Theories of Urban Land Use and their Application to the Christchurch Property Market

by John McDonagh, Lecturer in Property Studies
Lincoln University

(First published as a series of articles in the Property and Land Economy Institute of New Zealand Newsletter, May – August 1997 and based on an essay written for a masters subject in 1995)

INTRODUCTION

Contrary to popular opinion, our cities are not primarily formed by the actions of local body politicians or town planners, but rather it is the aggregate activity of property developers of all types, that ultimately determine the form a city will take.

Multiple, and often conflicting factors influence developers decisions and therefore ultimately influence the land use distribution within a city. These factors can generally be categorised as: demographic, economic, sociological, legal and political. Of these demographic, economic and sociological factors tend to drive demand. Economic factors again are employed as the decision making tools choosing between various alternatives. Whereas the legal and political factors will establish the framework within which the development takes place and will attempt to influence, for the benefit of society in general, the direction of that development.

The interrelationship of factors under the previous five headings is extremely complex and one factor cannot be adequately viewed in isolation from the others. One "holistic" technique that can be used to analyse this interaction, is to study historic urban land use throughout the world in an attempt to see if any consistent patterns of development have occurred. If such urban land use patterns can be determined, and by deduction, their causes identified, this will help in predicting the future shape of cities in a similar set of circumstances.

In this essay the main theories that seek to explain city land use patterns will be analysed and critiqued followed by an attempt to relate these theories to the existing situation in Christchurch. From this, predictions will be made regarding where future growth will occur in Christchurch for the different types of real estate usage.

THEORIES OF URBAN LAND USE

Burgess

An early theory designed to explain the land use structures of cities was presented by Ernest Burgess in 1923. Burgess developed a concentric ring approach theorising that a city expands from its original centre in a series of concentric zones. This was a development of Von Thunen's explanation of rural land uses and values, put forward in the early part of the last century, and based upon the concept of a medieval village design

It was assumed that the central district would be used for intensive high rent uses such as office buildings, department stores and other retailers, financial institutions, hotels, theatres etc. The ring immediately surrounding the central district would be made up of a variety of uses including low rent workers residences for those employed in the central area as well as manufacturing, wholesaling, storage and similar activities which are related directly or indirectly to those activities carried out in the central zone.

Rings further out in the hierarchy would in turn be devoted to low cost wage earner housing, middle class housing, and on the rural urban fringe higher cost upper income housing.

A later development of the concentric ring theory states the central zone is the "100% spot" and again includes the principal stores, office buildings, banks, theatres and hotels. It is the focal point of the social, civic and commercial life of the city.

The surrounding area is termed a transitional zone, this is made up of older homes - some converted to flats, and other high density housing upon which factories and other business establishments are encroaching. To a large degree this area surrounding the CBD is blighted by the process of change and may be a high crime area. In some cities this can be slum type accommodation or other interim low rent type uses. According to Ratcliff what characterises this transitional commercial fringe of the CBD are "pawn shops, food stores, pool halls, beer gardens, strip joints, automotive supply shops, shoe repairers, cheap photographers and cheap restaurants".

Beyond the central zone and the transitional zone is the inner ring of residential uses. The people living here are the wage workers of the central zone and the transitional zone. Their houses are generally small and relatively high density or they can also be former expensive housing now converted to flats or apartments. The inhabitants prefer to live in this location because of lower rents and values and because they are within easy commuting distance of the CBD and their places of work. There is a high percentage of rental accommodation and a relatively transient population.

Further out are again concentric rings of progressively higher valued housing.

Industry displaced from the inner core or transitional area does not encroach on these residential rings but instead leapfrogs out to urban periphery "greenfields" sites, usually alongside important transport routes.

In the concentric ring theory, the basis for the higher value properties being further out from the centre is that high income earners can better afford the accompanying commuting expenses, lower housing densities and larger houses. In addition the closeness to "green" rural land uses and the consequent distance away from industrial and commercial uses will give a greater "amenity" value (and thus economic value) to those properties.
Another development of this theory is the "ripple effect" that maintains land uses spread out from a central point of high intensity (or density) to progressively lower intensity in a similar manner to ripples from a stone dropped in a pond.

One of the major problems with this theory is that it fails to recognise the significant impact of transportation routes, commuting time, topographical features and competing satellite urban centres on the distribution of land uses.

Traffic routes are recognised in the concentric ring theory as attracting lower cost housing to their proximity, due to the poorer amenity value caused by traffic volume and also by the ease with which the lower income occupiers could utilise public transport, but this tends to understate their effect.

One of the reasons may be that the concentric ring theory was developed prior to the widespread use of the motor car and its subsequent effects were not yet apparent. Since that time, while commuting cost may still be a minor concern to high income earners, commuting time and convenience are not. The traffic congestion that has developed in some cities, along with the apparent abhorrence for public transport by higher income earners has meant that for large cities inner suburbs have retained some of their attraction and value ahead of newer, but further afield suburbs. In other cases the development of new easy access via a motorway or bridge (eg Auckland) has transformed the accessibility and thus usage of large areas.

An additional problem is that geographical features will often prevent the development of a uniform radial pattern around a central point, as will the influence of nearby (or absorbed) satellite towns which have already established their own land use patterns.

Hoyt

The sector or wedge theory is an important alternative to the concentric ring theory outlined above. This theory was developed by Homer Hoyt during the 1930s and was the result of an analysis of more than 200,000 neighbourhood blocks in approximately 70 American cities.

The sector theory assumes that in a city unconstrained by geographic features, a sliced pie shaped spread of land uses will result - numerous sectors or "slices" extending out from the central business district to the cities outskirts. Within each sector like uses and people of similar social strata will tend to associate and growth will be accommodated by pushing further outward from the city centre rather than by encroaching on an adjacent sector.

