Principles of Housing which Achieve Social Interaction and Community Integration

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Abstract

Courtyard housing in other cultures, such as China and Europe, has been proven to be capable of providing densities similar to those proposed in intensified development for Auckland. Many existing models have also proven that courtyard housing can be a sustainable housing solution relevant for the environment. However, the application of courtyard housing with higher density development has not been explored before in the New Zealand context.

Present housing patterns in Auckland tend to keep different types of households segregated from one other. There are areas of two-bedroom houses, other areas of studio and one-bedroom apartments, other areas of three- and four-bedroom houses. This means we have, correspondingly single people, couples and small families with children, segregated by type. However, the idea of sustainable growth is to promote the increase in density, mix of functionality and communities, and create neighbourhoods with individuality and identity. Increase in density is vital, otherwise suburbs will endlessly take over agricultural land and even the countryside, resulting in urban sprawl and an ecological imbalance. A mix of function helps to compensate for social problems and the mix of type and age of people strengthens the community as a whole.

This research design project challenges the current status quo in regards to the Auckland planning regime, as well as housing designs, and aiming at achieving social interaction and community integration to fulfil the human desire for a sense of belonging, through quality urban solutions and architectural designs.

Through research it becomes apparent that housing is more than just architecture; it needs to engage with both the urban issues and the community in order to develop neighbourliness. The possibilities for the courtyard housing typology in the Auckland urban context have been tested through the processes of ‘research for design’ and ‘research by design’. This research showed that the typology has the potential to increase urban density and to provide for security and privacy.
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Definitions

**Neighbourliness**: like, characteristic of, or appropriate to neighbours; kind, friendly, sociable, etc.

**Spielstraße**: German for “Play Street”, it is traffic calming measure. Part of the instructions for a Spielstraße from the Straßenverkehrsbehörde München Verkehrssicherheit (*Road Traffic Safety Authority Munich*):

1. Pedestrians may use the road in its entire width, children games are allowed everywhere. It must, however, to be really for children (under 14) and real children’s games ….

2. The vehicle traffic, including bicycle traffic must step speed (that is, about 5 km/h) comply.

3. The driver must not endanger pedestrians or impede, if necessary, they must wait.

**Woonerf**: Dutch (Plural, *woonerven*) for “Street for Living”, an urban street stripped of lane markings, curbs, footpaths, pedestrian crossings and obvious boundaries denoting spaces meant for single forms of transportation, e.g. footpath equals pedestrian here, and the car is secondary to the needs other the other uses of the street.
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I. Introduction

1.1 Research Question

How can community integration and social interaction in medium-density developments in Auckland be enhanced?

Can the architecture of the courtyard house play a role in this?

1.2 Research Objectives

Housing is more an urban issue, rather than just an architectural one. Together, urban design and housing form a large part of our urban environment. Housing should be addressed at every level of detail and every scale in relation to its urban context and the community.

The intended outcome of this research design project is not only to resolve the architectural issues, but also to respond to the deeper human desire to belong to a community.

With this objective, this study proposes to:

1. Conduct a series of studies of traditional and contemporary courtyard houses in order to present an alternative medium-density housing solution for the Auckland housing market.

2. Investigate the possibilities of the courtyard house as an alternative housing solution, which will accommodate the urgent need for dwellings for small households as well as responding to the demographic, social and economic changes in Auckland, for both current and future generations.

3. Master plan a high quality built environment offering opportunities for social interaction and community integration.

4. Provide a proposal in which issues of density are met with a high-quality urban housing solution.

The outcome: setting a benchmark to which future developments should aspire.
1.3 Methodology

This research will be conducted using the following methods:

The first part is of this research project has been carried out by research for design, which was focused on gathering information about courtyard housing, such as theory, history, architectural configuration, society, culture, climate and related issues. This helps in defining the shortcomings, difficulties and potential for future design development at both urban and architectural levels.

In the second part an analytical method is used to examine the performance of the current existing housing typologies in Auckland. This is to identify the issues and the possible improvements towards strengthening the community and the local social environment, which is based on a critique drawn from current reports and design guides.

In the third part research is conducted by design, whereby experimental trials on the various master plan concepts and the possible configurations of courtyard housing typologies are tested against the context relating to Avondale.

Lastly, an evaluation of the adopted master plan and architecture designs will be conducted using a set of key principles that have been established through this research as design guidelines for the future.
2. Project Definition

2.1 Brief

The brief of this research design project is to design medium-density housing on a selected site in Avondale.

The new urban housing development has the function of reconstructing the neighbourhood as a social element of the wider city and, therefore, the urban issue will need to be considered alongside the primary aim of this project.

The outcome of this design should enhance community integration and social interaction, as well as respond to the demographic, social and economic changes of Auckland. New Zealand is currently undergoing a substantial demographic change, but our planning regulations have not yet responded to this issue. The result of the present rigid planning regime is that there is a lack of housing choice, and there is an urgent need for dwellings for small households. (For significant demographic, social and economic changes, refer to Appendix 9.1)

This project is about more compact urban development; specifically, the proposed design solution is expected to achieve a much higher density than 15 dph.

In order to make the design of courtyard houses viable in the Auckland context, the following criteria also need to be considered:

• Since courtyard housing is not typical of New Zealand housing stock, research into the various types of courtyard houses will have to take place at an international level. This will facilitate a firm understanding of configuration and the various issues related to the design of courtyard houses. This input will enhance the design of courtyard houses specifically for Auckland.

• It shall respond to the current demographic shift, catering for the large demand for smaller family housing.

• Functionally, it shall not only fulfil residential needs, but will accommodate optimal mixed household sizes and promote social interaction and community integration within a shared communal environment.

• Spatial arrangement should consider privacy, safety, Auckland’s climate, especially the determination of daylight exposure of the indoor and outdoor spaces.

• The resultant housing design should also take into account the quality of materials used and energy efficiency within its systems.
The site selected is in Avondale. It offers more prospects for urban community development, which matches well with the intention of this research design project.

2.2 Site Resources

The site selected is in Avondale. It offers more prospects for urban community development, which matches well with the intention of this research design project.

Avondale was first established in 1843 by early European settlers, but settlement in larger numbers did not occur until the late 1850s. By the middle of the 1920s Avondale had become increasingly suburban. Early industries included brickyards, tanneries, mills and pottery works.1

Avondale has developed its own town centre, which has its own character, fostered by the local community. Avondale has a very diverse community – there are more Pacific and Asian populations in Avondale today than any other of the town centres of Auckland city.2

Over the next 30 years Auckland’s population is expected to gain 640,000 people, similar to gaining the population of three Wellingtons.3

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The current population of Avondale is estimated at 13,500 and by 2030 Avondale is expected to have a population of 27,000 people, double the number today. However, the scale of the projected development for Avondale is not expected to make it as big as New Lynn.

Historically, the greatest development of Avondale took place between 1959 and 1996, and, since 2001, only minor changes have taken place. This development pattern of Avondale has demonstrated an important trend; ever since Avondale was established it has been kept in a state of equilibrium. The forecast development for Avondale will be around public transport, public services and facilities. The Avondale Future Framework has advocated rezoning parts of Avondale to Residential 8a and 8b to accommodate the predicted population and to encourage urban intensification closer to the Avondale town centre.

2.2.2 General Area Profile of Avondale

Avondale has the capacity for urban intensification within an 800-metre radius of its town centre, with adequate public facilities such as schools and open spaces to anchor the community, and it has sufficient public transport, such as trains and buses, to encourage large groups of community living around the public transportation hub.

There are a total of 4,341 households in Avondale; the average household size is 3.1 people with a low median household income. The median age group is between 30 and 34. Household composition is led by couples with children, one-person households and couples only. Dwelling types feature smaller families, most of whom are employed full time and working in the professional sectors.

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5 Auckland City Council. *Area Profiles: Avondale*. 

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2.3 Literature Survey

2.3.1 Courtyard Houses

The idea of courtyards as a plan configuration goes back thousands of years to Neolithic settlements. In the beginning, the logic behind this type of plan was mainly to provide a protective area from outside forces, such as invasion by human enemies and wild animals. Over time, courtyard housing has developed into a solid, logical configuration that maximises the built-up area in the urban context and allows control of sunlight, especially in regions where it is abundant. (For the evolutionary processes of courtyard houses refer to Appendix 9.2)

The courtyard, as a house plan type, exists extensively from China to Morocco. Traditionally it is associated with the Middle East, where climate and culture have given shape to a particular type of courtyard housing. Apart from the climatic and functional efficiencies of this plan typology, its cultural relevance is equally important. For example, in Islam the house and the residence are very private realms. Guests are welcome, but in many cases with a separation of the genders. Guest access is confined to designated areas to ensure genders do not mix. The courtyard, therefore, becomes an exclusive private part of the house, used only by members of the family, while the guests are entertained in the guest rooms near the entrance to the house.

This generic type of planning offers the possibility of very dense urbanisation and maximum use of urban land. With high population densities, the courtyard house also creates intensely strong social interactions. For example, in the old city of Beijing, where a special kind of community life evolved in conjunction with the city’s physical characteristic neighbourhood form.

In a well-defined courtyard, the two natural elements, earth beneath and sky above, ensure direct contact with nature. An important aspect of a courtyard has always been to include a tree or a calm and cooling pond. In many house types the kitchen, where the major household activities take place, also opens to this space. The yard is the heart of the home. The courtyard also provides a climatically controlled space from many of nature’s unwanted forces, such as winds and storms.

7 Ibid.
2.3.2 Courtyard Housing Typologies

There are three generic forms of courtyard housing typology:

1. The interior courtyard house, where the house encloses a courtyard, characteristic of urban areas. This type of courtyard house was originally inhabited by sedentary farmers, appearing frequently in rural society; it features a territory focused arrangement.

