependencies between urban and rural areas. These studies were undertaken largely for economic and policy purposes, rather than furthering academic research on the subject matter. A key example is the study undertaken by the Minnesota Rural Partners. This study identified the ways in which urban Minnesota depends on rural Minnesota. Minnesota is a state with a population of around 5.5 million (US Census Bureau, 2014), and is largely rural in nature. The largest city, Minneapolis, contains a population of just under 400 000 (US Census Bureau, 2014).

The study aimed to answer the following questions:

- *"How can we represent rural Minnesota's contribution to the vitality of the entire state's economy?"*

- *"How can we measure the economic interdependence between rural and urban Minnesota?"* (Minnesota Rural Partners, 2011, p. 7)

This study utilised quantitative methods to identify and cluster businesses that exist in rural and urban regions. Seventeen clusters were identified in the state, including agribusiness and food processing, energy, forest and wood products and transportation and logistics. These clusters were considered goods and services that are traded between areas, as opposed to non-traded services like retail (Minnesota Rural Partners, 2011, p. 9).

The study found that that approximately 40% of employment in the cluster industries occurred in rural Minnesota in 2008. For specific clusters such as energy, agribusiness, recreation and visitor industries, rural Minnesota provided upwards of 50% of employment in 2008.

The second part of the study focused on monetizing the interdependencies through an 'input-output analysis'. The input-output analysis is a "theoretical framework for examining the ripple effects from increases or decreases in output in a particular industrial sector within a specific geographic region" (Minnesota Rural Partners, 2011, p. 12). It thus estimated the effect that a change in output in one industry has on the inputs of another industry (Minnesota Rural Partners, 2011, p. 12).

The research examined the effects of an increase or decrease in output, using the manufacturing cluster as an example. It found that if the rural manufacturing sector experienced a 6% growth in output, 16% of job increases as a result of this growth would be in urban areas, and urban areas would accumulate 38% of the "ripple effect" resulting from the increased output (Minnesota Rural Partners, 2011, p. 17). The findings in the report demonstrated a strong linkage between urban and rural economies. It notes that the research would prove to be useful for planning if it is expanded upon to include other sectors and refined to improve accuracy. Finally, it reflected the findings of the literature review in this report; stating that there are limitations associated with the definitions of rural and urban, and that defining regions in accordance with their economic functions may be more useful for planning purposes (Minnesota Rural Partners, 2011, p. 27).

The Minnesota study considered rural-urban relationships on a regional scale. On a national scale, rural-urban studies have focused primarily on the environmental influences and effects of urban areas on rural areas. An international conference in Georgia in 2005 brought together individuals from several disciplines to discuss emerging environmental issues on the rural-urban fringes of the US. The purpose of the conference was to identify the pressures and effects on the natural environment on the rural-urban fringe and bring together stakeholders from a range of disciplines to work towards addressing these effects through policy development (Laband, 2005, p. 2).

The conference covered a wide range of issues, including:

- Identification of the rural-urban interface in South Carolina through Geographic Information System processes, satellite imagery and Census data (Gering, Eddeins & Marek, 2005, p. 18)

- The fragmentation and parcelisation of forested land in Northeastern US in sensitive rural areas currently under urban expansion pressures (Tyrrell, Hall & Sampson, 2005, p. 61)

- The growing role of farms in producing food for urban areas, and whether increased productivity as a result of biotechnology applications can be sustained in the long-term (Djunaidi & Anderson, 2005, p. 370)

A second conference was held in 2007 that expanded upon these issues and identified new pressures on the rural-urban interface (Laband, 2005).

In an attempt to expand upon the rural-urban relationship knowledge base, the US case study in this report focuses on particular aspects of the rural-urban relationship as identified in the general literature review in Section 3. The first part of the case study focuses on rural tourism in Marin County and Gilroy town in California, and the second part of the case study looks at the development of locally unwanted land uses in the state of Colorado.

4.3 Tourism in California

A notable example of changing land-use and resource-use as a result of urban expansion is the rise in popularity of rural tourism. Lichter & Brown (2011) contend that the rise in rural tourism across the US forms part of changing perceptions of rural America. Rural America is now seen as a "place of consumption… where rural goods and services are directed towards and consumed disproportionately by people with strong ties to urban and big-city populations" (p. 574).

Torres & Momson (2011) examined the rise of rural tourism in their book *Tourism and Agriculture: New Geographies of Consumption, Production and Rural Restructuring*. It was noted that the increasing popularity of rural tourism has occurred in conjunction with the gradual transformation from purely agricultural economies to service-based economies (Torres & Momsen, 2011, p. 1). Torres & Momsen (2011) elaborate, stating that "although agriculture remains an important livelihood strategy for many rural people across the globe, tourism has become the world's largest and fastest growing industry" (p. 1) Over the past 10 years, rural tourism ventures have developed on the rural-urban fringes of large cities, as well along the main transportation corridors of tourism cities.

In academic literature, there is an increasing focus on particular subsets of tourism. Academics have coined terms such as "agritourism" and "brand tourism" to denote subsets of rural tourism that are of particular relevance to rural-urban relationships. Agritourism utilises productive farms and ranches for

educational, recreational or accommodation purposes. In essence, agritourism enables farmers to diversify their incomes through a secondary income generator (Rilla, 2011, p. 175). Agri-tourism is wide ranging and includes activities such as 'pick-your-own', farmers markets, vineyard experiences, nurseries and farmstays (Veeck, Che & Veeck, 2006, p. 242).

Similarly, brand tourism is a subset which uses a specific attribute of a town for the purpose of promoting a town to tourists. This may include a historical feature, cultural history or food produced in the town. Brand tourism is typically seen in smaller towns in the non-urban regional areas beyond the city (Gartner, 2004).

The state of California provides a strong example of both agritourism ventures and brand tourism. Rilla, Hardesty, Getz & George (2011) researched the nature of agritourism in the state for the University of California. In particular, the authors noted that "the pressures of urbanisation and shrinking profits have led California farmers to seek alternative approaches for maintaining profitable agricultural enterprises" (p. 57). It was found that 2.4 million visitors took part in agritourism activities in California in 2008, and it is estimated that around 88% of these visitors were normally resident in California (Rilla, et al., 2011, p. 59). These results indicate that agritourism in California is primarily driven by domestic demand, rather than international demand.

Marin County, California

Rilla (2011) studied the rise of agritourism in Marin County, California. The case study is primarily interview-based, and demonstrates the effect of nearby urban areas on the wider region from a tourism standpoint. Marin County has a population of around 250 000 people, and is located approximately 60 km from San Francisco, a city of 825 000 residents (US Census Bureau, 2014). Marin County is connected to the San Francisco area by the Golden Gate Bridge, a popular tourist attraction for the city. The county itself is largely rural in nature, and agriculture is one of its main sources of income (Rilla, 2011).

The author interviewed two agritourism businesses located in the county; one specializing in organic dairy farming, and the other with a larger operation consisting of free-range eggs, beef, weddings and a B&B. The primary motivation for moving into agritourism for both farmers was the economic instability of the agricultural market and the need to diversify income. A farmer noted that the county experiences a large visitor rate and that the farm was situated close to the motorway, and therefore strategically placed to attract visitors (Rilla, 2011). Demand for these goods and services are driven by nearby urban areas, such as San Francisco. The farmers interviewed believed that the type of visitors to tourism businesses were those looking to "get away" from urban areas for a rural experience (Rilla, 2011).

The agritourism market does, however, face challenges. Rilla (2011) determined that pressures from other land-uses such as industrial businesses were considered a challenge for agritourism looking to

establish in the rural-urban fringe. A second challenge for agritourism is related to zoning and planning regulations, and ensuring that these regulations are dynamic enough to accommodate changing demand for land. Rilla et al. (2011) stated that the county offices want to promote agritourism, but at the same time, want to ensure that the tourism venture remains secondary to an agricultural business (p. 7). Planning regulations also differ between counties, and the level of compliance required may therefore be inconsistent between rural areas.

The study concluded that "*more coordination among county departments and between counties would ease the regulatory burden on agritourism operators*" (Rilla et al., 2011, p. 65). This finding illustrates the earlier discussion in this report; that it is beneficial to identify and plan for relationships that intersect regions, rather than plan only for the regions themselves. However, to do so, there needs to be an understanding of how urban demand for goods and services influences land use in the areas beyond the city.

Gilroy, California

Growth in tourism as a result of urban demand is not limited to only rural areas. A significant section of contemporary tourism development in regions have focused on 'brand tourism'. An example of this is Gilroy, California. Gilroy is a town of 50,000 people located approximately 50 kilometres from the city of San Jose. Gilroy is known as the "garlic capital" of the world, and as such, much of its tourism land-use promotes this brand (Gartner, 2004, p. 158). The town hosts a yearly garlic festival to celebrate the brand; catering to the 'niche' market of a more populous urban area. In a book about Gilroy, Adema (2009) contends Gilroy's brand as the 'garlic capital' has now formed part of its identity. The author dubs Gilroy a 'foodscape'; a term that combines the physical and geographical use of space with the sociocultural forces that dictate how that space is used (p. 5). Foodscapes and brand tourism are common in the US near major transportation infrastructure and large urban areas. As in the case for agritourism, planners must balance the land, resource requirements, and environmental effects of brand tourism.

4.4 Rural Prisons in Colorado

In contrast to the development of rural areas and small towns as a 'playground' for city residents, Lichter & Brown (2011) studied the phenomena of the 'rural wasteland' in the US. Given the limited availability of space in urban areas, as well as changing demand from urban populations, rural areas are increasingly used to locate "prisons, slaughterhouses, feedlots, landfills, hazardous and toxic waste sites" (Lichter & Brown, 2011, p. 582). In academic literature, these activities are typically considered to be "Locally Unwanted Land-Uses" (LULUS). LULUs are infrastructures that are vital to the functioning of a city or region, but are perceived to be negative due to their potential impacts on the community or environment (Hannan & Courtright, 2011, p. 52). The type of response from residents in the area is known as a 'not in my backyard' (NIMBY) response; in other words, there is an

understanding that this infrastructure is needed, however, it 'should be located somewhere else' (Hannan & Courtright, 2011, p. 52).