Individual sectors are influenced by various transportation routes radiating out from the city centre. Particular land uses found in each sector will tend to expand outwards along these principle transportation routes as they represent the lines of least resistance. Transport routes may also represent the natural boundaries between each sector.
This theory helped explain the existence of ribbon type street frontage developments and the tendency of commercial districts to expand lengthways followed by periods of infill between the extended street frontages. This aspect was further developed into the Radial Corridor Theory which represents a change of emphasis within the sector theory rather than a new direction of thought.
Hoyt's theory also incorporates the concept of a synergistic relationship between land uses so that there is an advantage in similar land uses being located adjacent to each other. For example, industrial property will tend to locate beside other industrial property and residential alongside residential. By doing so the positive "interchange" aspects of being adjacent to similar land uses

are reinforced and the negative impact of incompatible uses being close to each other are minimised.

An additional concept of Hoyt was that, as the city grows and expands, a high proportion of housing occupied by middle and upper income groups is likely to be newly built, on former rural land, towards the outskirts of the city. This expansion outward is related to existing areas of medium/high income residential housing being constrained on either side by an intermediate value area, but with the higher income groups most able to afford to build new houses on vacant land.

Vacant land lies available adjacent to the existing high value area due to it not being available for low value housing, either, because developers have restricted it to a high grade (and high profit) use, or the value placed on the land by the market has already incorporated this profit potential to the extent prices are now so high, that development for middle or lower income housing is not viable.

Hoyt's theory also emphasised topographical factors in that high priced housing would move towards high ground, undeveloped water fronts, land with views, or similar areas with natural beauty, and away from but handily accessible to high speed transportation routes. He also observed that "there is a gradient of rentals downwards from these high rental areas in all directions." For this reason low income housing tended to be as far away as possible from high income areas and nearest to industrial sites or other low amenity factors.

Harris and Ullman

A further development of the theory of urban land uses was the multiple nuclei theory of 1945 by Harris and Ullman. This enlarged on Hoyt's thesis by asserting that cities and other metropolitan areas often evolve with more than one business district. This is particularly the case in very large cities. There is still a principle or down town business CBD or central core but as a city grows there emerge one or more additional business districts, located along major transport routes, at some distance from the CBD. Each of these becomes a nucleus for a similar hierarchy of land uses that are comparable to those occurring around the CBD according to the Burgess or Hoyt theories. For this hierarchy to fully occur, however, there needs to be an area of vacant or low intensity use land between the various nuclei.

One of the reasons for multiple nuclei occurring is that expanding cities sometimes overrun already existing commercial centres which continue to operate as a nuclei within the larger land use pattern of the city.

In other cases distance and time involved in commuting to the CBD will create the opportunity for subsidiary nuclei offering some of the more common functions otherwise performed by the CBD. This has been particularly apparent since the second world war with the widespread use of the motor car and the construction of new streets resulting in urban congestion in the central CBD areas. An associated factor is that this pattern is more likely to occur where public transportation systems are weaker and therefore do not contribute so significantly to the strength of the CBD core.

Other driving forces include synergistic factors encouraging certain activities to clump together in particular locations or at the other end of the scale, incompatible uses locating as far apart as possible.

Succession Theory

All the above theories assume that over time, urban growth will result in a "succession" of different land uses as the "highest and best use" changes. In this way, for example, commercial areas that are already constrained by other surrounding uses (in a ring or sector) will eventually expand only by the acquisition and redevelopment of neighbouring uses, changing their character to that of the commercial property.

The theory of succession is also considered to apply to the residential property market and may occur in advance of acquisition pressure by other uses. For example occupants of older but originally high cost housing close to an expanding commercial area consider the prospect of modernising and rebuilding their houses but often decide instead to sell. In doing so a filtering down process commences, in which high cost and medium cost houses of yesteryear gradually decline and are occupied by a succession of lower income owners and tenants until they are eventually converted into apartments or flats. Eventually these are demolished and replaced with commercial or industrial premises.

The succession theory is therefore a useful overlay to the broader theories in explaining the transitional areas that often occur between land uses, but are not explained by other theories.

Technology

Another factor influencing land use patterns is change in technology. The influence of the motor car has already been mentioned but changes in heavy transportation and containerisation have meant that industrial land uses are tending to spread further out from the central business district than was historically the case. In addition industrial concerns are demanding larger buildings with lower site coverage to cope with these transportation changes.

Industrial users often find existing sites too constrained for these technological changes or even just due to simple expansion of their business. They need to move to "green fields" developments to allow this expansion to take place. This has resulted in many new industrial locations being on the outskirts of cities whereas older industrial areas closer to the CBD gradually decline and become unsuitable for current industrial operations. Redevelopment of these areas is often fraught with high cost problems, such as site amalgamation and environmental clean up, that are not present in a green fields type development. This can result in inner city "waste lands" such as the dockland area in London before redevelopment.

Technological change via computerisation has made suburban office parks, with their low site coverage, available parking, enhanced environment and convenience to the workforce, not only attractive to local service providers but also corporate head offices and government departments.

Weber's Theories

Further theories of land use relate to specific sectors. For example, last century Weber's theory dealt with the importance of location, in respect of raw materials and markets, for particular industries. These considerations are termed transfer costs and effect some industries in particular. Other industries are more sensitive to processing costs and need to locate close to sources of labour, availability of infrastructure and facilities. Then again some industries that are neither market nor material orientated may locate at a specific location because of some synergistic relationship with other businesses. For example, they may share local pools of managerial or consultant talent, they may wish to take advantage of relatively low living costs, or a high standard of amenity, or good water supplies, or cheap electricity, etc.