2. The exterior courtyard house, where the courtyard borders the house, providing a protected area contiguous with the dwelling units but not enclosed by them. This type of courtyard house has been regarded as a semi-nomatic type of dwelling, which appeared a lot in urban contexts. This typology of courtyard housing concentrated on lavish decoration for the wealthy population.

3. The garden courtyard house, with the courtyard at the back and the entry at the front. This arrangement tends to work well with contemporary automobile-orientated cities. The two major factors that dictate this design are (i) the orientation of the building unit so that it will take the greatest advantage of direct sun and daylight exposure; (ii) accessibility for both the inhabitants and the car.

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9 Ibid.
11 Ibid., 22-50.
2.4 Precedent Survey

Courtyard housing is widely considered to be a responsive typology to low rise high-density urban housing and is an appropriate form of housing within the contemporary mixed use, sustainable urban environments. Many existing courtyard housing typologies have been given shape because of the climatic, cultural, and traditional factors in various regions around the world. This part of the research project is going to unfold the different courtyard housing models in relation to a variety of conditions and contexts.

2.4.1 Courtyard Housing in Beijing, China

The Hutong and courtyard house is a type of traditional architecture which is rooted in three thousand years of living tradition of the people of Beijing. The apex of courtyard housing development took place during the Ming and Qing dynasties. It was during this period that a hierarchical structure was established which reflected social hierarchy and the relationship to the monarchy. It also formed a balance and harmony between living and nature – it sets an early example of sustainable housing typology for the Chinese. Culturally this type of housing reflects a typical Chinese family’s feudalism order, which is often dominated by the older parents in the family. The layout of the housing design features a type of enclosed living environment, with a central courtyard in the middle and houses on the four sides. Everything behind the grey walls of the courtyard houses, therefore, becomes transparent, the neighbours become part of the family and the families form a small community. Spiritually the design of the house speaks for the sky, above the people, and the earth, below the people, with the people in the middle living harmoniously and peacefully.

12 ‘In Beijing, the word hutong means a small alleyway or lane. They are typical of the old part of Beijing and are formed by lines of siheyuan (a compound made up of rooms around a courtyard) in which most Beijing residents used to live.’ (China Daily, January 14, 2004, http://www.chinadaily.com.cn/english/doc/2004-01/14/content_298860.htm).

13 Norbert Schoenauer, 6,000 Years of Housing, 3rd ed. (New York, NY: W.W. Norton, 2000), 196-203.
2.4.2 Courtyard Housing in Algeria, North Africa

Algeria lies in central North Africa, between Morocco to the west and Tunisia and Libya to the east with the Mediterranean Sea to the north. The climate in Algeria is hot and dry. The designs of Algerian courtyard houses are modified in response to the extreme climate. Exterior walls are usually very thick, constructed from two layers of stone. This offers protection against the heat of the sun by insulating the house. Windows in exterior walls are small to keep heat gain to a minimum, and also to keep out the sand and dust which are carried by strong winds. The courtyard is usually planted with trees for shade and has a water source, such as a small fountain or pool, to provide humidity. ‘Half rooms’ or ‘iwns’ are roofed areas supported by pillars around the courtyard, making cool, shady places to sit or work.\(^\text{14}\)

The outside walls of a traditional Islamic courtyard house are plain with few windows and usually just one small entrance door. Decoration is reserved for the inside of the house. Exterior walls lining the street are usually left bare and windowless. If a window is necessary it is placed high above street level, making it impossible to peer in. Usually there is only one doorway to the house. Doors opening on to the street rarely face the doorway of a neighbour, and entry to the building is via an angled passageway, preventing any direct views into the house. Traditionally rooms for men and women are kept separate, and reception rooms for guests are located near the entrance so that visitors do not enter the inner parts of the house; this is rooted in the strong cultural beliefs of Islamic society.

Courtyard houses grew to accommodate the family, new rooms could be added as needed, and, if the available ground space was used up, the house could be extended vertically.

2.4.3 Courtyard Housing in Middle East

There is evidence that houses with courtyards existed in Iran around 8,000 years ago, and the courtyard was an important architectural feature in the late Mesopotamian civilisations.\textsuperscript{15} Although courtyard houses in Iran and Arab countries do not always perform the same function in domestic architecture, they still share a lot of similarities. The Iranian courtyard house consists of a number of structures, such as the house, barns and stores, which are effectively surrounded by the courtyard; this keeps a unification of spaces and elements in a house. The fence separates the yard from other houses and allows the inhabitants of these houses to directly observe their farm, which was usually close at hand. In the hot-humid zones of southern Iran, parts of Iraq and Saudi Arabia, the courtyard has an important role to play in air circulation and cooling. In a compact urban context, habitable rooms and other spaces are commonly surrounded by the courtyard; this defines a space of privacy for the family. In historical towns such as Shiraz and Isfahan, the house is usually bounded either by neighbouring dwellings or by narrow streets. Access could be circuitous and, for reasons of privacy, openings on the external spaces were avoided.

2.4.4 Courtyard Housing in European Countries

Descended from the Roman courtyard house, the Northern European\textsuperscript{16} perimeter block house was formalised in the nineteenth century in response to health and urban planning issues of industrialised nineteenth century cities. Although the perimeter block is bigger than the Middle Eastern courtyard, at four to five storeys high, and occupying the perimeter of an entire city block, it shares three key evolutionary forces with the Middle Eastern courtyard house – climate, privacy and gender separation.\textsuperscript{17}

Health and urban planning in nineteenth century industrial cities were concerned with sunshine and ventilation. In Scotland the health authorities considered ventilation was more important, but in Europe it was sunlight that was considered to be more important. The perimeter block and the street were, therefore, designed to maximise these requirements: if the block is orientated for sun, it is oriented on a north-south axis, but if for ventilation, it is oriented to the prevailing winds, south-west in Scotland and south or south-east in Germany.

Like the Middle Eastern courtyard, the perimeter block was organised with gender zoning. Both share the feature that the men are at the front of the house, near the entrance, and the women to the back, away from public or masculine eyes. Likewise, the streets are for men while the inner courtyards are for women. Architecturally the building facade reflected and reinforced the gender roles; the front elevation was formal and uniform, often to classical lines, ‘with pilasters and string courses establishing a proportional system to which whole street blocks subscribed’.\textsuperscript{18} The rear elevation was informal, with the \textit{ad hoc} arrangement of the window and extensions related to the function of the rooms.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Figure_2.11_European_Perimeter_Block_Barbican_London}
\caption{European Perimeter Block, Barbican, London}
\end{figure}

\textsuperscript{16} Scotland, Germany, The Netherlands and much of France, Italy and Spain
\textsuperscript{18} Ibid., 124.
2.4.5.1 Contemporary Courtyard Housing Examples in Europe: Fredensborghusene, Denmark, 1962-63 by Jørn Utzon

- The design of the houses reacts to the topography of the site.
- Each house has the same ‘L-shaped’ plan, and they are rotated for interest and variety.
- Lower walls around the courtyard allow for light penetration, but higher walls facing the streets are for privacy.
- Windows facing the streets have vertical louvers which block views into the housing.
- The main entrance leads directly into the interior of the house.
- Access into the courtyard is through the interior of the house via walkways or internal doors.
- This typology variant is limited to single storey to preserve privacy and is therefore not able to achieve higher densities.
2.4.5.2 Contemporary Courtyard Housing Examples in Europe: Odhams Walk, London, England, 1979 by GLC Architects

- The layout of the building complex reinforces the existing life of the neighbourhood by being built right up to the back edge of the pavement, with shops fronting the main streets.

- Internally, the terraced houses are clusters around a series of pedestrian walkways and small squares, which relate to the wider network of old alleys in the surrounding streets.

- The building complex has multiple levels with a mixture of two, four and five-person units stacked on top of each other; each household has their own terraced garden designated for their essential outdoor activities.

- Car parks have been provided in the basement, but, since the demand is so low, many have been leased out for commercial use.

- Privacy has been protected by the segregation of the tenants on various levels, the larger household families being located on the bottom and the smaller families stacked on the top where it is quieter.

- Access to these individual units is through community shared stairways and lifts located on the four corners of the site. Depending on the location of the units, private access ways are also designed for some tenants.

- This use of courtyard housing typology in a stacked form results in a much higher density.
2.4.5.3 Contemporary Courtyard Housing Examples in Europe: Celosia, Madrid, Spain, 2009 by MVRDV

- The layout of the building development is divided into 30 small blocks of apartments, in a 10-storey configuration.
- They are positioned in a chequer board pattern next to and on top of each other, leaving openings between the blocks for communal patios.
- 146 one-, two- and three-bedroom apartments are all accessed via these communal spaces.
- Most apartments offer additional private outdoor space in the shape of a loggia right behind the front door.
- This housing scheme encourages the inhabitants to gather in the communal high-rise patios which offer a vista, as well as provide natural ventilation.
- The ground floor offers a total of six individual retail units, sharing a large, open courtyard with the residential community.
- Underneath the building is a parking garage on two levels providing 165 parking spaces. Access is via lifts and stairs next to each of the building blocks.
3. Project Development

3.1 An Overview of The Current Housing Models in Auckland

New Zealand’s current town planning regulation is heavily rooted in modernist concept and dogma. The impact of modernist theories and methodologies on architecture and urban planning has oversimplified the architecture and planning of our towns and suburbs.19 Standardisation is causing cities around the globe to formulate a universal language, as if with one voice they speak for all humanity, resulting in towns and suburbs that lack identity and a sense of belonging. Sense of belonging is a basic emotional need, from which derives a feeling of neighbourliness, and that is to be achieved in narrow, short streets and the quality spaces among housing clusters rather than in spacious redevelopments.20

Figure 3.1: Current Housing Models in Auckland. Left, Single House on Large Full Lot. Middle, Multi-Story Development. Right, Attached Dwellings

Multi-storey, apartment buildings have provided a solution to housing problems since industrialisation. Apartment blocks have the advantage of providing every household with privacy, which is one of the basic needs of modern family life. However, they also create problems. First, the open space around the housing blocks is usually too large in relation to the human scale. Its intention was to give access to fast, modern transport, but its spatial structure is often not designed for social purposes. Second, some outdoor space may be used by residents on the ground floor, but those living in the upper levels do not tend to have the same privileges, other than a cramped balcony. Third, although apartment blocks offer the same equality of living conditions to all residents, at the same time they create a monotonous living environment, devoid of identifiable features. Fourth, multi-storey and high-rise buildings challenge the human scale in an urban environment.