The location of LULUs are widely studied in academic research, primarily from a social or economic perspective. The research focus is generally on the perception of these land-uses, the type of communities they are located in, and the economic benefits or losses as a result of their establishment. A key example of a LULU that is of particular relevance to this report is prisons, as the establishment of these can be triggered by demand in nearby urban areas.

Fremont County, Colorado

Whitfield (2008) undertook a study about the economic impacts of prisons on rural communities. As part of the study, the author did a literature review of US studies; focusing on the impact of prisons on their local community. Whitfield (2008) reviewed data from a number of states, including Colorado, Missouri, New York and Oregon.

The author noted that the tradition of building prisons in rural areas in the US was a long-standing tradition, however, the rate at which they were located in rural areas increased considerably from 1990 along with the economic growth of urban areas (Whitfield, 2008). The location of the prisons varied; some of the prisons were built on the rural-urban fringes of metropolitan areas, while others were built in more remote communities. The reasons for locating the prisons in rural areas were both political and economic (Setti, 2001). The high cost of land in urban areas, as well as the "NIMBY" mindset of urban residents created a disincentive for the placement of prisons in the city or town. At the same time, rural communities either welcomed the placement of prisons for economic reasons, or did not have the political voice to oppose the prisons (Whitfield, 2008).

The literature review examined a study of rural prisons in the state of Colorado. Denver is the largest city in Colorado with a population of just over 600 000 people. Since 1985, Colorado State has built six prisons in rural areas with a population of less than 15 000 (Whitfield, 2008). These prisons are scattered in rural areas 250 km or less from Denver. The prisons are typically located close to state highways for ease of access, and are within driving distance of smaller cities such as Colorado Springs.

The study looked at the economic benefits of prisons in rural areas in order to determine whether prisons were a viable investment for rural communities. Fremont County, south-west of Colorado Springs, campaigned to have a prison located in the county, as it was believed that it would create jobs and stimulate the local economy. While the prison did create over 1,100 jobs, it was found that 72% of staff were not normally resident in Fremont County. The author discussed several reasons why this may occur. These reasons included:

- The higher paying jobs require educated applicants that are normally recruited from urban areas. These applicants may therefore not be normally resident in the area;

- Workers tended to live closer to urban areas as their households were dependent on employment in the city or fringe
- Prison developments typically have "limited impact on developing other aspects of the regional economy" (Turner & Thayer, 2006, p. 6), as equipment, material and supplies are sourced from other areas. Prisons therefore have a "small economic multiplier" when compared to other land uses (Turner & Thayer, 2006, p. 6)
- Lower-paying prison jobs have a high turnover rate. Those employed typically save for a certain period and then leave, thus preventing long-term benefits for the rural economy (Whitfield, 2008).

As it stood, the benefits of locating a prison in a rural area in Colorado did not exceed the costs. The study concluded that "while prisons do not have a negative effect on these counties, they do not have an overwhelmingly positive effect either" (Setti, 2001, p. 3). The author situated environmental planning as a key tool in determining the benefits and costs of hosting a prison. Specifically, the following matters should be considered by the prospective host community:

- The sphere of influence of the prison, where workers are likely to live and whether additional housing must be built
- The social stigma of being a prison host community, and whether this will affect the location of other businesses or tourism ventures
- The development of social services such as courtrooms and medical services that are required to support the prison
- Infrastructural requirements and upkeep costs that will be placed on the host community as a result of the prison. This may include water, wastewater treatment and communications (Whitfield, 2008, p. 17-18).

Limon Town, Colorado

These financial impacts are demonstrated by the prison experience in Limon, a community of 1880 people approximately 140 km from Denver. Prior to winning the bid for the prison to be located in the village, more than USD 340 000 had to be spent on infrastructure development such as roads and wastewater treatment, and this infrastructure must be serviced annually by the town (Setti, 2001, p. 7). This was a substantial cost to a small town, as it had an annual budget of only USD 4 million. In order for prisons to be financially viable, host communities require a strong base population, economic activity, and the capacity to deal with a changing social, economic and political environment. It is therefore important to understand the full costs of prisons, rather than only the initial start-up cost, **before** construction occurs.

In conclusion, the two examples in the US case study illustrate that urban areas can influence rural areas in both positive and negative ways.

5. Case Study 2: Dublin, Ireland

5.1 Introduction

The second case study examines Dublin, Ireland. This area was chosen because of its similar population to the Auckland-Waikato region, as well as similar land-uses such as agriculture.

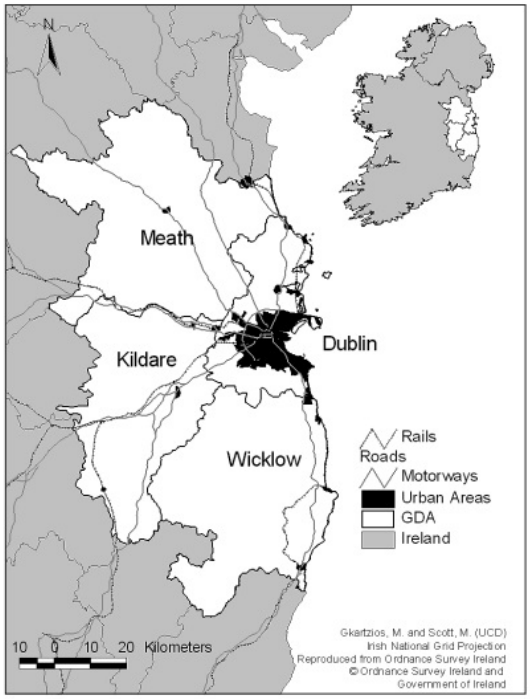


Figure 1 Greater Dublin Area (GDA)

Image 1: Greater Dublin Area. Gkartzios & Scott, 2010, p. 24. Edited by Lana Kotze, 2013).

According to the 2011 Census, the population of Dublin City is just over 500 000, while the population of the Dublin County is approximately 1.2 million. Dublin County is situated in the Greater Dublin Area; the name given to Dublin County and the surrounding counties of Meath, Kildare and Wicklow. The Greater Dublin Area is a fast growing region in the Republic of Ireland and accounts for almost 40% of the population in the country (Central Statistics Office Ireland, 2013). On an international scale, Dublin City is considered to be 'small city', however, similar to Auckland City, it is an economic driver and critical part of the national economy.

The Republic of Ireland experienced significant economic growth and population growth between the years 1990 and 2006 (McInerney & Walsh, 2009). This growth was dubbed the "Celtic Tiger" by economists. The "Celtic Tiger" period of economic growth was primarily driven by increased investment in the technological industry as a result of lowered taxes for businesses, as well as corporate agreements (Clancy, 2009, p. 5-6).

During this time, the real GDP of Ireland effectively doubled over a period of 10 years (Foley, Williams, Cudden & Shahumyan 2012, p. 25). Consequently, Ireland had the 6th highest GDP per capita in the world in 2007. The country transformed from a low-performance economy to one of the highest performance economies in the European Union (Foley et al., 2012, p. 25). At the same time, the Irish economy shifted from a protectionist to an open-market economy, and shifted its production model from agriculture to the service industry (Clancy, 2009, p. 6).

The effects of economic growth were particularly visible in Dublin City and the surrounding region. Dublin is considered a major "knowledge sector" and attracts highly skilled residents and international migrants. It is also considered to be favourably situated for communication and trade between the US, Ireland and the rest of the United Kingdom (Williams, Foley, Cudden & Shahumyan, 2012). The city was a major employer during the Celtic Tiger period; and in 2007 the unemployment rate stood at a low 4.8% for the Dublin Region (Williams, et al., 2012, p. 6).

This case study examines key spatial trends of this period, as this period illustrates how a period of economic and population growth in a city might influence land use and resource use in the wider region. A review of literature identified three key trends, namely:

1. Counter-urbanisation in the rural hinterland
2. Expansion of Dublin City's functional area
3. Investment in transportation corridors

5.2 Counter-urbanisation in the Rural Hinterland

Gkartzios & Scott identified three trends that suggested counter-urbanisation was occurring in the Greater Dublin Area. Firstly, the core area of the city was experiencing a lower population growth rate than the wider adjacent areas. Secondly, the type of development that occurred was indicative of counter-urbanisation in that the development displayed a dispersed pattern; it was occurring across the hinterland rather than one specific settlement. Finally, it was found that there was an increase in housing stock in the hinterland counties of Kildare, Meath and Wicklow. This suggested that there was increased demand for housing in areas outside the urban core, but within areas with good transportation linkages (Gkartzios & Scott, 2010, p. 26).

The counter-urbanisation trend identified by Gkartzios & Scott (2010) is supported by a study of land-use change between 1990 and 2006 for the Greater Dublin Area (McInerny & Walsh, 2009). The study analyzed land-use data from 8 Greater Dublin Area counties. It classified satellite imagery according to land-use types, specifically:

- Artificial: buildings, roads, carparks, railways and parks in the urban fabric
- Agriculture and forestry: pasture, coniferous forest and deciduous forest
- Natural spaces of a non-farming nature, such as peatlands

- Waterbodies including rivers and streams (McInerney & Walsh, 2009, p. 213).