Economic Base Theory

This theory can help identify which particular industries are dominant in a city, and as a consequence, the factors above most likely to influence the direction of industrial growth.

Traffic Counts

In respect of retail development, theory would have it that prime locations are related to the trading ability of that site. In the past this was closely tied to pedestrian counts and access via public transport. Over the last 50 years this theory has been extended to include motor vehicle counts and particularly availability of motor vehicle car parking.

Convenience goods suppliers these days often find it more advantageous to locate away from the central business district so they can better supply the daily needs of people living in a particular neighbourhood. This trend is also being followed by some service providers such as real estate agents, dentists, lawyers, accounting firms etc.

Again the degree to which this theory applies is often a function of scale. Small cities still find the CBD area the most significant location for commercial activity, but as the city grows the dis-economies of scale mean that suburban centres become progressively more important, and the city experiences a decentralisation of their retail activities. In some situations this has resulted in a concentration of the CBD's activities with a reduction in its geographic size, the outskirts of the CBD characterised by low rent, low intensity retail uses, or car parking. In very large cities this can result in a "dead centre" with only daytime office uses, very little retail and night time crime problems.

Shopping Theory

Another theory that helps explain urban retail distribution is the different distances people will travel to purchase convenience goods, specialty goods, and shopping goods. This is particularly reflected in the location of shopping centres which now represent an interim scale of land use between the neighbourhood shop and the CBD. The successful positioning of shopping centres is contingent upon an adequate catchment of shoppers and not being subject to competition from alternative shopping centres or the CBD. In reality however, shopping centres often grow

out of existing and perhaps not ideally located neighbourhood shopping centres, or alternatively as the result of the arbitrary positioning of these centres by town planners.

Residential Theory

Theory in respect of residential location asserts that the typical householder wants convenience, adequate space and a pleasing environment. Therefore, as well as the straight economic considerations applicable to industrial and commercial space we have the influence of a far more subjective factor. Personal preferences can be fickle and what may be desirable to one consumer may be undesirable to another. In addition "fashion" can play a significant role.

Before the advent of modern transportation facilities, "convenience dictated that residential locations were very much tied up with proximity to a workers place of employment". Today however, housing can be located almost anywhere within a large commuting zone, and the location, style and amenities are dependent on the workers personal "trade off" preferences along with willingness and ability to pay.

As can be seen from the above, there are a large number of theories seeking to explain urban land use patterns and we have not even started to consider political factors, nor the more esoteric mathematical models. This serves only to indicate the complexity of the situation, and the fact that no one model is adequate.

Reviewing all the above it is usually the sector theory in combination with the multiple nuclei concept that provides the most meaningful "holistic" explanation of the land use patterns found in modern cities. That being said there are quite significant variations apparent which some of the other theories can help explain. One of the most important is to consider the relative size of the city and its economic base. With a small rurally based economy the land use patterns are likely to tend towards the concentric ring theory. If a city is larger and more industrialised the sector theory is more likely to be applicable, and when the city becomes very large the sector theory in combination with the multiple nuclei concept is most likely to be dominant.

Overlaying all these "classical" theories is the assumption that a laissez faire type system is in place which allows the market to determine where uses eventuate. While this is representative of reality for many cities up to the middle of this century, and is the foundation upon which many of the various theories have been based, in recent times the influence of town planning has been very much more significant. Whether these theories will continue to be adequate to explain the shape of cities in the future remains to be seen. It is likely the influence of political and social considerations, as reflected in the planning process, will become more and more dominant with the result that the patterns of urban growth will be even harder to analyze and predict.

APPLICATION OF URBAN LAND USE THEORIES TO THE CHRISTCHURCH PROPERTY MARKET

As might be expected, the older areas in Christchurch most clearly exhibit the early concentric ring theories of land use. In particular the CBD, centred on Cathedral Square, represents the core of this land use distribution with, historically, a discontinuous ring of light industrial/warehousing and worker accommodation uses immediately surrounding the central district to the south, south west, east and north. South of Lichfield Street down to the railway were substantial enterprises, many associated with the clothing industry. To the south west and east saw less significant general industrial buildings, along with breweries, food manufacturers and the fruit, vegetable and flower markets.

These uses were generally related directly or indirectly to those activities in the central zone in accordance with the concentric ring theory. There was little residential accommodation to the south of the square until beyond the railway line, but in the eastern area between Madras Street and Fitzgerald Avenue and north of Kilmore street was and remains a considerable area of low rent residential accommodation. Much of the original early housing was been replaced in the 60's and 70's with higher density but still low rent housing.

The "theoretical" ring did not extend all the way around the central core. Both to the north-west and west the ring was broken by relatively high cost housing and the influence of Hagley Park and "cultural uses" such as Christ's College, the University and Christchurch Boys and Girls High Schools. The Avon also formed a natural boundary and, because of the particular amenity values associated with the river, the central business area flowed directly into high cost residential without the transitional zone of industrial, warehousing and low cost housing uses that would have been expected in accordance with the concentric ring theory.

Further out from the central city, particularly to the east, south and south-west we see a continuation of land use patterns in accordance with concentric ring theory. Areas such as Linwood, Phillipstown, Waltham, Sydenham and Addington originally, and still to some extent, contain low cost worker housing. The vast majority of this original housing has been replaced in some areas though, particularly in Sydenham.

Further afield again we have the historically middle class suburbs such as Opawa, St Martins, Beckenham, Somerfield and Spreydon and to the north Richmond and St Albans. In accordance with the theory these represent another concentric ring of medium priced housing. High cost housing reflects the theory only to the south being represented on the city periphery by suburbs such as Cashmere, Hillsborough, and Huntsbury.