The row-like layout, which includes terraced houses, attached dwellings and townhouses, exist extensively around the periphery of our city and town centres. This type of housing tends to offer certain adequate open space around the building. However, it is usually occupied by services such as parking, vehicle circulation and rubbish collection. There is a lack of spatial arrangement and layers of spaces in between buildings that offer the opportunities for social interaction. Although row houses are directly accessible from the street front, they keep a strict relationship to the road, resulting in a repetitious street character. The courtyard house, on the other hand, has a superior sense of familial territory. The same strict relationship to the road does not apply in the courtyard type, so any side of the lot can face the street without interfering with the internal organisation of the house.

The single house on a full lot housing pattern is a result of the modernist embrace of automobiles and standardisation, driven by mass production and economic factors. Thus it led to a decentralisation of our urban fabric, causing longer travelling time between destinations and brutal damage to our natural environment. A lively, safe, healthy and sustainable city should not be car-centric, but focused on people and many activities.


In this section of the research, an examination of the performance of currently medium-density housing developments in Auckland is carried out. This is to identify the issues and possible improvements which may be made in strengthening both the community and the neighbourhood for the Avondale redevelopment. Two developments have been selected to illustrate the general standards and architectural possibilities for this medium-density housing genre at two levels of density.

### 3.2 Alberton Grove Development, Mount Albert

Alberton Grove development is a local example of medium-density housing development, built at a density of 60.3dph. It is located on a secluded site, but at the same time it offers convenient accessibility to the surrounding public services, facilities and transport, being located next to a...
green reserve, which offers extra quality to the urban living environment. The entire development comprises 60 two-storey housing units which are divided into three blocks by two corridors, as public access.

Each house has a typical townhouse layout of two bedrooms, one bathroom and balcony upstairs; living room, dining room and kitchen downstairs, and a carport. The development is targeted at singles or couples, which is an example of a monotypic development. This development precludes the benefits provided by a mix of household types in creating a healthy neighbourhood.

Generally the planning of the development lacks social structures and spatial arrangements that could enhance the neighbourliness of the community, with the only community open space (264 m²) being located in the north-west corner. It lacks character and any sign of ‘ownership’ by the residents; it does not look like it is being used to its full potential. Figure 3.5

A 20-metre gap has been allowed between the rows of building for both vehicle movement and for privacy, with minimal landscaping planted at the edge of the impervious surface offering visual relief.

Architecturally the building shows little sign of individuality. Standardised material and surface treatment makes it uninteresting. Small openings have been placed on the south and west facades for privacy and ventilation.

Although extra outdoor space is provided with the upper level balcony, it is too narrow to be a desirable outside space. It also lacks any privacy.

For security and safety, this development has been designed with one entrance off Soljak Place. This is through a gated access way controlled by an electronic security system.
3.2.2 Tuscany Towers Development, New Lynn

This case study of the Tuscany Towers development in Ambrico Place, New Lynn, Waitakere City, is based on two reports: *The Best Practice in Medium Density Housing Design*\(^{23}\) and *From Clay Pit to Community: A Study of Medium Density Housing in Ambrico Place, New Lynn*.\(^{24}\) Both reports provide positive feedback on development planning and architectural design.

Tuscany Towers was the first and largest stage of the development in Ambrico Place. The development consists of 97 units, including a tennis court and a public community space marked by a tower, which also houses the television aerial. The internal streets are also community shared spaces, providing extra, non-allocated parking.

According to the post-occupancy report, nearly two-thirds of the residents had moved to Ambrico Place from other locations in Waitakere city, 40% of residents responded that they used to live in standalone house

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and 45% were renters. 80% were smaller family households, 10% single occupants and 10% of households were made up of people flating together.

The information on the rental report shows that there is a demand for two-and three-bedroom units in the wider New Lynn area. The residents initially chose to live in medium-density housing for the following reasons: less household and yard maintenance; convenience and proximity to shops, public transport and the town centre; and for security and safety reasons.

There was a positive response on the values of community and the neighbourliness of this development, which is reflected in the public domain represented at several hierarchical levels. The reports also responded positively to the physical features of the development, such as facilities, layout, traffic flows and proximity to amenities.
The residents at Tuscany Towers complex valued privacy highly; most residents were satisfied with the privacy of their indoor space and more than half were satisfied with their outdoor spaces.

The siting of this medium-density development is in close proximity to transport nodes, which aligns with the strategy promulgated by the council to encourage greater use of public transport. Almost all respondents reported positively on the status of car parking, although at the beginning car ownership was very high, but there was an increase in the use of public transport, with over half responding that they use public transport.

The architecture is uniformly Tuscan style, including details of ornament, colour palette and variations of height, forming coherent, consistent and knowledgeable examples of genre. A variety of small openings have been designed for privacy and ventilation. The majority of the houses are two-storey, three-bedroom terraced units with garages accessed internally. The design and layout of these housing units in relationship to the streets also provides opportunities for both living and business use.

A storey-height step was inherited from the former use of the site on the eastern boundary, with living space on a platform over a four-car garage offering living-work options to some residents. Access to these units from street level is via ornate tile stairs shared by two adjacent houses, and also from the external public road by a second ‘front’ door.
3.3 The Development’s Programme

The land use of the site is going to be divided into two parts, which correspond to the existing land-use pattern of Avondale. Part one of this development focuses on housing – this is the core of this research design project – whereas part two of the development is supplementary to the overall development of the site.

Part one corresponds to the residential land-use pattern of Avondale, at the south-west end of the site. Programmed with medium-density courtyard housing, the projected density is to achieve 30 to 50 dph, with a total of 60 to 100 housing units. The average net floor area of each of these household units will be expected to occupy between 80 to 120 m². The result of these courtyard houses will be one or two storeys high with a mixture of household types. These residents are mainly smaller families with children, and smaller households, such as working professional couples, single parents with children, and a small range of 65-plus senior residents. To provide greater opportunities for a community to integrate, a range of shared facilities, such as shared parking spaces, children’s playgrounds, public open spaces and desirable walkways, will also be included in the design programme.

Part two of the development is at the apex of the site, corresponding to the southern end of Avondale town centre, programmed with mixed use programmes. This will make this development more feasible and will provide a long-term return. The ground floor level will be devoted to retail and hospitality services, and the upper levels will be programmed for offices and apartments. An underground car park is required to accommodate the mixed use development and for the residential development in part one of this development.
3.4 Site Analysis

This site analysis is only a brief overview of the existing site condition; a detailed investigation of the site is attached in the Appendix 9.3.

The proposed site is located at the southern end of Avondale town centre. It is within five minutes walking distance of the town centre and within six minutes walking distance of the train station. Local shops and schools are also located within walking distance of the site. Other amenities such as open spaces, parks and the community centre are also located around the site, especially the Avondale Racecourse, which generates a lot of community activities, such as the Sunday market and a variety of sporting events.

The total area of the site is just less than 20,000 m², with a current density of 12.5 dph, and a total of 25 low-density residential dwellings. Framed by Great North Road, which is much busier than Wingate Street and Larch Street, (Refer to Appendix 9.3.6) it is positioned next to a five-way roundabout intersection, primarily designed for vehicular movement, impeding foot traffic. (Refer to Appendix 9.3.9 & 9.3.10) It lacks safe crossing points for pedestrian access to the public services, facilities and transport infrastructure, thus it restricts viable urban intensification and higher density urban development in a progressive urban context. The roundabout, therefore, is becoming a pedestrian constraint which needs to be addressed with traffic calming measures.

The selected site, framed by Great North Road, Wingate Street and Larch Street, has always been occupied as residential land which has been subdivided since 1861. Great North Road through Avondale town centre has always been a major route for service vehicles. It was first used by Mr W Young with his horse buse service for business traders and light goods deliveries between Auckland and Henderson’s Mill.25 Gradually, Great North Road became popular for other business trades and small enterprises providing services for the local community.

Today Great North Road in Avondale is dominated by heavy service vehicles and private car, as it is a major arterial road, going into New Lynn. Most business and commercial development are located on either side of Great North Road, between Rosebank Road and St Jude Street. Although Great North Road is a major traffic artery for Avondale town centre, it still remains a strong, pedestrian-focused shopping environment on both sides of the road.

Wingate and Larch streets are suburban streets, which are less busy, as they service a small population of residents. The current housing pattern on the two sides of these streets is dominated by timber-framed, single dwellings orthogonally lined along the street. All buildings are set back from the street boundary, with the gardens indicating some kind of individuality, as well as providing privacy, avoiding direct view into the houses. Each household has their car parking space, or garage, arranged adjacent to the street, therefore both Wingate and Larch streets seem dominated by vehicles and single dwellings on a large section, causing these two streets to lack neighbourliness and social connections. In order to improve the current situation and foster quality streetscape, desirable landscape design and careful architectural solutions will be required.
3.5 Design Process

The initial design process was focused on the master-planning of the site and testing the possibilities of courtyard housing plans and layouts. A series of planning strategies have been tested, some based on geometric patterns, some on functional arrangements emanating from the site. The overall idea was to expand as much as possible the field of potential master plan concepts.
During the preliminary conceptual design stage, there were four concepts that seemed particularly promising for generating the master plan of the site; the Orthogonal Concept, the Grid Concept, the Radial Concept and the Island Concept. Each concept has its distinct character, which emphasises certain features, such as the interaction with the surrounding urban environment, density, interaction to the different part of the site and a variety of housing typologies.