The year 1990 was used as a base year for image classification, and the images were re-classified in 2000 and 2006 to determine change in the landscape. The report contained a number of findings that demonstrated changing land-uses. Most importantly, it found that:

- In 1990, the primary land-use was that of agricultural and forestry land
- In 1990, agriculture and forestry land represented **82.26%** of total land-use, while artificial land-uses represented **6.88%.** Natural areas made up **10.32%**, and waterbodies made up **0.54%;**
- By 2006, artificial land-use had increased to a total of **10.24%.** The increase in artificial land-use occurred in conjunction with a decrease in agricultural and forestry land use, as well as natural areas. Agricultural and forestry land-uses decreased to **79.93%** overall, and natural areas decreased to **9.28%;**
- During the 2000-2006 period, County Kildare had the largest total artificial land-use increase with an increase of **25%**

The report considered how these findings correlated with population growth. County Kildare experienced the highest percentage population growth between the years 1991 and 2002, with a total population increase of 27.2%. Between the years of 2002-2006, Fingal County had the highest percentage change of the counties, with a 22.2% increase. The changes in both land-use and population growth in the Greater Dublin Region demonstrate the rate of change that occurred as a result of economic growth. The study concludes that:

"It is evident that while a significant proportion of recent urban expansion occurred in areas adjacent to the existing 'built-up' area of Dublin city, greater than 50% of the total area converted to artificial surfaces is accounted for by relatively dispersed development within rural hinterland areas." (McInerney & Walsh, 2009, p. 220)

Gkartzios & Scott (2010) examined this process on a county level by analyzing data from a household survey distributed to residents in County Kildare. County Kildare was chosen as a case study based on its proximity to Dublin City, and the high population growth rate it experienced across the study period (Gkartzios & Scott, 2010). The total population of the County was just over 200 000 people in 2011 (Central Statistics Office 2013). The county is made up of rural settlements and smaller towns, with the largest town being Naas with a population of approximately 20 700 (Central Statistics Office 2013).

Predominant land-uses in County Kildare included agriculture, forestry and peat farming (County Kildare Leader Partnership, 2011). The majority of settlements in County Kildare are within driving distance of Dublin City and thus forms part of the 'commuter belt' for the city (Gkartzios & Scott, 2009, p. 36). Additionally, County Kildare has strong transportation linkages. Three motorways, two primary

routes and a secondary route run through County Kildare, thus establishing this county as a major 'corridor region' for the Republic of Ireland (County Kildare Leader Partnership, 2011, p. 1).

The study analyzed the survey response of 433 residences in 'high growth' areas in County Kildare; looking at the factors which influenced respondents to move to County Kildare. Potential reasons for moving included economic drivers such as lower-cost housing and the ability to buy a home, social characteristics such as the perception of a safe and high quality environment, and accessibility to work and services (Gkartzios & Scott, 2010).

From the households surveyed, the authors concluded that:

- Rural attributes such as the physical environment and perception of safety were the primary reason for relocation of the respondents, as **36.3%** of respondents chose this option
- This was followed by lower living costs and affordability of houses (**25.3%**)
- The third most important reason was the property itself, for example the size of the house or section, which was chosen by **24.7%** of households surveyed as the main reason for relocation (p. 40).

The authors noted that 57.7% of the residents surveyed moved into newly constructed residences when moving to County Kildare. At the same time, a report found that the historical undersupply of housing within Dublin City itself was partially met by housing developments on the rural-urban fringe. It stated that:

"The extent of the increase in new housing provision in these counties is illustrated by the fact that more dwellings were completed in Kildare in 2005 than were built in the three counties collectively in 1994. It is apparent, therefore, that the supply difficulties experienced in Dublin were partially met by an enhanced housing supply response in the hinterland of the city." (Williams, Hughes & Shiels, 2007, p. 18)

Situating this trend in the wider context, the County Kildare Leader Partnership (2011) reports that the number of farms in the county decreased by 11% between the years 2000 and 2008 (p. 1). While the reasons for this decrease are not identified in the report, conclusions can be drawn when considering both the demand for residential land in County Kildare, as well as the increase in housing supply (Gkartzios & Scott, 2010).

The *type* of housing that was constructed in County Kildare during this period is also of interest. In the initial growth stages, the county experienced a sharp increase in detached housing being built in rural settlements, primarily due to the lack of development controls in rural regions (Gkartzios & Scott, 2010). In 2004, housing policies were developed and implemented as a response to inflation and low housing supply in the market (Williams, Hughes & Shiels, 2007, p. 20). These policies advocated for both an increase in supply and densities. The survey by Gkartzios & Scott (2010) found that 47.2% of the 433 households surveyed lived in semi-detached housing compared to 15.3% in detached housing.

Arguably, these increasing densities across time are illustrative of the shift from 'rural communities' to 'commuter towns'.

In conclusion, Gkartzios & Scott (2010) note the importance of changing housing trends in County Kildare as illustration of counter-urbanisation, stating that "counter-urbanisation flows in this case study are also associated with housing construction and therefore with a *physical change* in the rural landscape" (p. 42). As such, the County Kildare example illustrates both the pull factors of the physical and social landscape in the hinterland, as well as the push factors of low housing supply and high cost in the capital.

5.3 Expansion of the Functional Urban Area

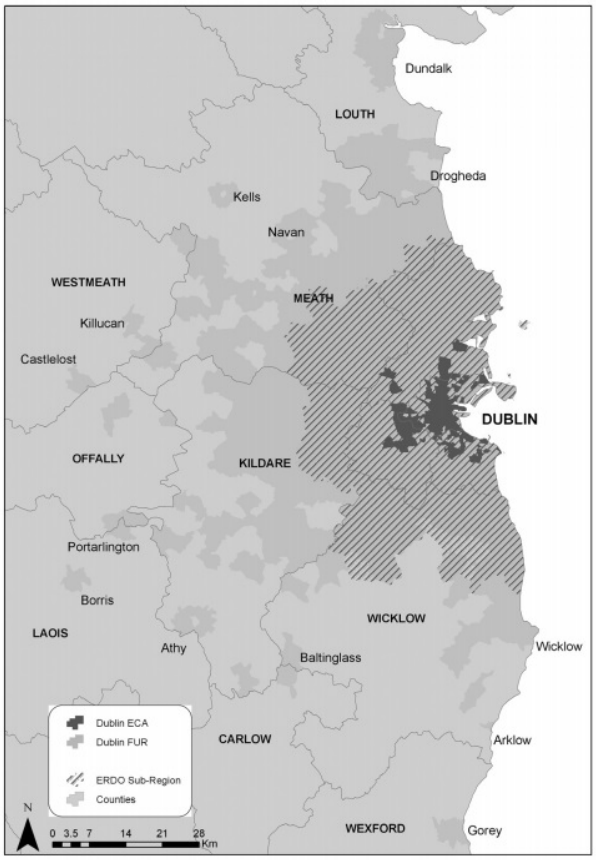
In addition to the aforementioned trends, the movement of population from the urban core to outer areas has been driven by economic forces. Williams, Walsh & Boyle (2010) studied these economic trends by looking at the expansion of the 'functional urban area' of Dublin across the study period. The functional urban area is defined as an economically active area in which "businesses enjoy access to a wide range of infrastructure and services, including telecommunications, business premises, skilled labour force and educational institutes and research centres" (Williams et al., 2010, p. 9). In other words, the functional urban area is the employment centre that attracts nearby workers (Williams et al., 2010, p 9).

The functional urban area of a city is subject to change driven by outside forces. In the case of Dublin, Williams et al. (2010) argue that change in the functional urban area is illustrative of two trends. Firstly, the clustering of businesses in large metropolitan areas to achieve economies of scale, and secondly, the on-going recognition of the importance of cities for the economy (Williams et al., 2010, p. 6).

Williams et al. (2010) attempted to define the functional urban area for Dublin to illustrate dispersal of economic activity across the region. This was done through a quantitative calculation using Census data and statistical methods of analysis. In simple terms, the calculation involved the following steps:

1. The report used the 2006 Census data to map employment density in electoral districts and assess commuting patterns by looking at departure and arrival destinations for workers
2. The economic core area was then defined as electoral districts with at least 7 jobs per 700 square kilometres in the 4 Dublin counties (Williams et al., 2010, p. 16).
3. The economic core area helps determine the Dublin functional urban region. If at least 10% of workers, or at least 50 workers, in the electoral districts are employed in the economic core area then the electoral district in question makes up part of the functional urban area.
4. The functional urban area of Dublin is the collection of all the electoral districts that meet the aforementioned criteria (Williams et al. 2010, p. 18)

The map below shows the Dublin economic core area (ECA) and also the functional urban region (FUR) as calculated by the authors of the study:



Source: ERDO (1985), Census of Population 2006, POWCAR dataset, analysis and mapping by C. Walsh. Ordnance Survey Ireland boundary datasets, Ordnance Survey Ireland Permit No. MP009006 © Government of Ireland.

Image 2: Dublin ECA and FUR. Williams, B., Walsh, C., & Boyle, I. (2010). Edited by Lana Kotze, 2013.

The maps illustrate that the functional urban region of Dublin extends beyond the city into the counties. This is described as the "discontinuous patterns of development" (Williams et al., 2010, p. 5) These patterns result in the 'edge city' (Williams et al. 2010 p. 24) phenomena in which employment opportunities are located in new development nodes on the periphery of the core city. Williams et al. (2010) contends that this pattern of development is often unsustainable in the long term, since there is a lack of integration between the economic centres and the wider area. For example, change in the functional urban area has a strong effect on the commuting patterns of settlements. As change occurs, distance to employment centres change; putting pressure on infrastructure such as roads and land provision in the short term, and affecting consumer preferences for housing in the long term (Williams et al., 2010, p. 13).

As an illustration of changing economic core areas in Dublin, MacLaran, Attuyer and Williams (2010) examined patterns of office locations in Dublin from 1960 until 2008. Demand for office locations in suburban areas saw a dramatic increase from the 1980s onwards. The trend was particularly prevalent during the 1990-1999 period, with 48% of new offices located in suburban areas in Dublin (MacLaran, et al., 2010). This suburbanisation of office space, coupled with increasing mobility of workers dramatically shifted the commuting patterns of residents and fueled the demand for housing on the periphery (MacLaran, et al., 2010, p. 53).

Changing economic areas are similarly visible in smaller towns; resulting in the phenomena known as the 'globalised village' (Van Der Bly, 2007). A low supply of commercial land in the urban centre increases incentives to locate in suburban areas, and at the same time, a low supply of land has also increased incentive to locate businesses *beyond* metropolitan limits, but within driving distance from the City. An example of this trend is the village of Leixlip in County Kildare. During the 19th and 20th century, Leixlip was a small village with only basic amenities. In the 1970s, the village underwent a period of population growth, and this growth peaked during the 1980s - 1990s. In 1989, the international company Intel made the decision to locate its factory in Leixlip, and was soon followed by Hewlett-Packard and others (Van Der Bly, 2007). The town has therefore transformed from a small village to an economic centre in itself, and attracts workers from nearby towns and villages.