The concentric ring theory can therefore be seen to apply reasonably accurately to the south, south-east and south-west of Christchurch city, especially in relation to properties built up to the 1920s. It appears the accuracy of application is related to the age of the housing, and as a consequence the economic base of the city (i.e. rural), the relative size of the city (small) and the available transport technology (pre motorcar). In other words the city still closely resembled the rural Von Thunen foundation for the concentric ring theory. Also at least until the Heathcote and Port Hills were reached, there were no topographical features to the south, southeast, and southwest that would impinge on development in accordance with the concentric ring theory.

The same could not be said to the north of the city, where the early established high value area of Fendalton, along with the enhanced amenity value influences of the Avon River and Hagley Park would have significantly constrained development in accordance with the concentric ring theory in this direction.

Another applicable aspect of the concentric ring theory is how the "transitional zone" on the periphery of the central zone is quite evident in Christchurch. This is particularly so in the areas of Lichfield, Tuam and Manchester Streets which, as per the theory, are blighted by the process of change. We don't see slum type accommodation in this location but we do see the other interim low rent type uses identified by Ratcliff such as: "pawn shops, pool halls, beer gardens or bars, strip joints, automotive supply stores, shoe retailers, cheap photographers and cheap restaurants". Further to the east surrounding Latimer Square we saw formerly expensive houses converted to low rent flats, but most of these have now gone.

Interestingly in Christchurch, the central business district, rather than expanding into this transitional zone has in fact shrunk, due to the "concentration" of retailing by the development of malls and arcades. This has seen some previously central areas such as lower High Street turn into a transitional zone as identified by the concentric ring theory.

The theory though, does not seem to apply very well to the north and west of the city which, as mentioned earlier, are influenced by the Avon River, Hagley Park and cultural amenities. We no longer seem to see any significant transitional zone in these areas (Victoria street once was) and indeed the CBD central zone has in effect been extending down Victoria Street influenced no doubt by the Park Royal Hotel and Casino developments.

To the east and south the concentric ring theory is again strengthened when considering the relatively high density of housing, the predominance of low rents, low values, a high percentage of rental accommodation and a transient population. All of these factors fit with the theory and are reflected in the City, Linwood, Phillipstown, Waltham, Sydenham, Addington, and to a lesser extent St Albans and Richmond neighbourhoods.

The basis of the concentric ring theory: that higher valued properties can be further from the centre due to the higher income earners being better able to afford commuting expenses, is well reflected to the south of Christchurch. However, overall Christchurch is of such a size that commuting expenses from any of the neighbourhoods are relatively insignificant. More importantly perhaps, the public transport system is particularly weak, and as the inner suburbs do enjoy the best service available in this respect, it most likely strengthens the concentric ring land use pattern.

The adverse environmental impact of transportation routes on property distribution, in accordance with the concentric ring theory, does not arise in Christchurch to any great extent because the traffic volumes carried by our major routes are not so heavy as to greatly affect the property values. Some major routes such as Fendalton Road still have very expensive housing along their frontages and it is only in a few cases such as Riccarton Road, Lincoln Road, Cranford Street and Ferry Road that a significant impact would be apparent.

In conclusion, the concentric ring theory is useful in explaining the patterns of land use in the older, inner areas of Christchurch city particularly to the south, east and southwest, but does not adequately address land distribution to the north-west, west and more recently developed outer suburbs.

Turning to the sector or Hoyt theory helps the situation considerably. It is obvious that the north-west "wedge", represented initially by Fendalton, has always been a desirable residential location in Christchurch. Much of this is tied up with the amenity values offered by nearby Hagley Park, as well as river frontages available to many properties in the Fendalton area. This area also had a particularly good water supply, important in the early days of settlement in Christchurch city.

This wedge or sector has as its natural boundaries Riccarton Road and Papanui Road. After the initial development of inner Fendalton we had later development of high cost housing in adjacent suburbs such as Merivale, Riccarton, Ilam, and Bryndwr in more recent times Avonhead, and Burnside. This extension outwards of land uses of a similar quality constrained by adjacent areas of different quality (as represented by housing in St Albans and to the south of Riccarton Road) conforms almost exactly to the wedge theory or sector theory developed by Homer Hoyt.

In accordance with the theory, transportation routes radiating out from the CBD are central to the development of sectors, as these represent "the lines of least resistance". In the case of Christchurch's north-west these routes are primarily represented by Fendalton Road and Memorial Avenue, and to a lesser extent by Rossall Street, Strowan Road, Wairakei Road, Creyke Road and Maidstone Road.

The other major roads, Papanui and Riccarton, did not so much support the development of this area as constrain it, as the land uses either side of these two streets were quite different, although the influence of Merivale has now spilled over Papanui Road into the western parts of St Albans. It is interesting that, apart from the original inner upmarket area of Fendalton, the adjacent areas such as Bryndwr, Ilam, Avonhead, and Burnside were only developed since the advent of the motorcar. This ties in with Hoyt's theory, which was based on cities in the United States which would have been going through the same process of motorisation in the early to mid part of this century.

The ribbon type street frontage developments that are also characteristic of the sector theory can be easily seen along Papanui Road in respect of motel development and along Riccarton Road in respect of commercial development. This can also be seen in other areas where the sector theory is not otherwise so obvious such as south along Colombo Street, south-west along Lincoln Road, and south-east along Ferry Road. We have not, however, seen the development of commercial use infill between these major routes as would be indicated by the theory, largely due to the relative size of Christchurch and the ease of access to the central business district.

As well as Fendalton and the other high value areas further out to the northwest, the sector theory can also be seen to apply clearly to other residential neighbourhoods. For example to the northeast we have the older, inner middle income areas of Richmond and St Albans merging

into newer but similar status suburbs such as Dallington, Shirley, Burwood, Avondale, and Mairehau.