3.5.1.1 Orthogonal Concept

The orthogonal concept is placing the buildings at right angles to the facing road or street. The resulting concept is dictated by the characteristics of the two opposing routes. Great North Road, being an arterial road, is consistently busy, filled with vehicle traffic, pollution and noise. Whereas Wingate Street is much quieter, the same as any other suburban street. This concept has acknowledged these differences, offering denser housing solutions and mixed use development along Great North Road, acting as a buffer to the site tucked behind. Small clusters of courtyard housing typology are, therefore, responding to the less busy Wingate Street. The apex and the Larch Street end of the site have been dealt with in a much more conservative manner. This is to keep consistency with the existing urban pattern, neglecting the potential of the most prominent parts of the site, which could be utilised for higher density or mixed use developments.
3.5.1 Preliminary Master Plan Concepts

3.5.1.2 Grid Concept

The grid concept is in reference to the right angle intersection of Wingate and Larch streets. This grid layout is inspired by the traditional urban layouts of Beijing, when the city used to be filled with courtyard houses. This layout gives a formal arrangement that allows a more regular placement of the buildings. A modular system and repetition of patterns is utilised as it seems to work better with the grid system. However, this results in underutilised land, which is very uneconomical. This concept is aimed at achieving a much higher density requirement for the purpose of urban intensification within the town centre. However, this might exceed the housing demand of Avondale; in this case intensification has overtaken the idea of desirable living. Large open spaces have been offered in between these medium-density apartment blocks for vehicle circulation and other shared human activities; this may result in an unpleasant neighbourhood. Unlike the orthogonal concept, this concept has seen the potential of the apex of the site, offering a corner building positioned by the roundabout intersection, where it is most visible, adding quality to the busyness of the town centre as well as giving a definition to the site.
3.5.1.3 Radial Concept

The radial concept is based on concentric rings around the roundabout, dissecting the site into five smaller city blocks by neighbourhood lanes. This allows for vehicle and pedestrian traffic access from Wingate Street to Great North Road. The advantage of smaller city blocks is to encourage pedestrian access and to cultivate a behaviour of using public transport, but the increase of vehicular access on to the main road is more likely to add more traffic congestion on Great North Road. Although this concept shows a symmetrical placement from the site plan, the housing typologies vary greatly depending on the relationship of the housing complex relative to the two major routes. A much denser group of housing is positioned facing Great North Road, compared to a group of lower density housing on Wingate Street. A variety of open spaces have been designed within the housing complex, which offers hierarchical spaces between buildings. This concept also takes advantage of the apex of the site, with mixed use programmes that could add to the value of this redevelopment. The density increases as it gets closer to the apex of the site, therefore this offers a transition between the business and chaos of the roundabout and the residential zones.

3.5.1 Preliminary Master Plan Concepts
3.5.1.4 Island Concept

The island concept treats the site as an island, without considering the external surrounding context. This concept is aimed at taking advantage of the unusual shape of the site and making it prominent so that it stands out from the existing urban fabric. The site is divided into two by its axis, like an arrow extending from the apex. The centre of the axis is dominated by a pedestrian shopping lane, allowing a more vibrant atmosphere into the heart of the site. Behind the central shopping strip is medium-density housing.

The entire development is elevated 1.5 m above the ground, hence providing an underground car park and freeing up the ground level for mixed use and housing development. This scheme is an experimental idea with the aim of inserting urban streets into suburbs. This has been done in many European cities, but it might not be suitable for Avondale. This approach to the site solution may also cause issues for the future development of Avondale, but this solution is valuable for urban intensification.
3.5.1 Preliminary Conceptual Design Evaluation

In summary, although these four concepts have their individual qualities, they also share some similarities which can be developed further. Among them, several concepts have recognised the different characteristics of the opposing routes, Great North Road and Wingate Street, one being very busy and the other being quiet and residential. This has influenced the planning of the site, by selecting different programmes and different densities. By dividing the macro urban block into smaller city blocks, it offers the advantage of more pedestrian access and encourages shorter walking distances to public transport and other local facilities. The idea of the hierarchy of the open spaces among the housing clusters will add more interest to the site, enhancing the quality of the community spaces, therefore encouraging greater social interaction. The underground car park is an ideal solution if the density reaches above 60 dph, that is 120 units, otherwise this solution is considered uneconomical, but it can be adapted into commercial space, if the design is flexible enough. The commercial value of the prominent apex of the site suggests a potential mixed use programme which will add value to the development, therefore offering a strong character to the intersection while forming an interesting streetscape.

The four concepts have also revealed some ideas that are good but the timing is not yet right for the Avondale situation. For example, the perimeter block idea is unacceptable at present, but may be acceptable in the next 15 to 20 years. The grid concept did not work well with the triangular shape of the site, resulting in too much underutilised land, this is an uneconomical solution. There is also an excessive amount of large open space that could result in neglected spaces which are uninviting and give the appearance of being less safe. The site-driven strategies did not deliver the site plan concept itself, but informed the process towards it in several important ways.

Figure 3.30: A Collection of Preliminary Concepts:
1 Orthogonal Concept,
2 Grid Concept,
3 Radial Concept
4 Island Concept
New Zealand is currently undergoing a substantial demographic change, but our planning regulations have not yet responded to this issue. The rigid and inflexible planning regime challenges the idea of urban intensification and high-density developments around town centres and public transport and service centres. The following experiments are to examine the current Auckland planning regime and the possibilities of utilising the courtyard housing configuration to achieve a higher density and to accomplish the desired outcome of greater social interaction.

### 3.5.2.1 Comparison of Typical New Zealand Housing Pattern with Possible Courtyard Housing Pattern

Typical traditional lots are restricted by the building regulations, with setbacks on all four sides contributing to the forced placement of the house on the lot. Building coverage averages between 30 and 35% of the site. Pedestrian and vehicle access is usually approached from the road frontage side.

Possible configuration on the lot of same size, with the elimination of the setback requirements. Access is not only confined to the road frontage side, but on internal passageways as well. Density is increased as two courtyard homes are placed on one lot. Both building coverage and green space have been decreased in order to design dwellings for the smaller households. One hundred per cent of that is private. A minor percentage of the building footprint of each lot is dedicated to communal access. Three lots are dedicated to open space for the entire block.

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3.5.2.2 Mirrored Floor Plans and Elongated Floor Plans

The following four experimental concepts are to test the current Auckland planning regulations by developing the master plan to follow the current zoning requirements. The site is within Residential 6a, this zoning regulation restricts higher density development on the proposed site. (Refer District Plan in Appendix 9.4) These two experiments showing on the left have proven that the current Auckland planning regime contradicts the idea of urban intensification promulgated by the Auckland Council.

During this investigation a series of floor plans, such as the Mirrored Floor Plans and the Elongated Floor Plans have been designed, with the aim of maximising the density and to test the viability of these courtyard housing plans for social interaction. The result of this investigation was that these two site planning options failed to meet the desired outcome of a greater density of 40 to 50 dph. This design outcome also lacks social structure and spatial arrangements that offer opportunities for social interaction and community integration.
3.5.2 Master Plan Concept Development: Programme Driven Strategies

A: Examine The Current Auckland Planning Regime

3.5.2.3 Design for Vehicular Movement and Open Spaces

These two master plans are a further examination of the current Auckland Planning Regime. Here the intention is to use the cluster arrangement to introduce open spaces in between the dwellings, be vehicle orientated and be able to achieve a much higher density. The housing clusters are composed of four to six interior courtyard houses, arranged adjacent to each other and back to back. Although these courtyard houses offer higher density and increased privacy, due to having their own interior courtyard, there is potentially less social interaction between the neighbours. Another drawback of this back-to-back arrangement is that it causes a lack of sunlight in the courtyard. (Refer to Appendix 9.5 for Experimental Models)

Each housing unit is accessible from the streets and the internal laneways. Community open spaces are designed between the housing clusters, which are accessible from the internal laneways, shared between pedestrian and vehicular movements. The open space needs to be prioritised as a community open space, inviting the residents to engage with each other, as opposed to being used as a parking lot.

Figure 3.33: Experimental Site Plans and Possible Courtyard Housing Explorations

Considered Courtyard Housing Plans: Not in Scale
3.5.2 Master Plan Concept Development:
Programme Driven Strategies

A: Examine The Current Auckland Planning Regime

3.5.2.4 Summary of the Examinations on the Current Auckland Planning Regime

This section of the design process focused on examining the current Auckland planning regulations, seeking alternative housing plan solutions to work within the limitations, such as building setback, restricted site coverage and building height limitation. Although a series of possible courtyard housing plans have been developed and tested in the planning of the master plan concepts, the outcomes have failed to achieve a much higher density of 40 dph. There was also a lack of social structure and spatial arrangements between the dwellings, which I believe is very important in developing social interactions between the residents. The spaces in between the dwellings, which were designed for prioritising vehicular movement as opposed to pedestrian movement and other transportation modes, have also failed to achieve the desired quality.

The site planning experimentation clearly demonstrated that the Auckland Planning Regime does not encourage quality medium-density housing. I then extended my investigation beyond the Auckland planning rules and regulations, discovered that the cluster arrangement could have potential and be worth further investigation. I saw the possibility that this arrangement could help in developing the social structures in between dwellings. I have also discovered the importance of the quality of these spaces, such as the open spaces and the streets in between the dwellings, which could become a device for knitting the community together if they are designed well.
3.5.3 Master Plan Concept Development: Programme Driven Strategies

B Housing Clusters Investigation

3.5.3.1 Exploration of the Hierarchy of Housing Clusters

The following strategies are to demonstrate the importance of cluster arrangements in a neighbourhood, the size of the cluster that will make an impact on the social behaviour of the household mix, and the proportion of the household mix that generates a cluster.