The shift in demand for land from inner city to suburban areas and areas in the wider region mean that infrastructure providers have to react to a change in consumer preference. This is problematic in that "infrastructure is relatively fixed in the medium-term" (Williams et al., 2010, p. 13). As such, issues may arise with infrastructure in the interim. In the case of Dublin, this meant congestion in the region, specifically in areas of high economic activity (Department of the Environment, Heritage, and Local Government, 2002, p. 14) as well as a lack of housing to meet demand (Williams et al., 2010). The need to plan for relationships rather than administrative regions is thus evident. Williams, et al. (2010) support this finding, concluding that:

"*It is clear from the analysis of population, housing and travel-to-work trends that existing administrative boundaries in Ireland often fail to reflect the reality of contemporary housing and labour markets, which operate at a regional scale and are characterized by complex intra-regional and urban-rural relationships*" (Williams, et al., 2010, p. 10).

5.4 Transportation Corridor Development

The influence of the city on the wider region is particularly visible in transportation corridors. An example of this is the Dublin-Belfast corridor. This transportation corridor is a set of motorways that run 160km northwards from Dublin towards Belfast. The Dublin-Belfast area houses the majority of economic activity of Ireland as a whole (Williams, Foley, Shahumyan & Petrov, 2013 p. 95). Investment in developing this economic and transportation corridor commenced in the 1990s during a time of

strong economic growth for Dublin City. A number of activities are developing along the corridor, including technology services and manufacturing firms. Additionally, the corridor provides a link between three major airports in Ireland.

The strategic importance of the motorway connections are recognised in both Northern Island and the Republic of Ireland. In particular, some smaller cities along the corridor utilise these transportation connections to build cooperative relationships with each other (Williams et al., 2013). These relationships address matters relating to planning, tourism and infrastructure development; ultimately with the aim of increasing efficiency for both cities. The residents living along the transport corridor are able to derive benefits from high levels of traffic thoroughfare, connectivity and business opportunities that result from infrastructure investment and development (Williams et al., 2013, p. 99).

However, these land-use changes are not necessarily welcomed, as increased economic and housing activity increases pressure on infrastructure. These pressures are particularly prevalent near small communities and more rural settlements that have limited funding available (Williams et al., 2013, p. 99). Additionally, the spatial distribution of development is uneven along the corridor, with development primarily concentrated in the east (Department of the Environment, Heritage, and Local Government, 2002, p. 22). To address these issues, there is a need to link transport and land-use planning within regions but also across regions. This will allow regions to fully capture the costs and benefits of transportation infrastructure and address regional disparities (Williams et al., 2013).

In conclusion, the research studied showed that, overall, there is increased recognition of the effects occurring in the hinterland under the influence of Dublin City. The National Spatial Strategy (NSS) is a planning framework adopted by the Irish government for the purpose of addressing regional imbalances and dispersed population growth across a period of 20 years (DEHLG, 2002, p. 10). This spatial strategy plans for Dublin City and beyond; recognising that there is a need for long-term regional planning. This framework outlines the aforementioned issues of counter-urbanisation, expansion of the urban area, and the influence of transportation corridors. It states that:

"*There is strong evidence that Dublin is becoming a 'Dispersed City' demonstrated by the fact that the hi-tech industries located around the city's edges are drawing their workforces from places up to and beyond 80 kilometres away, but within about an hour's drive of peoples' workplaces. New hotels, major industrial parks, technology campuses, out-of-town shopping centres, suburban business and office parks, improved roads, relatively low road fuel prices, higher car ownership and availability and use of certain commuter train services have created an increasingly dispersed form of growth in the GDA and beyond*" (DEHLG, 2002, p. 22).

The Dublin case study is a strong example of land use patterns on the rural-urban fringe, and how growth and pressures from the city can change these patterns over time.

6. Case Study Discussion

The preceding case studies provide a broad overview of land use and resource use changes in the rural areas that may occur near growing cities. Based on the discussions thus far, key themes can be identified. In the US case study, it was found that:

1. **Rural change around cities can be gradual, and may change in line with consumer preferences and global trends**. The literature studied as part of this case study focused specifically on the shift of national economies from agriculture towards more service-based economies. Accordingly, consumer preference and market forces dictate the land use and resource use on the rural-urban fringe and beyond.

2. **Consumer preference can result in new types of businesses establishing themselves in a non-urban landscapes.** An example of how these preferences have manifested themselves is the establishment of 'agritourism' and 'attribute tourism' ventures in places such as Marin County and Gilroy Town, California. Consumers are increasingly searching for so-called authentic rural landscapes that offer niche products and experiences. The main point to draw from this trend is the difficulty of balancing new tourism ventures with traditional agricultural needs (Gartner, 2004, p. 153).

3. **Growing cities can continuously 'push out' LULUs towards non-urban areas due to high land prices in the city.** Locally unwanted land uses such as prisons, landfills, slaughterhouses and other 'dirty' industries may establish in rural areas due to high land values within cities, as well as the 'not in my backyard' responses from city residents. As cities grow, there is increasing pressure on the LULU industries to cater for a metropolitan population. The case study of rural prisons in Colorado demonstrates that there is a high demand for large tracks of well-connected land near the main city.

4. **The location of LULUs in rural areas are heavily influenced by underlying social, economic and political forces, and may result in long-term infrastructure costs.** In addition to the land price and NIMBY responses that contribute to the outward push of LULUs into the hinterland and beyond, economic and political forces also come into play. As in the Colorado case study, poorer communities may consider the establishment of LULUs such as prisons, hazardous waste facilities and slaughterhouses as economically beneficial to the community. Alternatively, smaller communities typically lack a political voice, and may thus not have the necessary influence to direct these land-uses away from the community. While it has been illustrated

that prisons contribute to the wellbeing of smaller communities, the benefits must be weighed up against long-term infrastructure and service costs.

The case study of Dublin, Ireland introduces the idea of counter-urbanisation on the rural-urban fringe, and how city growth impacts on its hinterland. The main findings from the case study are as follows:

1. **Population growth in a large city may spill into its surrounding region and gradually displace rural land use with that of a more urban nature.** The Dublin case study provides a strong example of counter-urbanisation and its effects on the hinterland. As the population of a city grows, various 'push' and 'pull' factors of the rural hinterland come into play. Individuals may be 'pushed' out of the city by high rents, low housing supply and high prices, while simultaneously being 'pulled' to less urban areas because of perceived quality of life, safety, and housing costs.

2. **House densities in the rural hinterland could increase over time as planning methods adjust to counter-urbanisation.** In the Dublin case, the planning regime altered to address inefficient usage of rural land by requiring higher densities. As a result, housing demand may shift from large rural 'lifestyle' properties to suburban housing across time. In areas with strong transportation linkages, this shift could have social implications in terms of perception of space; certain areas may be perceived as commuter villages or towns, rather than rural villages or towns.

3. **High land-values in the city can increase incentives for offices and industries to locate outside the city limits, sometimes within rural areas.** This trend is demonstrated by the Dublin functional urban region, as well as the Leixlip case study. The location of businesses and industry within the hinterland and beyond raises concerns in relation to the provision of adequate infrastructure such as roading. Additionally, labour and economic markets are no longer contained within the administrative boundaries of a specific city.

4. **Regions surrounding large metropolitan areas increasingly act as a 'transportation corridor' between regions in the country, and their management are thus of national and international importance.** The Dublin-Belfast corridor is an example of a transportation connection that links two major cities and provides benefits for smaller towns and communities that are situated along the motorways. However, these benefits are not necessarily spread evenly along the corridor. One of the key findings is thus the need to link transportation and land-use planning in the short and medium term to address any issues that may arise.

5. **Spatial planning initiatives can attempt to address issues of growing cities on their hinterland, but must recognise that issues are not necessarily contained within administrative boundaries.** The National Spatial Strategy focuses not only on Dublin City, but also the Greater Dublin Area, and aims to redirect growth to be spread more evenly rather than concentrated only in the metropolitan area. The long-term success of the spatial strategy depends on its recognition that housing markets, economic markets, infrastructure demand and labour are continuously shifting within and between administrative boundaries.

In conclusion, the case studies demonstrated how 'push' and 'pull' factors influence population movement, and ultimately land-uses, industries, services and housing.

7. Auckland-Waikato Relationship

Shifting from international case studies to a national perspective, the Auckland-Waikato relationship can be examined. Auckland City is the largest city in New Zealand. At present, Auckland City is undergoing a number of changes in terms of its population, housing, economy and society. As of 2013, the population of Auckland Region is 1.42 million; an 8% increase since 2006 (Statistics New Zealand, 2013). More than 50% of population growth in New Zealand from 2006-2013 occurred in the Auckland Region, and presently, around 33.4% of New Zealand residents reside in the region (Statistics New Zealand, 2013). Although the population increase in Auckland has slowed since the previous Census results in 2006, growth in the region is set to continue and must be planned for into the long-term.

In consideration of this growth, the city, district and regional councils in the Auckland Region were amalgamated in 2009 to form a unitary authority, the Auckland Council. Under the Local Government (Auckland Council) Act 2009, the city was directed to produce a spatial plan for the Auckland region. This spatial plan would set a strategic direction for Auckland growth over a 20 to 30 year period, and act as a platform for collaboration between stakeholders. The Council developed the Auckland Plan and adopted it in March 2012 (Auckland Council, 2013).

Auckland and the Waikato Region are connected physically, as well as socially and economically. Specifically, Auckland shares a district boundary with the Waikato District south of Pukekohe following the amalgamation of the Franklin District into the Waikato, Hauraki and new Auckland Districts (Auckland Council, 2013).

While the physical boundary between the regions indicate the existence of cross-boundary issues in terms of resources and land use, there is also a strong interdependent relationship between the regions economically and socially. Auckland provides the Waikato region with entertainment, specialist services, education, employment and economic spill-overs from a competitive world city. At the same

time, Auckland is dependent on the Waikato Region for its water supply, electricity, aggregates, export goods, recreational and tourism activities, and waste management. These interdependencies have manifested in physical infrastructure, including the Hampton Downs racetrack and landfill, Springhill Prison and transportation corridors between Auckland, the Waikato and the Bay of Plenty.