By the same token the older lower income suburbs such as Linwood and Phillipstown to the east, tend to merge into similar low class neighbourhoods such as Woolston, Bromley, Aranui and Wainoni.

Another concept of the sector theory is that the middle and upper income groups are most likely to build new housing on the outskirts of a city. This is again evident in Christchurch by new developments such as Westmorland, Hyde Park and Regents Park as well as parts of Parklands, Halswell and areas off Lake Terrace Road. This reflects the theoretical restriction on the development of new low cost housing discussed earlier, and in fact the predominant supplier of new low cost housing has, until recently, been the Government via the Housing Corporation.

Developers have also, in accord with the theory, secured land well in advance of it being required for new high cost housing in order to protect their markets and further enhance their profit margins. A potential example of this is the purchase by Apple Fields Ltd. of large areas in the green belt adjacent to existing high value residential developments. In the meantime these areas are being used for orcharding purposes. The same applies in respect of Enterprise Homes who have secured a similarly large area within the green belt, but bordering on to housing already developed by the company. This is classical development theory in action.

The situation in Christchurch also reflects Hoyt's emphasis on topographical features influencing land uses. We have seen the high value uses move towards the river frontages and towards the hill areas with their consequent views. But inexplicably we have also seen high value areas move towards the airport and little movement towards the largely underdeveloped water front areas of New Brighton. This perhaps, shows how the strength of the sector theory in respect of like uses locating near each other is far stronger than the influence of a topographical feature such as the airport. It also may be a function of the relative light usage of the airport at present and it will be interesting to see if in twenty years time the premium attached to Burnside and Avonhead properties remains.

The sector theory again can be seen to apply to industrial areas. To the south-east we had an extension of industry along the railway line in early times, which was the primary industrial transport route, and therefore in accordance with Hoyt's theory the line of least resistance. This can be seen in the industrial areas of Waltham and Woolston. Expansion in this direction was also particularly influenced by the railway tunnel and access to the port at Lyttelton.

In the opposite westerly direction we had expansion sector wise, via the industrial areas of Addington, Middleton, Sockburn, Hornby and out as far as Islington. Development in this direction initially only extended as far as Addington and was constrained until the development of better road access to the Sockburn and Hornby areas. This initially occurred in the 1950-60's when the former stock route between the saleyards near Hagley Park and the abattoir at Sockburn, along which stock were originally driven on foot, was converted into a major four lane road - Blenheim road. Previously access to Sockburn and Hornby had only been possible via congested Riccarton Road and a similarly difficult route along Lincoln Road and Annex Road. Once Blenheim Road was completed the development of Sockburn and to a lesser extent

Hornby occurred quite rapidly. This was at the expense of other developing industrial areas such as Woolston and particularly the Bromley-Bexley industrial area.

This process needs to be viewed in terms of the political situation of the time. Greater Christchurch was divided into a number of local authorities and in particular, Paparoa County Council and Waimakariri District Council were competing with the City Council in trying to attract industrial development and the rating income that goes with it. Paparoa County had ample industrially zoned land and importantly it had better access to the north and south road routes as well as the airport. Deregulation of the transport industry made the western side industrial areas far more attractive than the eastern Bromley/Bexley/Woolston areas within Christchurch City Council jurisdiction, which had difficult access to both north and south main roads as well as a smell problem from the nearby sewage treatment works. By this stage access to the railway line had become less important, particularly as there was also a road tunnel giving an extra route to Lyttelton Port.

One of the reactions of the Christchurch City to this difficulty of access was to promote major new roading initiatives, such as the Brougham Street expressway, as well as extensions and connections of major roads through to the Bexley area. At the same time Waimairi was trying to take advantage of its own industrial areas' proximity to Christchurch airport as well as the north/south city bypass route. These competing political entities probably distorted the reflection of land use theory in the shape of Christchurch's development and it will be interesting to see if under the now united Christchurch City Council a different development pattern takes place. As it is, the improved access to the port via the Brougham Street and Opawa expressways further strengthened the dominance of the Hornby, Sockburn area, although the Bexley area has started to pick up in the last five years.

This influence of road, rail, sea and air access routes only further strengthens the application of the sector theory to these industrial parts of Christchurch city. We have also seen the phenomenon of ribbon type industrial development followed by subsequent infill, again a characteristic of the sector theory, in places such as Blenheim Road, Buchanans Road, the Main South Road, and Carmen Road as well as Dyers Road and Maces Road in Bromley.

There have however, been other less visible influences on industrial development in Christchurch. One of these was a significant restriction on trade waste disposal into the sewerage system in the Hornby area. This prevented many industrial concerns that were high volume users of the sewage system, from locating in the heavy industrial I4 zone of the former Paparoa County. This inhibited development for some time, but has now been relieved by upgrading and by the closing down of the Islington Freezing works which previously used much of the sewerage capacity in the Sockburn/Hornby area.

The multiple nuclei theory developed by Harris and Ullman is less apparent in Christchurch than the two earlier discussed theories. The central business district is still very much dominant in Christchurch, largely due to the relatively small size of the city, the relatively flat and featureless topography and the ease with which it is possible to travel from one side of the metropolitan area to the other in a motorcar.