A balanced life cycle is well related from one and another, people from every stage of life. Teenagers see young couples, old people watch the very young, people living alone draw sustenance from large families, youngsters look to the middle-aged for models, and so on. This housing cluster arrangement of mixed household types will sustain a balanced life cycle and encourage social interactions between the neighbours.

In order to seek an appropriate cluster mix, an evaluation of household types was carried out for Avondale. The following data was collected from the Avondale area profile.\textsuperscript{27}

The findings illustrate that there are four main household sizes: single, two-person, three-person and four-person households. A two-person household is the most common household type, at 29.7%, followed by the single-person household, at 26.1%; then the three-person household at 21.4%, and lastly the four-person household at 17.8%. The remaining percentage of only 4.7% is made up of minority household types. This evaluation will be used as a benchmark to determine the size and mixture of the household types of the clusters for the proposed site.

\textsuperscript{27} Auckland City Council. \textit{Area Profiles: Avondale}. 

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**Figure 3.35: Household Composition of Avondale**

<table>
<thead>
<tr>
<th>Types of Households</th>
<th>1P</th>
<th>2P</th>
<th>3P</th>
<th>4P</th>
<th>XP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Households</td>
<td>1200</td>
<td>1000</td>
<td>800</td>
<td>600</td>
<td>400</td>
</tr>
</tbody>
</table>

**Percentage Household Types**

- 29.7% 1P
- 26.1% 2P
- 21.4% 3P
- 17.8% 4P
- 4.7% XP
The following concepts have been developed from the initial concepts, combining some of the initiatives with some new ideas to evolve new design strategies that are more appropriate for the master plan of the development site. This part of the conceptual development is aimed at an investigation of the clusters of households mix, the spaces in between the buildings and the courtyard housing typologies.

### 3.5.3.2 Exploration of the Hierarchy of Housing Clusters: Multi-storeyed Two-grid System on Orthogonal Orientation

This concept is based on two grid systems, one is referenced to the right angle of Larch and Wingate streets, while the other is oriented to Great North Road. The apex of the site and the buildings aligned on Great North Road are mixed use developments, with residential units adjacent to the back. A neighbourhood lane divides the mixed use development with the stacked courtyard housing complex on the Wingate grid.

These housing complexes are arranged in clusters organised around a courtyard 10 m in diameter. Each cluster consists of 10 to 12 households, made up of a variety of single, two- and three-bedroom units; this is determined by the evaluation of household types in Avondale. This cluster size seems to work best according to Herbert Gans’s investigation on social behaviour and human habits. Its finding illustrated that the representatives of 10 to 12 households can meet face-to-face around a dining table where common issues can be discussed. There are a total of six housing typologies, each having a 5 x 5 private courtyard, arranged in clusters of up to two and three levels. Access to these units is via shared and private stairs. An underground car park is designed for the residents, as well as to cater for the commercial and mixed use development. Pedestrian access points from the underground car park to ground level are located within each of the community courtyards. The aim is to utilise the courtyard space for foot traffic flow and to increase the opportunity for social interaction.

3.5.3 Master Plan Concept Development: Programme Driven Strategies

B Housing Clusters Investigation

3.5.3.3 Exploration of the Hierarchy of Housing Clusters: Single-storeyed Two-grid System on Orthogonal Orientation

The following concept is a further investigation of the different sizes of the clusters. The aim is to offer more intimacy and to provide greater opportunities for social contacts. The layout is still based on the two-grid system, but the cluster is made up of a mix of six to eight households. This size allows people to meet over a kitchen table where discussion can be carried out casually, allowing everyone to keep in touch with the whole group face-to-face.29

In this concept there are more community courtyards, which have been reduced in size; parking spaces are arranged around the courtyards, encouraging pedestrian cross-circulation through the common spaces, as well as offering the residents a meeting point for different activities. It acts as a focus and physically knits the group together. However, the downside of this approach is that it requires careful consideration of privacy, safety and ownership of these common spaces. One of the drawbacks of this scheme is that there is a lack of privacy for each household property, and there is no clear delineation of the ownership of the common spaces, which could cause safety and vandalism issues.

Figure 3.37: Housing Clusters Experiments: Site Plans and Possible Courtyard Housing Explorations

29 Ibid., 201.
3.5.4 Master Plan Concept Development: Programme Driven Strategies

C Spatial Investigation

3.5.4.1 Spatial Investigation: Study of City Blocks

The following concept is an exploration of the hierarchy of open spaces and the hierarchy of routes in relation to the housing clusters. At first, an investigation of city blocks was carried out based on three examples: Paris in France, Madrid in Spain and Fez in Morocco. The findings illustrated a significant difference between the sizes of the city blocks by comparison with conventional New Zealand city blocks. I found that the sizes of these blocks are much smaller as they have laneways cutting through the macro block. This is a much better idea as it encourages greater pedestrian access. The hierarchy of the open spaces is also present; that is, on the one hand it creates visual interest and on the other it provides a sense of security.

City Block Paris France
- Site Area: 9,186.12m²
- High Density Urban Housing and Mixed use Development
- Site Coverage: 74%

City Block Madrid Spain
- Site Area: 25,547.14m²
- High Density Urban Housing and Mixed use Development
- Site Coverage: 90%

City Block Fez Morocco
- Site Area:
  - (Block 1) 24,480.61m²
  - (Block 2) 39,054.86m²
- High Density Urban Housing and Mixed use Development
- Site Coverage: 97%

Figure 3.38: Illustrated Study of City Blocks in Paris, Spain and Morocco
3.5.4 Master Plan Concept Development: Programme Driven Strategies

C Spatial Investigation

3.5.4.2 Spatial Arrangement Investigation: Exploration of the Hierarchy of Open Spaces and the Hierarchy of Routes

The previous concept lacks a clear definition of the spaces in between the various dwellings and the housing clusters. In this concept the space between the dwellings is opened up, a) to allow for greater light penetration, and b) to create a variety of open spaces. These spaces will then be able to interact with the much larger open spaces in between the clusters, forming superior layers of hierarchy of private, semi-private and public open spaces by comparison with the previous concepts.

The hierarchy of routes in this concept is similar to the idea that was developed with the Radial concept (refer to 3.5.1.3 for detail), where the site was dissected with access ways to allow greater movements into and through the urban block. Thus, the block has been divided into micro blocks, with one main access street in the middle and neighbourhood lanes on either side.

There are a few design issues with this concept. One is that the size of the housing cluster running in the middle of the site is too large, forming a barrier and blocking east-west movement across the site. The size of the cluster is also too large to enable intimate social interaction between all neighbours. The courtyard space in between the neighbours of this cluster is also considered too narrow for the number of households sharing it. It is hard to define responsibility and ownership of this space. Therefore, the space between the neighbours may not be used effectively for its social purpose.

Secondly, the housing cluster behind the mixed use development does not relate well to the mixed use development. At the same time they form a large cluster on their own, having similar social and ownership issues to those stated above. Thirdly, there are a large number of unusual courtyard house plans causing feasibility issues, and these are less economically viable.
3.5.4 Master Plan Concept Development: Programme Driven Strategies

C Spatial Investigation

3.5.4.3 Evaluation of Housing Clusters and Spatial Arrangements

The investigation of housing clusters and the spatial arrangements examined in this section of the design process illustrated a possibility that these arrangements can work well together to achieve a density closer to 45 dph, as well as creating communal social open spaces, which enhances social interaction and community integration. The result of the housing cluster investigations has determined the size of the cluster is going to make a difference to the social behaviour of the household mix in that cluster. A medium size of eight is the most appropriate number as it offers more intimacy between the neighbours and allows optimum social interaction to take place, whereas a cluster size greater than 12 offers less intimacy and could result in people being overlooked or neglected. The hierarchy of open spaces and routes has proven the importance of categorising the various spaces and streets in between the housing clusters, to form a diversity of spaces, which will encourage more pedestrian movement and other modes of transport.
Housing is in close relationship with its urban environment, and having good urban design strategies will make an effective impact upon a housing development. The following urban design strategies are possible suggestions, which may enhance the redevelopment of the Avondale site. For the regeneration of Avondale town centre, it is suggested to start with mixed use developments along Great North Road, which is a response to the capacity issues of the Rosebank Business Precinct.30 This strategy is also in line with the idea promulgated in the Auckland Unleashed - The Auckland Plan Discussion Document.31 The commercial and mixed use development along Great North Road will be brought forward onto the street frontage, prioritising it for pedestrian access. Car parking spaces will be provided at the back of the mixed use development along Great North Road, directing vehicle movement away from the busy road and to support greater pedestrian access by filter through the buildings and lane ways onto the main road.

The urban plan shows two significant urban nodes along Great North Road. One open space on the corner of Great North Road and Racecourse Parade with possible programmes such as a daily flea market or a farmers market, this is due to the popularity of the Avondale Sunday Markets. The other open square is to replace the existing roundabout at the five way intersection. The intention is to reactivate the town centre; to reduce the amount and speed of vehicles travelling through the town centre, to enrich the experience of walking in the town, and to encourage greater use of the public transport.

4. Design Outcomes

4 Design Outcomes
4.1 Urban Design Strategies

The selected master plan concept has been developed based on combining some of the design strategies that support particular intentions of the project. This concept aligns fully with the agenda of this research design project designing a socially interactive, community living environment, prioritising a walkable community with efficient land-use patterns and thus the ultimate aim of urban intensification.

The following breakdown of the key design outcomes and strategies show:

1. **the three elements of the scheme are:**
   - Open spaces and layers of privacy.
   - Categorising a variety of routes relevant to the use of the area.
   - A range of housing cluster sizes that consist of mixed household types.

2. **the key organising principle for all of the above is the principle of ‘hierarchy’, meaning the size or levels.**
A sequence of private personal spaces starts from the inside of the house. The most intimate and personal space is the bedroom, it is a place of invitation. This room belongs to the person and is an expression of their inner self.