As identified in the literature review, the relationship between two regions is dynamic and subject to social, economic and political forces. As such, the interdependencies between the Auckland and Waikato Region may shift, connections may become stronger in some aspects, and weaker in others. New interdependencies may also be created in the long-term subject to changing physical and economic conditions. There is a strong awareness of this interdependent relationship. At present, the interdependencies between Auckland and the Waikato are managed in three key ways:

1. **The statutory submission process.** The Waikato Regional Council and the Waikato District Council have both submitted on the Draft Auckland Plan and the Unitary Plan. These submissions provide an outline of the interdependencies between the regions, and identify the aspects of the Plans that may affect the Waikato district or region.
2. **The Upper North Island Strategic Alliance (UNISA).** UNISA is an agreement between the Auckland Council, Bay of Plenty Regional Council, Northland Regional Council, Waikato Regional Council, Hamilton City Council, Tauranga City Council and Whangarei District Council for the purpose of collaboration between agencies on matters such as infrastructure, economic development, tourism, water, and international competitiveness (Waikato Regional Council 2013). In terms of the Auckland-Waikato relationship, the UNISA partnership provides a platform for discussion on cross-boundary and interregional issues and partnerships between agencies.
3. **Meetings between stakeholders.** In addition to the statutory methods of managing interregional issues, meetings and communication between stakeholders on relevant matters such as transportation modelling are a key means through which interdependencies are recognised and managed.

The continued development of communication and collaboration platforms are of critical importance to the Waikato Region. However, effective communication and collaboration are dependent on an understanding of the issues facing both the Auckland Region and the Waikato Region, and how these issues interplay.

8. Stakeholder Interviews

As part of the research undertaken for this report, interviews were conducted with stakeholders in the planning and economic development professions. These interviews were for the purpose of encouraging discussions surrounding current and future issues that may arise in the Waikato region as a result of growth in Auckland, and were structured as open ended-questions. Participants discussed a broad range of potential issues, and the feedback received can be divided into four broad categories:

1. Current trends and land-use change in the region;
2. Long-term changes in the Region;
3. The role of Hamilton City
4. The importance of communication and collaboration between stakeholders

This report provides an overview of these categories and the key points raised by stakeholders.

Current pressures

Stakeholders noted that change is already occurring in the Waikato Region, but was sometimes difficult to pinpoint. A planner who practices in the Waikato put forward the view that many of the perceived changes are "*not physical, and some of them are not that noticeable*". Most of the discussion on this point was with reference to the changes occurring in the Waikato District, specifically rural-residential development. This planner further noted that:

"Rural residential development is a really interesting one. Often the patterns of that you won't really pick up unless you are flying over it. Along that Auckland border there is a lot of rural-residential development… the same kind of densities that are happening around Hamilton itself. It doesn't become obvious until you map it."

Participants also mentioned the planned residential development at Tuakau as a change that is starting to occur. Tuakau is located in the Waikato District, south of Pukekohe. The Waikato District Council is in the process of preparing a structure plan for residential development in Tuakau that would allow for an increase of 4000-5000 people in the town. This proposal demonstrates current changes in consumer preferences and demand that will result in significant physical change in land-use in the near future.

Current changes are not limited to residential development. A planner stated that the Waikato side of the boundary had "*significant development potential*" and given this, development of resource-intensive industries such as concrete plants and quarries in rural areas are presently on the increase. These industries are joined by other 'land hungry' industries that are responding to the Auckland industrial market. A stakeholder who has on-going involvement in UNISA discussions and freight movement discussed this trend, stating that:

"Land hungry industries in South Auckland are finding that the rise in land-values are reaching tipping point, giving them an urge to find somewhere cheaper."

This stakeholder added that primary production industries, such as quarries, are also looking to locate outside of the Auckland region, due to the high cost of land in Auckland, as well as the legal costs associated with reverse sensitivity issues as Auckland continues to grow. These industries are flexible in terms of where they locate, since "*many of these have both domestic and international markets. As long as they're on the strip from Auckland to Tauranga, it doesn't really matter to them where they locate*".

A key concern of the stakeholders in relation to the pressures on land-use was the provision of infrastructure to support these changes. The Waikato Expressway is in the process of being constructed. Stakeholders talked about the importance of this Expressway in promoting the Waikato Region and ensuring efficient movement of freight. In order for this efficiency to be achieved, the larger transportation network must run smoothly. The Waikato transport planners interviewed felt that the lack of efficiency in the network in terms of freight movement is an existing issue, specifically near South Auckland. Through their conversations and research undertaken, they found that *"one of the key transportation issues… is the constraint of the Auckland southern motorway and southern railway link. The impact is not so much on journey time, but on journey time variability."*

Future pressures

There was a general understanding among participants that future change is not necessarily forecasted by the changes that are currently occurring, and that any prediction is speculative. The concepts of 'weak signals' and 'strong signals' was brought up by a professor with an academic understanding of the topic:

"*Something is there, but it's only just emerging. So weak signals might get stronger, or it could be a wildcard - something that changes again.*"

Trends, consumer demand and investment are also subject to political direction. A planner noted that land use and transportation patterns could change significantly if the political agenda shifted. Similarly, an ageing population may drastically shift consumer demand and preferences for services and residences. These pressures may occur in some areas more than others.

Despite the uncertainty of future development directions, participants identified issues and scenarios that may occur in the long-term. The main scenario raised was the imposition of the Rural-Urban Boundary by the Auckland Council and its long-term effects. The imposition of the Rural-Urban Boundary will allow for growth to occur in key nodes such as Pukekohe. The majority of planners and

professionals in the Waikato were concerned about how this growth would affect infrastructure provision and growth patterns in the Waikato District.

The concern about growth was mostly reflected in discussions with professionals in the Waikato. From an Auckland perspective, the relationship and dependencies were viewed primarily in a positive light, and stakeholders in Auckland were less focused on the resource effects of growth spreading outwards. The main concern for Auckland planners were the provision of infrastructure. An Auckland stakeholder said that:

"*Boundaries are meaningless for most people. There has been increased commuter movement between regions; people don't care whether they live in Auckland or the Waikato. However, for any growth, infrastructure needs to be in place.*"

On the other hand, Waikato professionals had a strong focus on how land is used, as well as effects on other resources. The growth in 'hobby farms' was brought up by a planner with a knowledge of the area. Additionally, it was suggested that there would continue to be growth of smaller businesses in settlements on the fringe. Stakeholders also believed that the movement of large industrial businesses to rural-urban fringe areas close to transportation linkages was set to continue, based on the interest shown by the companies in relocating in the long-term, as well as the completion of the Waikato Expressway.

In terms of the environment beyond the rural-urban boundary, stakeholders discussed issues surrounding changes in farming land-uses and how resources are to be used in the future. It was noted that farmers respond to changes in demand and consumer preferences, and thus land-use may change across time. Certain farming types and techniques will become more viable, while others will decrease in popularity. The opportunity for niche food markets, such as farmers markets and organic farming was briefly discussed by some planners, specifically those with knowledge of current land uses in the Waikato District. In general, there was a sense that there will be multiple demands for rural land in the long-term, and that the opportunity cost of each use would need to be evaluated.

A key point raised by a planning professional in relation to agricultural and farming is food security for Auckland in the long term and how this will be provided for. The planner said:

"How are Aucklanders going be fed? Where is that food going to come from? One thing we need to think about is this nexus between having a large city and the need for food production, energy and water".

Closely related to this issue is water provision and usage. Waikato planners agreed that growth in Auckland will increase demand for water in the future. There was uncertainty among participants about how water would be allocated. It was stated that "*we don't have any good economics about whether the best use of that water from a purely financial point of view and quality of life point of view, is for that water to be used by industry or people in the Waikato, or to be used by Auckland*".

There was thus the issue of balancing development between Auckland and the Waikato, and the amount of resources that should be provided for Auckland to grow.

Stakeholders were also concerned about Auckland demand for other services. An example given was that of waste management in Auckland and how this will impact the Waikato as Auckland continues to grow. This relates closely to the 'LULU' issue that was examined in the US case study. It is highly likely that there will be increased pressure for LULU-type businesses, such as waste management, to locate in the Waikato, and stakeholders were concerned about whether the benefits of these services would outweigh the cost for ratepayers, businesses and the Council.

Additionally, a planner discussed aggregate supplies and the extent to which Auckland depends on Waikato aggregate supplies. The stakeholders agreed that as demand grows, pressure on existing quarries will increase, and quarry businesses will be incentivised to locate in the Waikato.

Finally, while the long-term changes identified by stakeholders would result in pressure on land and resources, the participants from the Waikato emphasised the economic opportunities that may arise. One planner noted that the Waikato Region had "*location advantage*" and was ideally situated to "*join the regional economies*" of the North Island, and thus had significant influence.

These benefits have been experienced in the rural-urban fringe. A Waikato District planner believed that smaller settlements along the fringe are "*seats of innovation*"; attracting entrepreneurial individuals who wish to open businesses. Future growth in the Waikato District area will increase the economic viability of these ventures, and growth in other industries would provide employment for areas that would otherwise be stagnant or shrinking in terms of population.

Other planners discussed tourism in the Waikato as one area in which growth in Auckland will influence the **whole** of the Waikato region. Examples of tourism ventures was that of cultural tourism in towns such as Ngaruawahia, as well as that of 'point-location' tourism. A stakeholder suggested that "*specific location attractions like Waitomo Caves, Hobbiton, the Coromandel and Raglan… those sorts of site specific attractions will become more popular both for domestic tourists as well as international tourists, as they can more easily get there*".

The role of Hamilton city

Hamilton City was a key discussion point for participants, specifically the individuals involved in economics and business professions. When asked about the role of Hamilton City, emphasis was placed on the importance of the city as an agricultural centre, industrial hub and place to live. This role was also well understood by Auckland participants. An Auckland planner stated that:

"Obviously Auckland is the major metro area and the Waikato supports it, but there's certainly good opportunities for specialization. One key factor is industrial land. Auckland is rapidly growing but it's

hard to provide this land in the spatial boundary, and you can see the effects of this in the north of Hamilton where there has been significant development."