We have, though, seen recent expansion and development of new shopping centres along one of the major transport routes, i.e. Riccarton Road. While significant, it is not expected that this will be a new nucleus for development as it is too close to the central business district and already enveloped by very well established residential areas. It is possible that development of the Papanui/ Northlands area may eventually comprise a small nucleus but again it is already surrounded by developed residential areas and a true hierarchal structure is unlikely to expand beyond the central retailing core. The same could apply to Hornby, New Brighton, and Sumner

One of the reasons we have not seen the multiple nuclei theory reflected in Christchurch's structure is that the city itself has been constrained by a fairly rigorously enforced green belt policy, combined with a relatively constant population base. The latter factor though has changed recently with an influx of immigration. This has prevented the spread of the city to include existing satellite centres such as Kaiapoi and Rangiora. These have remained physically separate and, although they exhibit some of the hierarchy of uses in their individual layouts, they predominantly constitute dormitory towns. The majority of residents still work and shop in Christchurch. Distance and time involved commuting to the CBD are not yet a problem, and are unlikely to be so until the well established critical commuting time of 45 minutes is exceeded. This is likely to be quite some time off in Christchurch's case.

Where the city has expanded, this has been due to changes in lifestyles and accommodation preferences rather than population pressure. This is evidenced by the generally upmarket or "lifestyle" character of most new development areas.

New "green fields" land on the city edge has also been relatively cheap for developers to acquire and this factor has not encouraged redevelopment of inner city low cost housing areas or obsolete inner city industrial sites. If the Council succumbs to current pressure to allow further development in the green belt this will only make comprehensive redevelopment of the inner city even less likely.

The public transport situation in Christchurch is particularly weak and therefore multiple nuclei development could be expected to easily arise when traffic congestion becomes intolerable. The flip side to this, though, is that Christchurch has a relatively good roading system with almost no congestion in world wide terms at present.

At one stage in the early 1970's there was a proposal for a new satellite town to be developed at Rolleston, but this was during a period when significant population growth was anticipated which did not subsequently eventuate. The planned development at Rolleston would have been a true new nucleus as it was envisaged a full range of industrial and commercial uses would surround the new Rolleston central business district. It now seems unlikely that this will proceed on the scale originally intended in the foreseeable future. However, some expansion of Rolleston is occurring and is expected to accelerate. Some major employment generators will be necessary for Rolleston to assume the identity of a true nuclei rather than becoming a commuter satellite town similar to Kaiapoi and Rangiora.

The theory of succession can be seen to apply to some parts of Christchurch but not others. The unusual shrinking of the CBD, rather than expansion, has already been discussed which is almost a negative form of succession and quite contrary to the theory. However, to the east of

the city we have seen older but originally high cost houses replaced with cheaper, low rise high density housing which again is nearing the end of its economic life and likely to be redeveloped in the not too distant future.

We have also seen the original low cost housing areas of Sydenham almost completely transformed into high density industrial areas. Part of this process was encouraged by the planning blight that descended on Sydenham for several decades while a major motorway route was proposed through the area. Many properties were acquired by the Ministry of Works at that time and eventually found their way into being used for low rent temporary uses such as car wreckers. After many years, the proposal for the motorway was abandoned and these areas have subsequently been redeveloped into more upmarket industrial premises.

The theory of succession seems to have applied very little in the Fendalton and Cashmere areas where old, original high cost houses are still in significant demand and are unlikely to be replaced by any other use in the immediate future. In contrast, we have recently seen a proliferation of cross leasing and infill in parts of Beckenham, St Albans, St Martins and other medium quality, but elderly housing areas. This is of quite some concern to the people in those neighbourhoods as many believe this is the start of the filtering down process similar to that which has already occurred in places such as Linwood, where once new and attractive ownership flat properties of 15-20 years ago are now low cost rental accommodation. This development also significantly impacts on the demographic profile of the area with a large inflow of predominantly elderly people purchasing the new units.

Some other theories reflected in Christchurch's land distribution are technological changes such as the use of containerisation as well as political effects such as transport deregulation. In combination these saw the previously inner city industrial areas no longer capable of coping with the large yard and parking areas associated with these new forms of transport. This very much stimulated new industrial development on large sites in the Hornby and Sockburn area, down in Woolston and to a lesser extent Bexley. The introduction of the one way system into the centre of Christchurch in order to cope with CBD traffic congestion, while solving that problem, exacerbated the difficulties in truck access that were facing inner city industrial properties accelerating the process.

In respect of Weber's theories of location of industry, in relation to raw materials and markets, Christchurch has always been a market and transfer town for its rural hinterland and is likely to remain so. Access to international transport routes has, therefore, always been important and the location of export industries close to the railway line, to the main roads north and south, and on the route to Lyttelton has been important, particularly since transport deregulation and competition between ports for export business. We have also seen a remarkable recent growth in industry wanting to locate near the airport because of the importance of air transport to some of our high value fresh produce and hi-tech industries. Because of ease of transport in and around Christchurch we have not seen industrial location having significant impact in respect of the local market and there are no significant industries in Christchurch relying on bulky extractive industries.

A similar effect to that discussed above in relation to transport technology has afflicted industries who are simply expanding. Many of these who were located in the inner city found

their existing sites too constrained for business expansion and were forced to move out to Sockburn, Hornby, Woolston or Bexley in order to source a site of sufficient size for their new operations. Many industries have bought excessive areas in order to protect against finding themselves in the same situation again. This relocation has left areas in the city that are ripe for amalgamation and redevelopment for industry, but often these areas are fraught with high cost development, environmental, town planning and traffic problems. Until prices of "greenfields" sites go up this is unlikely to occur. Councils at the same time have a vested interest in keeping industrial land prices down, as this can attract industry and thus economic development to the city. For this reason most cities historically zone "plenty" of land for industry keeping the supply up and prices low.