4.2.1 Domestic Courtyard
The next layer of private space is the indoor living space and the domestic courtyard. Shared the most by members of the family, it has a common function such as cooking, socialising, gardening, etc. Its role is to bind the family members closer. The boundary outside this indoor and outdoor living space is beyond the private realm of the family; it is defined by the boundary walls and the border of landscaping against the edge of the courtyard house.

4.2.1.2 Community Courtyard
The space outside the courtyard house is the first layer of semi-private community space shared by the mixed households of the cluster. This space is a meeting point for different activities, with courtyard houses opening into it, providing greater social interaction between neighbours.

4.2.1.3 The Hierarchy of Open Space and the Layers of Privacy
Finding the right balance is very important in cultivating community integration, Ross Chapin states:

Personal space is a felt sense of comfort and safety that varies from one person to another. This zone of personal space is measured not so much by distance as by visual and acoustic separation. Cultural and personality differences play their part, but, just as important is how and where the boundaries of personal space are defined. If the boundary around the personal space is left undefined, a person may feel invaded, and if it is too enclosed, a person may feel isolated.32

A sequence of private personal spaces starts from the inside of the house. The most intimate and personal space is the bedroom, it is a place of invitation. This room belongs to the person and is an expression of their inner self.

To bring this community courtyard alive, it is designed with two gated entrances, providing access and cross-circulation for the household members of the cluster. This space has been given a character with outdoor furniture, landscaping and surface treatment; its purpose is to encourage people to stay longer, within this space. Since this space is shared between neighbours, they all have shared ownership, and, therefore, they are all responsible for looking after this space and maintaining its quality. This courtyard also shows a strong connection to the larger space outside this community courtyard. It provides an outlook with visual interest to the much bigger space outside, forming a clearer visual hierarchy, but it still retains its privacy and intimacy.

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4.2.1.3 Community Open Space and the Children’s Playground

The next level in the hierarchy of open spaces is the space in between the housing clusters. This space became rather important in order to develop neighbourliness, providing opportunities for greater social interaction and community integration. ‘Children’s play has always been an integral part of a city’s life’. They will use most of the site as one big playground, and it is through the children that many of the adults will meet. The aim here is to design the whole development as a playground that generates opportunities for many recreational and creative activities. A number of community activities can also take place within these public open spaces, such as street parties, cultural evenings, music events and the celebration of festivals.

33 Gehl, *Cities for People*, 158.
4.2.1.4 Public Open Square

The Church Square is the most public open space in the Avondale development. It is a result of the initial concept to reduce the traffic flow and the speed of the vehicles passing through the five-way intersection at the apex of the site. During the development process, priority-ruled junctions such as a gyratory at the junction and a traditional, five-way point-signalled junction was considered. The gyratory solution was preferred over the five-way point-signalled junction, as it is a more space efficient and more pedestrian friendly traffic management solution, because it functions more like a roundabout in principle; however, it is much more space efficient than a roundabout. Thus it opens up a usable space in its centre, and at the same time it makes the corner sites available for additional mixed use developments. (Refer to Appendix 9.3.9 and 9.3.10)

These four levels of hierarchical open spaces enable and regulate social interaction and strengthen the sense of belonging to the community of Avondale.
4.2.2 The Hierarchy of Routes

‘People come where people are.’ A lively, safe and sustainable city should be filled with human activities.\textsuperscript{34} The aim of this strategy is to categorise the routes and implement various designs and functions to ensure easy and free access, prioritised for pedestrians and shared with a wide range of transportation methods. A hierarchical network of permeable streets is designed with a variety of direct routes to encourage residents to walk and cycle to the retail and community provisions in the town centre, local schools and work sites. This network has been designed to ensure the level of traffic is relevant to the use of the area; for example, residential streets have been designed with staggered street alignment to reduce the speed of traffic and to allow flexibility and safer access for pedestrians and children playing within the neighbourhood. A number of traffic-calming measures, such as the red surface treatment, short streets, curved orientation, on-street parking, have been implied in the design to reinforce the idea of shared spaces. A new link connects Wingate Street and Great North Road, dissecting the site into two halves with neighbourhood lanes branching off it. These feed into the communal open spaces in among the housing clusters. The neighbourhood lanes are much narrower and shorter, designed for traffic-calming measures to slow traffic and to reinforce the opportunity of walking and cycling.

\textsuperscript{34} Ibid., 63.
4.2.3 The Hierarchy of Clusters

The hierarchy of clusters is more identifiable with this concept than the previous concepts. Each cluster is arranged so that it reflects the percentage of household types in Avondale.

The sizes of the clusters vary between six and twelve mixed households, which have been examined in the earlier Housing Clusters Investigation concepts. The aim is to maintain a balanced life cycle, which will help to develop a sustainable community. Each cluster consists of single, couple, three- and four-people household types, which is more like an extended family.35 The families are encouraged to stay within their communities where their network of relationship exists. Whenever their family structure changes, they are no longer forced out of their neighbourhood because there is a shortage of the appropriate housing typology. This hierarchy of housing clusters arrangement of mixed household types also supports the idea of social interaction and community integration, while offering variety and freedom.

4.3.1 Design Development

The initial research of the project was focused on housing; this helped in the development and the final selection of the master plan concepts. Each master plan concept was tested against the various possibilities of the courtyard housing plans and layouts, in order to seek an appropriate architectural solution to meet the initial aim of the project.
4.3.2 Demographic

For the master plan that was adopted, there is a greater percentage of couples, singles and three-person household units, as a response to the current demographic of Avondale and the need for dwellings for smaller households.

<table>
<thead>
<tr>
<th>Household Size</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 2 people</td>
<td>17%</td>
</tr>
<tr>
<td>3 or 4 people</td>
<td>19%</td>
</tr>
<tr>
<td>2 or 3 people</td>
<td>31%</td>
</tr>
<tr>
<td>Mixed use</td>
<td>4%</td>
</tr>
</tbody>
</table>

4 DesignOutcomes
4.3 Courtyard Houses
Figure 4.14.1 Collection of Typical Courtyard Housing Floor Plans for Avondale Redevelopment, Scale 1:200
4.3.3 Culture
The culture of New Zealand is largely inherited from English and other European customs, interwoven with Maori and Polynesian traditions. The culture of New Zealand today is multifaceted; however, there is a greater Asian-Pacific population in Avondale today than in any of the other town centres of Auckland city.

The design of the various sizes of courtyard housing has considered the aspects of Asian-Pacific traditions of community and family values. It offers flexibility for the tradition of living within the extended family. Designed in a variety of sizes, from single to four-person units, it will offer the opportunity for family members to live closer to each other within the same neighbourhood.

4.3.4 Suburban Urban Lifestyle
This is a 'new typology' as far as traditional New Zealand housing stock is concerned, but it meets the needs of many contemporary urban inhabitants, as it provides a range of low-maintenance dwelling options, but still offers adequate private indoor and outdoor living space. The courtyard also provides a venue for a small urban garden to fulfil the desires for a suburban garden lifestyle.

4.3.5 L-shaped and U-shaped Floor Plans
The design of the courtyard houses for the Avondale development is based on two of the three major courtyard housing typologies: the interior courtyard and the garden courtyard. (Refer to Explanatory Document 2.3.2)

The interior courtyard typology consists of both L-shaped and U-shaped floor plans, drawn from the idea in Utzon's Fredensborghusene that courtyard houses are designed with two sides which offer privacy but are still able to be orientated to maximise direct daylight exposure.
4.3 Courtyard Houses

4.3.6 Two Entrances

The layout of Chinese courtyard houses is often related to its urban pattern. The length of the courtyard houses is often defined by the space between the streets, and with two entrances, one to each of the streets which are defined by the character of that street.

The design of the Avondale courtyard houses has taken this into consideration; each household unit has two entrances, one from the community courtyard and one from the street. Each is responding to the different characteristic of the environment outside. The primary entrance leads into the house by way of the domestic courtyard, via the community shared courtyard, whereas the secondary entrance leads directly into the interior of the house from the street.
4.3.7 The Service Core
For a typical Arabian, multi-level courtyard house, the staircase to the upper levels is often located in the corner of the courtyard or in the corner next to the entrance; likewise, the service core for the Avondale courtyard house design is also located in the southern corner of the house, maximising the sunny areas of the house for living space.

4.3.8 Privacy
Privacy is very important for all domestic design; however, it is crucially important for the Islamic culture because of their religious values. The separation of genders is often very well confined to a designated area, women and children are often kept in a separate courtyard or on a different level. The design of the Avondale courtyard houses has a superior sense of familial territory, where the house encloses a private courtyard. The interior organisation of public and private areas is by vertical separation, where the more private spaces are kept on the first floor.

For a conventional courtyard house, the main entrance into the house is often off centre, which is to avoid direct view into the private areas of the house. The design of the entrances to the house is also offset from the centre, with the one entrance into the house designed within direct sight of the kitchen, enabling control of ingress and egress of the house.
4.3.9 Comfort

Auckland has a temperate oceanic climate, with a high rainfall, averaging 1240 mm throughout the year. It rains on an average of 137 days a year. The long-term mean temperature for Auckland is 15.3 degrees Celsius. The average sunlight hours are 133 hours per month in winter and 212 hours per month in summer.

The orientation of the housing units are arranged to maximise sunlight penetration and solar heat gain, in particular in the living zones and the bedrooms.

The domestic courtyard is to provide an outside living space during the hot summer days, with part of it enclosed and sheltered from rain and wind, but still providing a connection to the outside living.