A Hamilton City planner noted that there are also long-term aspirations for the area south of Hamilton City, which houses the airport. In general it was felt that that Hamilton as a city has a "strong role" in the national economy, and that this role is likely to get stronger with the completion of the Waikato Expressway. A stakeholder in the commerce profession considered this from an economic standpoint, stating that:

"Hamilton will very much become the 'thinking' aspect of the agrisector due to the proximity of Hamilton to the [Auckland International] airport… It will become a 'service town' for agriculture and the agricultural sector. Furthermore, meetings are being held between commercial and agricultural thinkers, banking, and the information technology industry as well. The IT sector sees Hamilton as a safe place to store information."

These trends are already emerging in the agricultural sector, as Hamilton is being used for agri-meetings due to its "*ease of accessibility around New Zealand*". However, according to a Hamilton business manager, the use of conference facilities such as the Claudelands Events Centre aren't limited to the agricultural sector, and a substantial amount of focus is on developing Hamilton as a conference destination for a wide variety of sectors.

In terms of industrial growth, the planners interviewed believed that industrial growth in the north of Hamilton is set to continue as land scarcity increases in a growing Auckland. This will trigger other changes in the long-term. For example, a Hamilton planner stated that "*there is definitely a possibility that there will be increased industrialisation of Hamilton, and consequently an increase in [demand for] residential housing"*. However, the magnitude of demand for residential housing was difficult to determine.

Finally, stakeholders considered the challenges that may be faced by Hamilton City as Auckland grows. Participants stressed the need to achieve balanced growth in the upper North Island. A Waikato planner said that "*…some growth could be accommodated here [Hamilton City]. If all growth is accommodated in Auckland then its dominance will increase"*. Despite these growth aspirations. It was stressed that potential growth in Hamilton City required an evaluation of what type of facilities and infrastructure are needed in Hamilton in the long term.

The importance of communication

In managing these issues, the importance of communication between relevant parties were stressed by several planners. A Hamilton planner stated that "*closing the gap between Auckland and the Waikato in terms of communication is an imperative*". Several planners identified the Upper North Island Strategic Alliance (UNISA) as the main forum for discussion, given its cross-boundary strategic planning

purpose. Integrating relevant policy between Auckland and the Waikato was also seen as a critical element in addressing future issues. For this reason, stakeholders situated the Auckland Unitary Plan as an important platform for addressing cross-boundary issues, as well as the review of Future Proof.

However, the stakeholders felt that collaboration should extend beyond issue inclusions in District and Regional Plans, but that this high level of communication is in its infancy stage. A stakeholder with involvement in UNISA stated that the regions "*…must not compete, but rather work together on a wider scale, similar to that of Future Proof… at the moment, there's no actual strategy for dealing with it [the issues]. Individual decisions will be made, specifically by freight and rail*".

Past work under UNISA demonstrates that there has been some effort made between Auckland, the Waikato and the other regions to work together to achieve efficiency. However, beyond this, some stakeholders in the Waikato felt that the connections between the regions are only now starting to become evident. This was also reflected in the discussions with Auckland planners. One Auckland planner said that:

"The issues are fairly emergent at the moment, but we are starting to see the relationship. There is a long way to go in terms of communication. However, five years ago… it wasn't on the agenda."

In conclusion, all of the stakeholders interviewed considered the effect of Auckland growth on the Waikato to be an issue of growing importance. The participants realised the difficulty in identifying potential issues, given the different dynamics that exist on the boundary, in rural areas and in Hamilton City. It is therefore difficult to predict to what extent these issues will develop in the medium to long term. As such, the planners stressed the importance of utilising existing forums for communication and developing new means of communication and collaboration to integrate policy and decision-making between the regions.

Discussion

The interview process brought together several stakeholders with an interest in the relationship between Auckland and the Waikato, and how this relationship may shift across time. In analyzing the overall discussion by these stakeholders, some conclusions can be drawn, specifically:

- There is a strong awareness of the interconnections between Auckland and the Waikato from both Auckland and Waikato stakeholders;
- Changes are already occurring in the rural-urban periphery as both businesses and residents are starting to see the benefits of locating outside city limits but within commuting distance to the city;
- The concerns of stakeholders generally reflect the findings of both the literature review and the case studies in this report. There is a need to re-define how society as a whole thinks about the rural-urban fringe, and there is a need to plan for regions of interest as well as administrative regions

- There is a high level of uncertainty. Some of the trends identified by the participants are gradually emerging; allowing them to go unnoticed for a long period of time
- Change will extend beyond the rural-urban periphery into the wider Waikato region, but these changes will be indirect and hard to quantify

In conclusion, the interviews undertaken indicate that stakeholders are thinking about the issues facing the Waikato region as a result of Auckland's growth. A strong understanding of the relationship between the two regions is likely to grow in importance in the near future as districts and regions increasingly move towards strategic spatial planning.

9. The Auckland Plan

In recent years, there has been a strong focus on economic growth in Auckland. One of the key methods to manage growth in Auckland is a strategic response initiated by the Unitary Council. The Auckland Plan is a high-level spatial strategy developed by the Auckland Council for the purpose of directing Auckland growth and development over the next 30 years. Section 79 of the Local Government (Auckland Council) Act 2009 set out the requirements for the Spatial Plan. In accordance with Section 79(3), the spatial plan must:

1. Set a strategic direction for Auckland and its residents
2. Provide a high-level growth strategy to achieve the strategic direction;
3. Enable integrated and coordinated decision-making by Auckland Council and other stakeholders for infrastructure and service provision;
4. Provide a platform to integrate all Council strategies, plans and programmes

The Spatial Plan should provide an overview of Auckland's role in New Zealand and identify and visually illustrate areas where future development of infrastructure, services and residential areas should occur. The Act directs that the decisions for future development must be underpinned by a strong facts base, and should be implementable through the strategies, plans and investment directions specified in the Spatial Plan.

9.1 Overview

The Auckland Plan firstly sets out the strategic vision for Auckland to become the "world's most liveable city" by 2040 (Section B). It discusses Auckland in an international context by elaborating on the growing importance of cities in the global economy. The Plan contends that Auckland is strategically placed to grow, given its diverse economy, skilled migrants and high levels of productivity

[21, 22, 23]. Finally, it notes the dependence of Auckland on both international markets and the local economy for investment and trading goods [24].

The Plan is divided into Chapters outlining specific matters for discussion. The first Chapters focus on the following matters:

- The social wellbeing of Auckland; specifically addressing issues such as quality of life,
- Maori matters,
- Arts and culture in the City;
- The promotion of sports and recreation;
- The protection and recognition of historic heritage

The second part of the Plan discusses the economic and environmental wellbeing of Auckland. Specifically, the Chapters 7-13 focus on the following matters:

- Climate change and potential strategies to deal with climate change;
- Rural and urban Auckland and their roles and relationships;
- The provision of housing, physical and social infrastructure
- The development and improvements in transportation

Each Chapter contains a broad Strategic Direction, and quantitative and qualitative targets to achieve in order for this strategic direction to be realised. The Plan then sets out the Priorities for each section. These Priorities provide an overview of what needs to occur in order for the targets to be achieved.

The Auckland Plan provides high-level detail on how the strategic directions in each Chapter will be achieved over the long term. The "Implementation Framework" in Chapter 14 identifies key stakeholders in achieving the vision, and describes the roles of these stakeholders. The latter part of Chapter 14 outlines the tools, mechanisms and strategies to be used by stakeholders to implement the principles inherent in the Auckland Plan. Specifically, the Plan identifies the key role of the Auckland Unitary Plan in achieving targets through its rules, regulations and zoning. It also situates the Long Term Plan as a document that directs investment and stages infrastructure across time.

Chapter 15 of the Plan, 'Measuring Progress" outlines how the strategic directions will be evaluated. The Chapter identifies targets and priorities for each topic, and sets targets and key indicators to measure progress overall, and identify where actions still need to be taken. In addition to indicators, it also identifies subjects or areas where there is a lack of information or benchmarks. This chapter therefore establishes a certain level of accountability for Auckland Council and other stakeholders, and provides more information to the public on how strategic principles translate to workable objectives.

9.2 Key Issues for the Waikato Region

The Auckland Plan primarily covers issues relating to the development of Auckland and the challenges it will face until 2040. However, the Plan does identify interdependencies between Auckland and the Waikato Region, and recognises that the success of the Plan depends on the involvement of stakeholders in and beyond the Auckland Region. In analyzing the Plan, the following topics covered in the Plan are of relevance to the Waikato Region:

1. Long-term global trends and climate change
2. The role of rural land, location for future development, and the Rural Urban Boundary (RUB)
3. The location of future development areas
4. Transportation and infrastructure provision and linkages
5. The process of becoming an export-driven economy

This report will provide a broad overview of these topics and to what extent they are covered in the Plan. Finally, it will briefly comment on the vision and contents of the Plan and how it relates to the Waikato Region.

Long-term global trends and climate change

Throughout the Auckland Plan it is recognised that population growth and climate change will have long term effects on Auckland. These effects are both positive and negative; technology will improve across time and new opportunities will be created, but at the same time the world will experience difficulties, including fossil fuel scarcity, food shortages and unprecedented population growth [52]. The Plan argues that these changes will result in fundamental shifts in how cities and their regions are organized in terms of their employment, production and electricity usage and generation [46]. For example, the effects of climate change will mean that some agricultural activities will become more or less viable in the future. Transportation costs might also increase due to fossil fuel scarcity, as well as changing employment patterns.

According to the Plan, New Zealand is uniquely situated to deal with the consequences of climate change, as it is not expected that climate change will have severe effects on the country [51]. Additionally, New Zealand is able to build on its "clean green" images for economic purposes and to attract "environmental migrants". The Plan predicts that the demand for sustainably produced goods will rise, and Auckland should be at the centre of this demand as both a producer and consumer of sustainable goods.