The theory of commercial development in relation to pedestrian counts and traffic counts is well illustrated by land uses in Christchurch. The highest value commercial uses have tended to congregate in those streets with the highest pedestrian traffic. Again the concentration and reduction in size of the central business district, as discussed earlier, also affects this issue. As the motor vehicle has become more and more important in the city, particularly since the 1960s, the relevance of traffic counts has become significant. Those locations that enjoy very high passing vehicle counts are now characterised by semi retailing uses such as: car sales yards, appliance stores, furniture retailers and bulk retailing outfits such as Mitre 10 and Placemakers - Moorhouse Ave is a prime example.

Another theoretical aspect that is increasingly applying to Christchurch is the lack of central city car parking impacting on the desirability of both retail and office space in the central city for some uses. A number of office users and retail tenants for whom car parking and proximity to customers are critical are moving away from the CBD and into suburban locations solely because of this factor. We have seen the development of semi-retail and office parks in areas such as Mandeville Street and along Bealey Avenue, the high tech office park development out near the airport, and the new retailing and office developments occurring along Moorhouse Avenue and near Ferrymead. These trends are likely to continue in the future, particularly if no new parking buildings are constructed in the inner city. It has not however yet progressed to the scale of Auckland and other cities which have seen very significant depopulation of their CBDs by retailers and office users.

A final theory that helps to explain urban land uses is the different distances people will travel to purchase convenience goods, specialty goods, and shopping goods. This is clearly evident in Christchurch by looking at the tenancies within the various shopping centres. It is fairly plain that travel time is not significant in influencing the location of "shopping goods" retailers (eg furnishing/whiteware) but "convenience goods" and "specialty goods" are generally well catered for in local and neighbourhood shopping centres dotted around the city. The only shopping centres approaching a scale so as to incorporate "shopping" type goods are those located along Riccarton Road and potentially Northlands after it has been redeveloped. There is quite a lot of contention that Christchurch is significantly "overshopped" and not all existing shopping centres and other retail areas will be able to survive long term unless there is a significant growth in consumer spending. It is also characteristic of Christchurch that the location of shopping centres has been more a result of historical precedent and relatively arbitrary town planning decisions rather than shopping centres locating in areas that best match their natural catchments.

FUTURE GROWTH OF LAND USES IN CHRISTCHURCH

In my last article for this publication I put forward my view on how the historic and existing patterns of land use in the city of Christchurch could be explained, at least in part, by reference to some of the "classic" theories of urban land use as developed over the last one hundred years.

In this article I will attempt to predict future land use patterns for this city - a dangerous pursuit at any time, but potentially even more controversial at this time in the city's history, given the recent and atypical increase in population combined with the comprehensive review of the city plan.

While the "classic" theories adequately reflected the economic and sociological forces that dominated development in the early part of this century, the future growth of land uses in Christchurch will be increasingly determined by less predictable political forces. That said, the patterns that are already in place will have a very significant influence on both political and economic decisions of the future.

For the above reason the currently most evident "sector theory" is likely to continue to predominate, but more evidence of the multiple nuclei theory will emerge due to a number of factors associated with the cities growth.

Firstly there are a number of physical factors constraining the growth of particular sectors. To the east development now extends as far as the sea and to the south as far as the hills. To the north- west there is little room for expansion before the influence of the airport becomes overpowering, or the floodplain of the Waimak is encroached upon.

Political constraint, in the form of the "greenbelt" has hitherto prevented expansion onto the good soils of the Marshlands or Halswell areas and expansion west beyond Hornby is constrained by storm-water and sewage servicing difficulties in addition to greenbelt considerations.

However, the integrity and extent of the greenbelt is now under considerable pressure due to both a perceived weakening of the protection of quality soils under the Resource Management Act, and the persistent pressure of developers who have over the last fifteen years secured substantial blocks of strategically located rurally zoned land with the long term view that the green belt will be "loosened".

If the "loosening" of the green belt is only slight we are likely to see further encouragement of growth in the satellite communities of Rangiora, Kaiapoi and Rolleston. This growth, already substantial to the north, will be further strengthened as commuting to the city becomes more congested and as a result the service and employment infrastructure of the satellite communities develop. The latter is already being bolstered by the increase in demand created by the significant population increase in the "lifestyle block" belt that exists both within and outside the greenbelt area.

Dealing with each major category of land use in turn:

Residential growth can still occur on the Cashmere hills, with a significant area of medium density land recently developed on the old Coronation Hospital site, and a new low density subdivision recently approved for the Kennedy's Bush area. There are other areas also suitable for housing but developers of hill property will always want to restrict supply and keep section prices and thus margins high, due to the high costs and risks of physical construction. The uniqueness of hill properties will always command a premium and while the top of the market is volatile in terms of turnover it is not so price sensitive as other markets, therefore the high margins will be there for those developers who get their timing right.

Residential land use is close to capacity out to the east, with only small areas remaining undeveloped in Parklands. It is this medium quality of housing that is most likely to be redirected to new developments in the satellite towns where traditional suburban "scale" and amenities will be able to be accommodated.

To the north, west and south-west it is the political decision in respect of the greenbelt upon which future land uses depend. If restrictions are relaxed, sector style expansion into these areas is probable, whereas if retained, growth will be accommodated in the satellite towns, and also by redevelopment within the city. The latter has not been a popular option up until now except for very close in and relatively expensive apartment development. For example, the Addington workshops area remains vacant and there are many older properties from Madras street East to Fitzgerald Ave that could be comprehensively redeveloped into medium density, moderately priced housing. However, while relatively cheap and problem free "greenfields" areas remain available developers will focus on these. If supply of these becomes restricted it will lift land prices to a level where redevelopment of obsolete industrial and residential areas into new, medium to high density housing areas with a range of values, becomes viable. On the other hand, if supply is not restricted these inner suburbs are likely to remain "in transition" for quite some time.