Summer days in Auckland can be rather hot and humid; double layers of openings have been designed to allow for cool air movement, while still maintaining privacy – wooden shutters on the external layer and glazing on the inside. This will allow flexibility of adjustments on the window openings to suit the needs of the residents.
4.3.10 Small and Large Openings

For the hotter climatic regions, small openings are often used to keep the heat out but still allow for ventilation. In this case, a variety of small to large openings are designed to allow for daylight penetration, as well as ventilation, privacy and aesthetics.

The openings are designed from the interior; the size and position of the openings are related to the activity inside that space. (Refer to Figure 4.20.1) They are designed to be offset to prohibit a line of sight into the opposing windows, with the purpose of maintaining maximum privacy. In some cases, wooden shutters are designed to be fitted to the external glazing, to function as a curtain. It obstructs direct view into the house, but still allows for daylight penetration.

4.3.11 Exposure to Daylight

The sunlight angle in Auckland is not very high by comparison with the Middle East. In order to maximise the daylight factor to the interior and the domestic courtyard, L-shaped and U-shaped floor plans have been designed to allow for direct daylight penetration to these spaces.

Larger openings have been designed on the northern facade to maximise sunlight, and smaller openings on the southern facade for natural daylight.

Investigation into interior exposure to natural daylight has been conducted in a range of computer generated 3D images at specified dates and times. (Also refer to Appendix 9.6 for more images)
Figure 4.20.1 Examination of Opening Position in Relation to the Interior Spaces
4.3.12 Structure and Materiality

Precast concrete panels are the main structural components of the building. Due to the number and size of the openings, quality control will be important; therefore, factory construction of the panels will be required. This will also lower the cost because of mass production and standardisation of the components. They will be easily erected on site and assembled by specialists, who are able to control the finished quality, in particular for weather tightness.

For a typical courtyard housing model, the exterior walls facing the streets are usually left bare and windowless. Decoration is reserved for the inside of the house. Windows are often placed high above the street level, making it impossible to peer in. In the design of the Avondale courtyard houses different materials have been used to define the external boundary walls of the house, compared to the internal walls facing the domestic courtyard. Whitewashed surface treatment is selected for the walls facing the street to emphasise the idea of defence and protection, whereas natural timber has been selected for the internal walls facing the private courtyard to offer intimacy. This also offers some design freedom to the house owners to allow for individuality.

4.3.13 Environment and Sustainability

Sustainability was not the initial aim of this project, but I still think it is important to integrate it into the design of this medium-density development for both economic and ecological reasons. By employing the following sustainable strategies in the design, it will help reduce energy costs in the homes.

The passive solar design strategy does not involve the use of mechanical and electrical devices; it is to maximise natural resources through the design of the building, except the U-shaped and L-shaped floor plans and the orientation of the buildings to maximise solar heat gain. There is also an increase in the number and size of openings on the northern facades in comparison to the southern facades.

4.3.14 Sustainable Water Collection System

A sustainable water collection system was considered, each of the housing clusters will have their own system in order to avoid being dependent on a single system. The system allows rainwater to be collected off the roof and stored in the tank for reuse in the home’s grey water system, providing substantial savings on water use and reducing demand on the mains supply.
4.3.15 Urban Farm and Solar Design

The rooftop in the Islamic regions are often utilized as a private garden for the family, especially in the hotter climatic regions; the rooftop garden is a place to escape away from the heat with high walls built round it. It is also quite usual for the members of the family to sleep up there. On the other hand Auckland’s climate is much damper and cooler, therefore the rooftop garden may not be applicable for its social purposes, never the less an urban farm on the rooftop could be a possibility. Thus, it offers the household the potential of harvesting fresh produce, which will help them become more self-sufficient.

Solar panels will also be installed on the rooftop, which will be utilized for energy consumption and hot water production. This is the most efficient and economical way to maintain a lower energy costs.
5. The Apex Building

Due to the shape, size and other site conditions, the apex at the North West end of the site was determined early on in the project, to become a mixed use development. Due to the busy character of the joining road and the square, the apex block is not appropriate for housing, but it has high commercial value. It will also provide the extra car parks in an underground car park for the residents. (Refer to Appendix 9.7 for the car parking solution)

The mixed use development takes advantage of the most prominent location of the site, alongside the other commercial developments. It is also making a bookend to the southern end of Avondale town centre, while enriching the experience of walking into the town centre and to the public transport.

Early concepts for this sub-project (refer to Appendix 9.8) were based on the idea of perimeter blocks, but they didn’t respond well, as the height was out of context with both the surrounding mixed use development and the courtyard housing complex behind.

Therefore, a different approach needs to be considered, with these guidelines:

1. Correspond to the neighbouring developments, in terms of scale and height.
2. Respond to the busy character of Great North Road.
3. Respond to the quiet character of Wingate Street.
4. Acknowledge the residential character of the main (housing) development behind,
not by separating different uses, but by forming a link.

5. Take advantage of the northern aspect, creating a desirable community courtyard shared environment for the business premises.

6. Provide access to the underground car park without causing traffic conflict on either Great North Road and Wingate Street.

This final concept (figure 4.23, 4.24 and 4.25) is a further development in response to the various conditions stated above. The Apex building complex will accommodate 20 retail spaces on ground level, with a total of 1554m² of floor area. Offices will occupy the upper levels, with 4016m² of floor area and 47 units. A total of 128 underground car parks will be provided for the Apex development and the residents onsite.

In this concept the Apex development has been divided into two parts. The slightly taller, 15-metre high building at the apex of the site responds appropriately to the surrounding buildings at the southern end of Avondale town centre and the square. The other part of the complex is arranged in a cluster behind the larger building, with a central courtyard and two to three-storey smaller building blocks surrounding the courtyard in the middle. The morphological similarity is deliberate, so that, this part of the complex relates to the residential development.
The aim of this research design project was firstly to investigate and optimise design possibilities in achieving the goals of social interaction and community integration in a residential project. Secondly, to test the typological suitability of courtyard housing in an application to a typical housing site. During the design process a set of key principles have been identified as crucial in aiming at an optimal solution. I believe these principles would be highly valuable to most medium-density housing development in Auckland in the future.

6.1 Optimum Density
An optimum density of 40-50 dph has been determined by this project. This density range is a vital parameter of success, as it encourages people to shape a community environment, where they have to inhabit the space together. It is through sharing the space that social interaction occurs. Densities higher, or lower, than this range can result in isolation or overcrowding. Although lower density offers more individuality and privacy, it lacks neighbourliness because of isolation. Similarly, in the high-density range, isolation and overcrowding can also result in a lack of neighbourliness, due to over exposure. Subsequently, this optimum density of 40-50 dph requires more strategic planning and design solutions in achieving the desired outcome.

6.2 Multiple Modes of Movements
It is important to consider other modes of movement rather than single-purpose conduits for automobiles. The idea of living-streets, like the Dutch Woonerf36 and the German Spielstrassen37 has been integrated into this project, aiming at creating home zones, with shared surfaces allowing for the integration of multiple functions in a single street. This offers the residents greater opportunities of direct contact with the society around. At the same time it makes the neighbourhood a safe place to be, without removing the convenience of access to private car ownership and use.

6.3 Layers of Privacy
Privacy is vital for everyone. The strategies used in this project help to compensate between the perceived loss of privacy due to living in a higher density and the position of living in a shared community. A hierarchy of spaces between the dwellings defines the layers of privacy, each having been designed to be relevant for its specific purpose. These layers of space act as transitional spaces between the most private and public spaces.

6.4 Spaces for Children
Children's play brings life to a neighbourhood, and it is through children that most adults will meet. "The city of Venice has essentially no playgrounds: the city is a playground in itself", said Jan Gehl.38 The 'please play here' concept of special places for children limits the children's ability to explore freely. This project recognises the importance of children by master-planning the site in a rather playful way. It offers children the freedom to utilise the entire site as a massive and safe playground.

6.5 Housing Clusters of Mixed Size and Household Types
'No one stage in the life cycle is self-sufficient',39 says Christopher Alexander. People need support from people. Normal growth through the stages of life requires contact, at each stage, with people and institutions from all the other life stages of community.40 The strength of the cluster arrangement is to draw people together into neighbourly contact. The cluster is only going to work if it is made up of a mix of household types. The size of the housing clusters will also impact on the social behaviour of the households, they must not be neither too big nor too small. The optimum size should be within a range of six to twelve dwellings, arranged in a cluster to create intimate shared spaces in between.

6.6 High-quality Dwelling Solution
There are four variations: each cluster consists of single, two-, three- and four-people household types, arranged to reflect the percentage of household types of Avondale. This arrangement makes the housing cluster like an extended family, aiming to avoid typological segregation.

Architecturally the form of the building speaks of the essence of courtyard houses: being protective, territorial and inward looking.

Functionally each variation will provide the basic requirements of shelter and privacy, according to their specific needs.

Structurally the use of a precast concrete system will make the houses acoustically soundproof and fireproof. Concrete also has the potential to store thermal energy; the housing units have utilised passive sustainable design strategies, such as the orientation of the building units to maximise passive solar gain, passive ventilation and natural daylighting.

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38 Gehl, Cities for People, 158.
39 Alexander et al., A Pattern Language, 189.
40 Ibid., 190.
7. Conclusion

The principal aim of this project was to investigate whether the courtyard housing typology could facilitate social interaction and community integration within a medium-density housing development in Auckland.

The project started by ‘research for design’. An investigation was carried out on the courtyard housing typology in different regions and cultures. During the research for design stage, a significant finding was that the courtyard house as a dwelling typology is not going to achieve the agenda of social interaction and community integration on its own. If a courtyard house model is to be plotted on a traditional suburban section, the result would be another standalone house. Rather, housing is more an urban design issue than an architectural one, it is about how the individual relates to each other, and towards its urban context and the wider community.

The ‘research by design’ stage of the project was carried out using a suitable and typical suburban site in Avondale. Through this process a number of site-driven and programme-driven master plan concepts have been tested. A variety of courtyard housing plans and configurations have also been designed in order to examine the architectural possibilities for each master plan concept. In this process of design the six principles have emerged as key design guidelines for housing intensification, and have been developed by application to the housing typology proposed.