Section B of the plan contends that policies, strategies and actions are required to address the long-term challenges for Auckland. The following actions are outlined:

- Reduce greenhouse gas emissions from residents and enable residents to be energy efficient through energy schemes and building design
- Improve the existing transportation network to provide for alternative modes of transportation
- Increase the resilience of Auckland in the face of natural disasters
- Preserve productive agricultural land located on the rural-urban fringe for the purpose of providing for future exports, as well as enabling self-reliance in times of food shortages or natural disasters [52]

There is thus a focus for Auckland on being both a producer and exporter of sustainably produced agricultural products, as well as growing food for domestic consumption to deal with potential food security challenges. At the same time, the City wishes to utilise the opportunities presented by climate change and improve its international economic standing as an exporter and migration destination.

The role of rural land and the effect of the Rural Urban Boundary (RUB)

The Auckland Plan contains specific directions in relation to rural areas around Auckland City. Chapter 9 of the Plan discusses the role of rural Auckland in the wellbeing of the Auckland economy. It is recognised that rural areas in Auckland have experienced substantial population growth in recent years. This growth has allowed for economic development on the periphery; Auckland's rural areas now service a valuable food production, recreation and manufacturing function role:

541_ Auckland's rural south produces a significant proportion of New Zealand's onions, tomatoes and potatoes. The north offers an increasing number of rural tourism attractions. It hosts vineyards and supplies niche products such as capsicums, blueberries and organics. 2% to 3% of Auckland's GDP is attributable to agriculture and agricultural services and processing from the region. This is about $1.22 billion annually.

At the same time, this development has also resulted in uncontrolled growth and land fragmentation, leading to inefficient use of productive land [530, 531]. This is of particular concern to Auckland, as it is a major consumer of the goods produced on the rural-urban fringe [539]. Given this, the strategic direction in the Rural Chapter therefore focuses on protecting land, rural character and fertile soils from inappropriate development. At the same time, it is looking to increase production, tourism and economic development on the rural periphery (Strategic Direction 9).

The Plan determines that a key way to protect rural land while increasing production is to move towards becoming a more "compact city". The benefits of a compact settlement form is discussed in the Development Strategy for Auckland:

"Encouraging growth within the existing urban footprint protects Auckland's rural hinterland and its productive potential: it enables ready access to coastal, marine and other recreation areas."

As part of moving towards a more compact form, the plan identifies growth areas where development will be concentrated in the future, as well as greenfield areas for long-term investigation. The map below displays the southern part of Auckland:

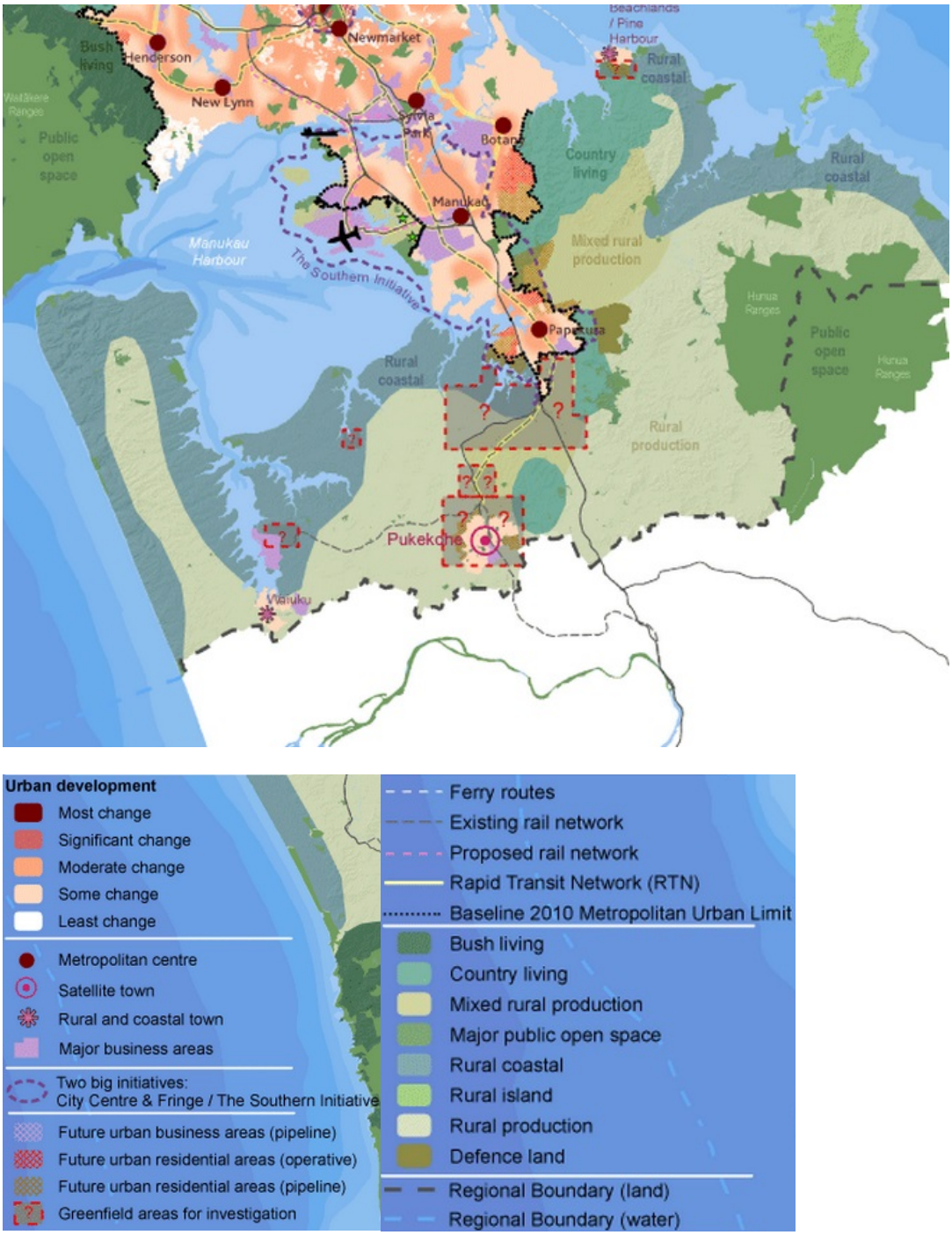


Image 4: Southern Auckland Development – Auckland Plan. Auckland Council 2013. Edited by Lana Kotze, 2014.

From this map it is possible to see that Pukekohe has been identified as a satellite town and potential future greenfield development area. Specific areas north of Pukekohe have also been identified as

areas that require further investigation. The areas surrounding Pukekohe are classified as rural production areas, with some land north of Pukekohe identified as mixed rural production areas.

The Plan identifies the establishment of a "Rural Urban Boundary" (RUB) as a key mechanism in achieving a compact form [153]. The RUB will be established as part of the Unitary Plan to include all existing small towns and settlements, including satellite towns such as Pukekohe [135]. Greenfield areas within the RUB will be released in stages, and all new development will be subject to structure planning. This will ensure that growth is concentrated within existing areas, and that growth will be accompanied by necessary infrastructure development. The process for the RUB is displayed in the images below:

Image 5: Staged release of Land – Auckland Plan. Auckland Council, 2013. Edited by Lana Kotze.

The RUB therefore aims to incorporate infrastructure staging with the planning process to ensure a more comprehensive outcome in the long term.

Resource and infrastructure requirements for Auckland growth

In order to develop as a competitive international city, Auckland must recognise and build upon its relationship with the wider New Zealand. The Auckland Plan identifies and discusses the resource and infrastructure interdependencies between Auckland and the rest of New Zealand, specifically the northern part of the North Island:

"Auckland is interdependent with the rest of New Zealand. It is the major domestic market for producers throughout New Zealand and is the distribution hub for the upper North Island cities and regions. This emerging northern North Island urban and economic system, comprising the cities and towns north of Taupo (52% of New Zealand's population), has significant business and freight connections with Auckland. With freight volumes to and from provincial centres and Auckland projected to double over the next decade, this interdependence will increase. Auckland also relies on energy and productive resources outside the region." [367]

The resource interdependencies are discussed in Chapter 7 and Chapter 12, which looks at Auckland's environment and physical and social infrastructure respectively. Chapter 7 highlights the importance of infrastructure planning, provision and maintenance in the economy of the City. The Spatial Plan identifies water, energy, waste, aggregate and transport infrastructure as critical resources for the Auckland region.

In terms of water, the role of the Waikato River and existing river infrastructure in supplying water for Auckland is highlighted [688]. It is noted that population and production growth in the Auckland region will require additional infrastructure to be implemented, such as a second pipeline from the river. While there are some actions to be taken to reduce demand and inefficiencies in the network, the Plan concludes that increased pressure on the water supply from population growth, industry and climate change are likely to occur [691].

Discussions of energy and fuel supply are similar; growth in Auckland will substantially increase demand for energy and thus put pressure on existing infrastructure. The Plan outlines four ways in which this demand can be managed, namely: the planning and implementation of shared infrastructure corridors, electricity supply diversification, increased investment in renewable energy and a more efficient consenting process [706]. While these measures are likely to reduce energy demand and result in a small increase in supply, there is a recognition of increasing dependence on the energy resources of the Waikato and Northland.

In terms of waste, it is noted that current levels of waste generated by Auckland are not sustainable in the long term. Under Strategic Direction 7, the main target in relation to waste is to "achieve zero waste to landfill by 2040". Shorter-term targets will focus on minimization of waste, specifically from industrial and commercial businesses [455]. Waste management linkages between Auckland and Waikato Region are not directly identified in the Plan, and the plan mainly focuses on actions to reduce waste.

Finally, transportation infrastructure, linkages and corridors between regions are discussed in Chapter 13 and referenced in several sections of the Plan. Strategic Direction 13 states that the main aim in relation to transport is to increase accessibility and enhance connections between Auckland and the rest of New Zealand and internationally. This will require the long-term integration of transport planning and land-use planning (Priority 2).

The Plan realises the strategic importance of the roads in the Waikato and Bay of Plenty, in particular with reference to freight movement between regions. As such, it aims to "support and advocate for effective inter-regional connections that support future growth and demand, and increased freight efficiencies" [755]. In order to manage these inter-regional connections effectively, the Auckland Plan

requires the management of local, regional and national transportation corridors as an integrated system (Directive 13.2).

