Reflections on Urbanism:
Public Infrastructure for Networked Realms

A thesis submitted in fulfilment of the requirements for the Degree of Master of Architecture

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June 2008
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I certify where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award, the content of the thesis is the result of work which has been carried out since the official commencement of date of the approved research program; and, any editorial work, paid or unpaid, carried out by the third party is acknowledged.

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June 2008
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Preface

This Masters thesis is a response to contextual aspects of Broadmeadows. It includes three strategic proposals for transposing public infrastructure within the suburban centre. The first is a mixed-use carpark, the second is a retail outlet, and the third is housing and recreation.

Initial research projects in Moreland and Oakleigh, sites of different topography and locality, has led to an exploration of the notion of urban interfaces in Broadmeadows, which are parallel to the yearly theme conducted in Urban Architecture Laboratory (UAL) studio at RMIT University.

Studies in Moreland considered urban density of under-utilised land for housing and domestic industry. An investigation into threshold conditions between zones such as court, cul-de-sac, kerb and open space were carried out. Qualities of conditions studied have been incorporated into the new strategic proposal. These qualities have been further applied to be tested in other suburban scenarios. These areas are mostly under-going transformations in growth as part of the network of suburban centres consistent with Melbourne 2030.

Transformed suburbs are a platform to question adequacy for mixed-use sites and flexible space and pragmatic demands in the design process. Spatial models on the periphery of activity centres were studied. These models were hybridised and resolved into the new configurations. The techniques studied through this process have contributed to generate proposals for public infrastructure in the three final projects within the suburban centre of Broadmeadows.
Introduction: Broadmeadows

Broadmeadows is located within the network of transit cities. The first project is a mixed-use carpark which is an infill in the open space between civic buildings. The carpark is a re-distribution of parking space within the suburban centre. It comprises fixed and flexible programs, which are parking, commercial and cultural respectively. The second is the re-location of a group of large-scale retail premises into a redundant factory. This factory has been turned into a retail centre housing retailers and functioning as a gateway to the industrial precinct. The third is the spill of housing and recreation from the fringe to the centre of the activity centre. All of these result from an outcome of transposed programs within the suburban centre.

These research projects are based on the transformation of urban fabric, particularly within the network of activity centres. They will be the major change consistent with Melbourne 2030. Moreland and Oakleigh were studied to provide an initial exploration on suburban conditions, particularly interfacing programs in mixed-use zones. Growth in Broadmeadows has prompted new implementation to revitalise the suburban centre. It is government policy to initiate changes to existing facilities promoting ideal suburban living, with proximity and accessibility to community infrastructure, industry and employment. By accommodating demands to fulfil capacity in the future, the main discussion focuses on public realms within the suburban centre, consisting of program-based infrastructure that requires re-distribution and re-connection. Broadmeadows belongs to a network of cities such as Frankston, Dandenong, Epping and Werribee as transit-orientated cities that bridge the rural and urban border as outlined in Melbourne 2030.

Suburban cities are mostly shaped by the centralised structure of the shopping core, sprawling housing and the inter-connectivity of these with other networked realms by urban infrastructure. Broadmeadows is accessible by air via Tullamarine airport, by rail, and road via Western Ring Road. Its suburban core is linked to a number of industrial parks nearby, including the Ford assembly plant which is situated north-east relative to Broadmeadows. The scope of this study is on mixed use development within metropolitan Melbourne, particularly in response to zoning issues. The design outcome from the combination of two or more programs has been derived from the process of merging and combining uses and spaces, resulting in the introduction of a new type of shared and flexible interface.

It seems that a focus on subject, space and program is the main concern for the exploration of spatial investigation, development and representation in the contemporary urban context. How do contemporary spatial models provide for the ever changing scenes today to propose strategic possibilities? What impact does this have on the exploration of the notion of urban interface?
The current state of public infrastructure in metropolitan Melbourne is engaged in a conglomeration of public programs and events. Spaces are evaluated primarily on their locality and usage. Public spaces within suburban centres are mostly program specific.

The following chapters are organised starting with an exploration of techniques and methods used in developing the three final projects in Broadmeadows. The first chapter discusses how spatial models are created and tested. The second chapter concentrates on suburban models in depth. The observations are developed into design schemes; for new possibilities of mixed-use sites comprising housing, industrial, retail and public space.

These thress images are a glimpse of the third chapter is about progressive outcomes of the studies done.

*Reflections on Urbanism: Public Infrastructure for Networked Realms*
2. Re-locating large-scale retailers into a redundant factory.

3. The spill of housing and recreation into newly available land.

2. Transformed factory.

3. The new housing and recreation centre.
The first two chapters are based on exploration of techniques and methods used in developing the three final projects in Broadmeadows. Reflecting technique was applied to the research outcomes in Moreland. Specific spaces for circulation, living and storage for residential and industrial use were inserted onto the housing proposal. This is to test adequacy of space for each zone. Features studied including a court, compound, kerb and buffer space. All these were then incorporated into the new housing development that negotiates functional needs for residents and the industry. A mixed-use model that combines housing and industrial space was concluded. It then initiates the transformation in Oakleigh as discussed in Chapter 2.

The network of activity centres in Metropolitan Melbourne is the main structure of studies in the second chapter. A collection of suburban models was urbanised into design schemes, for new possibilities of mixed-use development comprising housing, industrial, retail and public space. This is to suit the scenarios proposed which includes expansion of each zone (residential, retail, and industrial) adjacent to the test site.

Synergy of program transposal in Broadmeadows

Broadmeadows as a transit city towards Melbourne 2030 is experiencing capacity growth in density and population as tabularised. The cohesiveness of the projects in Broadmeadows is explained by these five diagrams on the right, which are the snapshots of each transposal. The synergy between each strategy relies on the shift, expansion, contraction and dispersion of the program.