The design outcome of the courtyard housing offers a private, habitable space by the use of a territorially defined and enclosed space between the house interior and the public space. Its advantage over the traditional New Zealand housing typology is that it does not require a large section in which to incorporate the courtyard. Thus, it is more economical and sustainable to achieve the goal of intensification. Densities in the range of 40-50 dph have been achieved in a two storey proposal, with a wide mix of unit sizes. All units are accessed from a public space, via an enclosed courtyard, maintaining the concepts of privacy within a small group community. The larger community is also able to benefit from spatial proximity, by use of the shared access pathways modelled on the ‘Woonerf’ concept, for vehicles, children and the social activities of the group. Individual courtyard units are rotated to optimise orientation for solar access and private space at roof level is available for recreational and productive uses. A lively and dynamic public environment is created by the diversity of the facade treatments of the street-side walls in contrast with the intimate, inner private courtyards.

The final outcome of this housing scheme has demonstrated that a different approach to the orthodox planning regime in Auckland. This project has offered several fresh approaches to both urban and architectural design. Because Auckland Council is promoting greater urban intensification, the conclusion with the six key design principles should offer benefits for many future medium-density housing developments.
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This is Beijing: Hutongs Courtyard Folk Life. Beijing: Beijing TV, 2008.
9. Appendix

9.1 Recent Significant Demographic, Social and Economic Changes in New Zealand

• The aging population. In the next 5 years the impact of the aging population will become particularly evident when the “baby boomers” demographic projection reaches retirement age.41

• People are, generally, having children much later in life, if at all, or having smaller families with one or two children.42

• Fewer people are getting married,43 and amongst those who do get married the divorce rate is high (50% by age 50).44

• Handicapped persons and the mentally ill are now encouraged living in the community rather than being “institutionalized”.45

• The large number of young people leaving tertiary education with substantial student loans.46

• The average house value is higher and less affordable, causing low ownership levels in all local authorities.47

The result of these demographic and socio-economic changes is leading towards an increase of small households (1-3 persons). Yet planning controls do not reflect these changes and the current housing choice is still limited to that which was appropriate for the previous generation. In order to accommodate these demographic, social and economical changes there is a need to expand the range of housing types available to consumers.

45 Ibid.
46 Ibid.
47 Ibid.
9.2 The Evolutionary Processes of Courtyard Houses

There are two evolutionary processes which change the basic courtyard house. These are the *taberna* and the *insula* processes.

The *taberna* process results in the building doubling its height and its width. In order for it to double its depth the façade invades the road space with the erection of a portico. This was the beginning of a process which ultimately led to the development of the row houses commonly found built outside the walls of a European city during the middle ages. The *insula* process is triggered by two opposing factors in the economic cycle, boom periods when the city is experiencing rapid economic expansion and new people are flooding into the city to seek work, then the courtyards were subdivided to provide more housing; and the periods of recession and social upheaval when the wealthy families moved out and the poor occupy the abandoned houses, subdividing the space.

It is during this latter period that the amount of commercial specialization dropped in the neighbourhoods, as those with the skills left. The *insula* process in Muslim society is basically a recent process, as significant changes impacted on the roots of the patriarchal family structure in the last half of the twentieth century, resulting in the rise of the mono-family courtyard house. Recent examples of these movements are in the Chinese cities such as Beijing and in the North African cities. Beijing has been experiencing rapid economic and population growth, many of the old courtyard houses became overcrowded multi-family dwellings. In North Africa wealthy families moved into the high status colonial dwellings, while the poor then occupied and subdivided the courtyards houses that had been left behind.

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48 *Taberna*, Latin for shop; this is the process of commercialisation of the courtyard house; with the development of shops on the front of the building.
49 The process of progressively filling in the courtyard, it has now become a multi-household building.
51 Ibid., 6-7.
52 Ibid., 8.
53 这是北京.胡同.四合院.民俗生活 (*This is Beijing: Hutongs Courtyard Folk Life*). Beijing: Beijing TV, 2008.
9.3 A Break Down of Site Analysis

9.3.1 Climate

- Auckland has a warm-temperate climate, with warm, humid summers and mild, damp winters
- Average rainfall is 120mm, 19-21 days in winter and 80mm, 10-12 days in summer
- Prevailing wind direction is West and Southwest
- Long term mean temperature is 12-16 degrees Celsius
- Average sunlight hours 133 hours per month in winter and 212 hours per month in summer
9.3.2 Drainage System

Site Analysis
Service and Drainage System

- The site naturally slope towards the West and the direction of the Whau River
- There is a 5m drop from the roundabout down to the Wingate Reserve
- Storm water is getting discharged into the Wingate Reserve and the creek
- A possible sustainable drainage system into the Wingate Reserve
9.3.3 Landuse

Site Analysis
Land Use

- Southern end of Avondale town centre, therefore the development needs to consider its impact on the urban context of Avondale
- Acknowledge and respond to the different land use of the site
9.3.4 Open Spaces

Site Analysis
Open Spaces

- Lacks public open space for community activities and social gatherings
- Possible new link to Wingate Reserve
- Reconfigure the southern end of Avondale town centre for a centralized open space with possible program such as a flea market or a square
9.3.5 Public Transport

Site Analysis
Public Transport

- Local Bus Stops
- Avondale Train Station
- Bus Routes
- Western Rail Line
- 450m or 5minutes Bus Catchment
- 450m or 5minutes Train Catchment
- Development Site

- Local public transport is within the 5 minutes catchments
- With high frequency public transport, it will take pressure off the roads and streets
- With better amenities will enhance the current urban environment of Avondale this will encourage more people walking into the town centre and to the public transport
9.3.6 Hierarchy of Routes

Site Analysis
Hierarchy of Routes

- Arterial roads through Avondale town centre are Great North Road, St. Judes Street and St. George Road
- Collector links framing the site are Wingate and Larch Sts.
- Taking advantage of the characteristic busyness of Great North Road, consider potential commercial development
- Access into the housing units from the main routes can be an issue, therefore consider to introduce new streets

Arterial Road
Collector Road / Street
Development Opportunity

Great North Road
25-30,000 through town centre per day

St. Judes Street
20-25,000

St. George Road
Less than 5,000
9.3.7 Urban Block Size

Site Analysis
Urban Block Size

- Conventional New Zealand urban block is too large, not designed for the convenience of pedestrian movement causing greater reliance on private vehicles compared with smaller urban block size in Pairs
- Not supporting urban intensification and higher density development
9.3.8 Possible New Links

Site Analysis
Possible New Links

- New links are to divide the macro urban block into micro blocks
- Encourage pedestrians and cyclists to filter through the urban streets and laneways
- Reduce travelling distance, make easy reach to Avondale town centre, public transport and local parks
9.3.9 Pedestrian Movement Constraint

Site Analysis
Pedestrian Movement Constraint

- 5 way intersection prioritizing for vehicular movement and lacks of safe crossing points for pedestrian access
- Impedes connection between the development site to the public facilities, services and transportation
- Require traffic calming measures to reduce the speed of vehicular movement, making the junction more user friendly for pedestrian movement
9.3.10 Possible Solution for Pedestrian Movement Constraint

- Replace the existing roundabout with a gyratory at the junction
- Works like a roundabout in principle, but it is more space efficient than a roundabout
- Open up an unusable space in the centre and at the same time this makes the corner sites available for additional mixed-use development
- This strategy prioritizes pedestrian and cyclists movement, thereby it will encourage to reactivate the southern end of Avondale town centre, and to foster a lively, safe, healthy and sustainable urban environment, which works more effectively for the intention of urban intensification
9.4 Auckland District Plan Residential 6a Rules and Regulations

Rules and Regulation for Residential Zone 6a

- Maximum gross site area 375m²
- Intensity level requires 1 person/child per area of site is 45m²
- Maximum building height is 8m
- Maximum fence height shall not exceed 1.2m if solid or up to 2.0m in height if more than 50% transparent
- Maximum Site Coverage is 35% of Net Site Area
- Not less than 40% of net site area shall be landscaped to the satisfaction of the council
- Not more than 25% of any net site area shall be covered in an paved impermeable surface
- 2.5m building setback from the road front boundary
- Minimum size: 100m² of private open space with minimum dimension of 3m measured at right angles to the perimeter of the area. Each area must be capable of containing a 6m diameter circle. Each area shall be accessible from the unit to which it relates.

9.5 Experimental Models: Design For Vehicular Movement and Community Open Spaces Site Plan Concepts

1 Residential Development on Wingate Street
2 Mixed use Development down Great North Road
3 Massing Model of Development Site Responding to the Neighbouring Urban Context
4 Laneway Between Residential Development and Mixed use Development
5 New Links Introduced to Divide the Urban Blocks for Other Modes of Movement
6 Community Open Space in between Residential Development
9.6 Interior Daylight Penetration Experiments

Daylight Penetration: 10th of November at 8.54am

Daylight Penetration: 3rd of October at 10.47am

Daylight Penetration: 24th October at 10.47am

Daylight Penetration: 11th of September at 4.54pm
9.7 Underground Car Parking Plan Layout and Sections
9.8 Apex Building Experimental Models

Exploration No1: Stepped down geometry arranged from the Apex, this arrangement dismissed its relationship to the surrounding complex.
Exploration No2: Retail spaces on the ground level and apartments above.

Building is too large, and too high, overtake the square, but it was successful in providing a density to enable greater economic viability.
Exploration No3: the corner building at the Apex seemed much larger and higher on its own.

Architecturally the building is not speaking a similar language with the surround buildings and it is not corresponding well to the square.

Exploration No3: This concept has considered its relationship to the residential complex.
The Urban Courtyard
Housing Clusters
Community Courtyard
Neighbourhood Lanes
Playground