Given the interdependencies of freight movement and resource use between Auckland and the regions outside Auckland, the Auckland Plan places emphasis on collaboration between stakeholders. The Upper North Island Strategic Alliance is considered key to integrating policy:

"New Zealand needs its cities and regions to work together if it is to compete internationally. Councils across the upper North Island (the area north of Taupō - including the cities of Tauranga, Hamilton and Whāngārei, with 52% of New Zealand's population), have signed an agreement to co-operate on matters of shared interest such as transport links, other forms of infrastructure, and land-use planning." [20]

There is thus an overall recognition that the success of Auckland is also dependent on areas outside the administrative boundary.

Shifting the economy to export-driven growth

In Chapter 6 Auckland's Economy, the Plan situates Auckland City as a key contributor to the economy of New Zealand both nationally and internationally. It recognises that, as a large commercial and population centre, the prosperity of Auckland is critical not only to itself but to the rest of the country [368]. In order to achieve this prosperity, the Plan directs that an educated and productive workforce be developed (Priority 4). This workforce will fuel an 'innovation hub' that will ultimately increase GDP, productivity and create wealth in the Region (**Strategic Direction 6**).

Auckland's economic interdependence with other regions is also noted in this Chapter, specifically in terms of freight movement and its role as a distributor of goods in the North Island [367]. Additionally, the Plan proposes a large-scale "structural change" for the Auckland economy, stating that the city is still "inwardly-focused, with an economy driven by consumption, real estate, and domestically-focused services" [373]. It proposes that the economy must undergo a change from import-led growth to export-led growth, and this will require the growth of other sectors in addition to its current sectors focused on tourism, marine, and tertiary education, among others [374].

The importance of growing the export-led economy is highlighted in Priority 3, which states that Auckland must "become internationally competitive and export driven". The discussion for Priority 3 states that the focus should be on building "collaborative networks" with stakeholders to improve exports in competitive industries (Directive 6.9). Improving the export-capacity of Auckland also requires investment in the infrastructure such as roads and ports, which will require collaboration between Auckland and other stakeholders.

9.3 Discussion

The Auckland Plan is a high-level development strategy that aims to provide an overview of the issues and opportunities facing the Auckland Region. Relating the Plan back to the Auckland-Waikato relationship, this report draws the following conclusions:

- The Auckland Plan provides a comprehensive overview of the land-uses and effects of increased development on rural land in the Auckland region. There is a need for the Waikato region to consider cross-boundary or spillover effects onto the Waikato District in particular. The land south of the proposed Rural-Urban Boundary contains similar land-uses and functions which may be affected by the imposition of a Rural Urban Boundary, for example:
    a. Infrastructure such as road infrastructure services both areas in some cases, and as such, any development close to the border will affect Waikato District settlements, farms and future development potential
    b. If a key aim is to protect the rural hinterland from inappropriate development and the land-use rules in the Waikato are not similarly restrictive, there may be increased incentive to develop Waikato rural land

- In terms of resource and land-use relationships, the Auckland Plan recognises that there is a growing interdependency between the regions in terms of water, energy, waste and infrastructure. However, the main directions and targets in the plan focus on the *demand* side of these dependencies, for example lowering water consumption or reducing waste. The Waikato Region would benefit from focusing on the supply side of the dependencies if demand fails to be lowered to desired targets. In other words, the Waikato region should consider how limited resources, such as water and land, will be allocated to provide for a growing Auckland population as well as a growing Waikato population. These interdependencies are likely to intensify in the long-term as Waikato becomes established as a transportation corridor.

- The Auckland Plan discusses the importance of rural land in ensuring adequate supplies of food to Auckland in the long-term, but also situates rural areas as key contributors to Auckland's transformation to an export-led economy. There is an inherent tension between these two objectives, as both represent an opportunity cost. The Waikato Region has the capacity to support Auckland's long-term aim for sustainably produced goods, but has to recognise its role as a consumer of goods at the same time.

Overall, the Auckland Plan provides a strong framework for on-going discussion and strategic action by decision-makers.

10. Emergent Themes

This report can now return to the research question and attempt to answer it. The question set out in the methodology section is as follows:

How might the development of Auckland affect land use and resource use in the Waikato region in the short to medium term?

This research report has identified a strong interdependent relationship between Auckland and the Waikato region. Auckland is dependent on the Waikato for its water supply, electricity, aggregates, export goods, recreational activities and waste management. The Waikato region is dependent on Auckland for its specialist services, education, entertainment and employment. While some of these connections have become evident through the development of shared infrastructure, many of these connections are less visible and difficult to define.

Based on the case studies, interviews and spatial plan review, it is possible to speculate about how growth in Auckland impacts the Waikato. It is likely that Auckland has a range of impacts on the Waikato region and that the type of impact will depend on factors such as proximity to Auckland, and the social and environmental characteristics of the area in question. Auckland is likely to influence parts of the Waikato more intensely where they are closer to Auckland, specifically on terms of resource use, land use and the provision of infrastructure in the Waikato. However, Auckland can still have quite an impact on more distant areas, such as tourism and holiday home developments in the Coromandel and Taupo.

With this in mind, the following conclusions can be drawn:

1. Land use in the vicinity of the metropolitan area will continue to be dynamic, with a range of changes as a result of the metropolitan influence;

2. Often cumulative impacts will not be noticeable until after the fact;

3. Changes may generally be more rapid and intense closer to the metropolitan area, and particularly around key transport corridors and existing towns;

4. The majority of change will likely be within the commuter distance of the metropolitan area on the rural-urban fringe;

5. As Auckland continues to grow, there is potential for greater influence throughout the Waikato Region, such as holiday developments in the Coromandel and Taupo, tourism throughout the region and flow-on land uses changes such as market gardening moving from South Auckland to parts of the Waikato.

6. Overall, there will be continuing pressure for fragmentation of land in the vicinity of Auckland as demand for goods and services change, and the economy of the rural area may continue to diversify as new land uses move in, gradually transforming from purely agricultural economies to service-based economies;

7. The population of the rural area will continue to grow in response to Auckland's growth, with people wanting to live outside the metropolitan area for reasons such as improved amenity, cheaper land, and perceptions of safety;

8. As a result of increasing population in the rural area, the rural area may increasingly demand local services such as shops, schools and public transport, and may increasingly become a place of consumption, and decreasingly a place of production;

9. Land use in the rural area may increasingly service the metropolitan area, such as in terms of food supply, water supply, tourism and minerals;

10. There may be continued pressure for location of Locally Unwanted Land Uses (LULUs) in the rural area, such as quarries, landfills, prisons, noxious industries and energy development;

11. There may be increasing demand by land hungry businesses wanting to locate outside of the metropolitan area, including timber yards, sports facilities and industrial parks;

12. There may be greater interest in locating offices in rural areas, particularly as the rural population grows;

13. The rural area may become more important as Auckland's food basket but also to provide agricultural product to be processed in Auckland, then exported;

14. Diversified and niche agricultural activities may increase in the rural area, such as hobby farms, organic farms, wineries, pick-your-own gardens, nurseries and farmstays;

15. Towns in the area of metropolitan influence may benefit from brand tourism, based on emphasising and developing a particular aspect of the town;

16. Commuting from the rural hinterland to Auckland is likely to increase, potentially changing the nature of towns from rural communities to commuter towns, and may cause increased road congestion in some areas;

17. In general, there will be increasing potential for conflict between land uses in the rural area;

18. The ecosystem services in rural areas may become more highly valued as population grows in the Metropolitan area and the rural hinterland;

19. Changes in the rural area will be physical, but also social and cultural as a greater number of people with diversified backgrounds, interests, skills and jobs move to the area;

20. The influence of Auckland will continue to strongly support economic and population growth in Hamilton;

21. Hamilton may become more specialised in specific goods and services as it continues to grow as a regional hub with strong transport connections.

11. Conclusion

In conclusion, this report has aimed to answer the initial research question by examining international case studies, talking to stakeholders and individuals with knowledge of the area, and considering how Auckland is planning for change in its own region. A range of impacts on the Waikato Region are likely as a result of the proximity to Auckland, and some potential changes are identified in the report. Actual changes will depend on many factors, such as the political decisions, economic forces, and demographic, environmental and technological change. It will be important to continue to develop an understanding of the changes, and for the Waikato and Auckland councils to work together to manage them.

12. Recommendations

In terms of future research, it is recommended that the following matters be further considered:

- **Additional research on rural-urban relationships**. It is recommended that more in-depth academic research is undertaken. This report provides an introduction to common themes, and there is scope for research to focus on a specific theme. This might include a broader literature review, additional interviews, and discussion and collaboration with international subject experts.

- **Land-use mapping, specifically on the rural-urban fringe**. Geographic Information System (GIS) tools can be used to map land-use change, similar to the mapping undertaken in the Irish case study. Maps are particularly useful as they provide a visual record of change, and are able to illustrate this change across time.

- **Monetisation of the interdependencies between Auckland and the Waikato Region**. This may help predict the effects of change in both regions, and enable collaboration between the regions. The process could be similar to the exercise undertaken by the Minnesota Rural Partners, which utilised software to demonstrate how input and output changes in either area affected the other. At the same time, the monetisation exercise should recognise the limitation of monetisation for certain social and cultural aspects of change, and identify means to address these limitations.

- **Implications for future land use and resource use planning**. Research may be extended by identifying matters that may require some further planning response. For example, Auckland's move south, and its continuing growth will increase demand for Waikato water and other resources. Additionally, there could be greater potential for amenity affects or reverse sensitivity effects from establishment of LULUs. Identification of such issues and potential planning responses would be useful for local authorities.

- **The benefits and costs of cross-boundary planning tools.** It would be beneficial to examine the successes and failures of international examples in dealing with cross-boundary issues on the rural-urban fringe. This might include an analysis of the collaboration between agencies, as well as the extent to which planning tools such as spatial plans have been able to capture cross-boundary issues.

While this report has provided a broad overview of literature and discussion surrounding the impacts of cities on their hinterland, additional research will provide decision-makers with a strong foundational knowledge and evidence base to inform decision-making.

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