Infill in respect of the "cheap and nasty" cross leasing evident in recent times is likely to cease soon because of a combination of negative public reaction, legislative change and reduction in the supply of subdivisible sections. Infill will instead be redirected to the more comprehensive schemes discussed above.

Industrial land is still plentiful in Christchurch and likely to remain so. The long term take up rate for industrial land is 15 ha per annum and at this rate, there is still over 20 years supply available (Regional Council and other reports). Many existing industries have spare land on which to expand, and low land costs have, so far, not spurred the redevelopment of long obsolete and unutilised factories such as the former Crown Crystal Glass, Skellerup and Islington freezing works complexes.

Corporate Real Estate Asset Management - the process of large organisations continually reassessing their property needs in light of their strategic objectives - has gathered steam in recent years with the result that substantial areas are being released to the market. Wigram Airforce Base closure and the completion of the relocation of railway operations to Middleton are notable examples - both potentially releasing large areas of industrial land onto the market.

The strong industrial sector growth of a few years ago has now subsided and was in any case largely limited to niche markets. As the economy begins its predicted slow recovery, market niches will continue to provide opportunities and while a continuation of recent new building development is expected in the Sydenham, Hornby and Airport areas other areas will remain in the doldrums.

In the longer term the new roading links opening up the Woolston and Bexley areas are expected to help these localities catch up with Sockburn and Hornby but only after supply in the latter becomes constrained which could be some time off.

While it is desirable for the satellite towns to develop their own industrial base, they will have to offer a minimum critical mass plus very cheap land, rates relief, or other offsetting advantages to combat the distance, infrastructure and synergistic benefits of Christchurch city sites

Commercial development in Christchurch is already in an oversupply situation according to many commentators. The future is likely to bring little net gain in this land use but rather a significant redistribution and upgrading.

In respect of office space there still remains an overhang from the last period of supply and little speculative development is expected until this is absorbed. Once it is, new high rises are expected to concentrate north and west of the square with those overlooking the river and other open areas having a competitive advantage. Parking and easy access are expected to become even more important than at present as the city grows. For the same reasons, plus the changing nature of many service organisations the developing trend to relocate from the CBD to fringe or suburban locations such as the four avenues, Papanui, Church Corner and near the airport is likely to continue.

Increasing use of "home work" telecommuting, and office and job sharing will lead to more demand for serviced and "intelligent" offices located close to residential areas. Eventually small developments of this type will be found "dotted" all around the city.

Retailing will continue to dominate ground floors in the CBD, but with a greater concentration on niche, upmarket, entertainment and tourist uses. Day to day purchases will be largely confined to the suburban shopping centres and discount warehouses with which the CBD retailers will not be able to compete. "Shopping" goods will be obtained from retail warehouses operating from semi industrial-showroom type premises located along major traffic arteries such as Moorhouse Avenue, Blenheim Road, The Main North Road and parts of the one way system.

When the satellite communities reach a "critical mass" new shopping centres will be developed to obviate the need to travel to the city for most purchases. This may have a significant impact on those Christchurch malls that now serve these markets (Northlands, Shirley, Hornby) and their recent and proposed redevelopment can be interpreted as a “pre-emptive strike” to try and prevent or at least delay the establishment of viable compassion in the satellites.

CONCLUSION

As stated in my previous article many factors conspire to create the patterns of land use evident in our cities and Christchurch is no exception.

Studying patterns of land use is a "holistic" way of helping us understand why these patterns exist, and how the existing situation combined with anticipated change will influence patterns of land use in the future.

Christchurch shows evidence of the concentric ring theory in its early development with the sector theory more recently dominant. It appears that we are approaching the size that coincides with expansion according to the multiple nuclei theory, but to some extent this rests with political decision making associated with the green belt policy.

Predictions of growth are difficult when overlaid with a political dimension of such importance, but residential expansion is inevitable while immigration and change in lifestyles continue. New demand will be accommodated by a combination of redevelopment and infill of existing areas and either sector wise expansion to the north, west and south west or redirection of this growth to the satellite towns. The relative balance between these options and therefore the way in which Christchurch will develop in the foreseeable future will be determined by decisions to be taken in respect of the greenbelt in the very near future.

In contrast it is evident that for the commercial and industrial markets, it is not straight growth in land use that is anticipated, but rather a re-focussing of activities that will see some new uses develop and others pass into oblivion. Theories illuminating this process include those of succession, technological change, economic base, transport, shopping behaviour and Weber's theories of transfer costs. None is likely to be dominant however, with the particular sector under consideration largely determining what factors are most significant but again over laid by the influences of the political process.

Some of the above analysis may prove controversial and responses to the editor of this publication will be welcome. The predictions are put forward for discussion by someone without a vested interest in any particular policy decision, but rather in an attempt to stimulate informed debate on issues that will affect all residents of Christchurch for a long time into the future.

REFERENCES

Barlowe, Raleigh. Land Resource Economics. Prentice Hall, Englewood Cliffs, New Jersey, USA, 1978

Ely, R.T. and Wehrwein, G.S. Land Economics MacMillan, New York, Usa 1940.

Mahoney J.D. Urban Land Economics. N.Z.I.V. Wellington 1974.

Park, R.E. and Burgess, E.W. The City. University of Chicago Press, London. 1925.

Proceedings of the Conference on the Growth of Greater Christchurch. Department of Economics, Canterbury University. 1955.

Ratcliff, Richard U. Urban Land Economics. McGraw-Hill, USA. 1949.

Richardson H.W. et al. Housing and Urban Spatial Structure: a Case Study. Saxon House, Westmead, Farnborough Hants. England. 1975

Richardson, H.W. Regional Growth Theory. McMillan Press, London. 1973.