Diagram 1 shows the existing massing of building structure in Broadmeadows activity centre. Diagram 2-4, demonstrate the transposal of programs within Broadmeadows, initiated by the development of the carpark in the civic precinct, the relocation of large retailers into the redundant factory and the result of that, which is the spill-over of programs on the fringe which are housing and the recreation onto the edge of activity centre. Diagram 5 sums up the transformation that sees the opening of east-west link over the existing road infrastructure through the factory as the gateway to the industrial precinct.
The aim of this research project is to test contemporary spatial models selected from similar interface conditions. Here, Moreland is a platform used to set up arguments in terms of providing initial processes, to speculate on strategic outcomes in Broadmeadows.

Spatial models are featured in each sub-topic alongside their application in the new scheme. Case studies are documented from existing models found in Moreland and surrounds. The models are categorised based on their features. Testing the adequacy of spatial models on a differing locale, the new scheme of housing development is remodelled on these features.

Land utilisation

In response to the current situation, where certain areas of land are under-utilised due to the expansion or shrinking of industries; pragmatic conveniences such as transportation systems, operating businesses and services in such areas will face the pressures of relocation.

There is a decline in employment as the industries are less accessible to the labour market and to other new markets. The ‘clusters’ emerged improves the productivity of industries. It promotes quality interactions and inter-change of information between cluster participants which requires further development.

Clustered developments are often locked into local or domestic market in high geographic concentration. It is crucial to overlap networks of clusters to develop collaborative bonds with other agents such as transport and public infrastructure.

The change of structure and composition of clustered networks is to link neighbourhood-based companies to the regional and global economy. The linkage of differing industrial sites, circulation system and product movement needs to be integrated with traffic of economic components including labour and product materials.
Fig. 11.1
Hierarchy of Access.
Located in North Coburg, the site is within 25 kilometre-radius from the CBD. It is accessible by air and sea via Tullamarine airport and Melbourne Port and by rail and tram from the city, whereas it is linked by the Western Ring Road to other freeways.

Fig. 11.2
Industrial Cluster.
Moreland belongs to a concentration of industrial parks in North-West metropolitan Melbourne.
The selected site is immediately adjacent to the Hume Highway. It is located South-East of Fawkner cemetery in North Coburg. Reserves, convenience stores, bars and restaurants are among the existing facilities.

A diagonal cut separates industrial and residential zones. Within the site precinct there is also an un-built road at the rear of the car service centre. The site is ideal to test contemporary spatial models concerned with threshold and interface.

Fig. 12.1
Area for investigation.

Fig. 12.2
Most industrial premises are directly accessible from main road.
Fig. 13.1
Existing land use and program distribution (2004).

Fig. 13.2
Street examined as threshold condition.
Chapter 1: Moreland Research Process

Testing techniques

Reflecting: The technique applied is borrowing an urban model such as a court that was then inserted into the new housing area. This is to reflect the spatial quality of a urban court. A court provides more space for communal purposes within the site. The four models studied in this chapter include the compound and the court, the cul-de-sac, the kerb and the buffer space. Models were tested on the secondary road which is the threshold of residential and industrial zones. Features from investigations into circulation issues in North Coburg and surroundings.

These four changes in diagrams below were then incorporated into a new strategic proposal. The increments of change on the threshold (the secondary street) are applied onto the site context, starting with the insertion of a court. The reflecting technique explained here is once more demonstrated in the final chapter in which a redundant factory in Broadmeadows was transformed into retail outlet.

Fig. 14.1
Proposed Compound + Court.
The apartment block frames the housing within the parameter to create an interface between the court and the industrial site.

Fig. 14.2
Proposed Cul-de-sac.
The cul-de-sac condition which is a discontinuation of motor traffic from both sides of the road is then added.
Fig. 14.3
Proposed Kerb.
The third scenario sees a few plots grouped together within the compound for concentration on types of circulation.

Fig. 14.4
Proposed Buffer Space.
The fourth feature tested which is the buffer space, addressed the adequacy of a shared space for users.
This research project incorporates urban features investigated on other sites within the Moreland area. This is in order to address pragmatic issues regarding zoning and circulation. It includes flow spaces such as egress and ingress, also transient spaces like service zones from one collective industrial site to another which mostly are autonomously designed. Focusing on interface design between residential and industrial zones, particularly overlaying street network over systems of clustered infrastructures, this strategy is to promote efficiency of mixed-use zoning.

Case Study 1.1: Compound

Due to space allotment and spatial availability, spaces are organised in such a way that proximity and security is the main concern over accessibility, which equally contribute to the process of determining organisation of space.
Fig. 16.3
This is an example of an industry cluster. The packaging factory is within the compound whereas the office is located outside the boundary with the parking facilities.
Case Study 1.2: Court

The court is an enclosed space. Within its perimeter, there is a continuous surface with openings to adjoining internal areas. A factory in north Coburg constitutes several smaller factories that have been grouped and consequently formed a large open negative space. (See Fig. 18.1)
Application 1: Compound + Court

Fig. 19.1
Existing Condition.
The existing condition is a mix of car industry and residential houses. Conflicts arise from on-going traffic from both heavy vehicles and cars. Clustered premises on the site are transformed to support the industry which is expanding due to the demand of the current market.

Fig. 19.2
Proposed court.
The street in this experiment is transformed, blocked, and only allows bikes and pedestrian traffic to flow through to the main road with scattered bollards acting as obstructions to change the speed of movement.
Fig. 20.1
Re-using quality of enclosed space of the court studied; an open space is designed exclusively for residents.

Fig. 20.2
Suitable scaled vegetation creates a sense of greenery within the court.

Fig. 20.3
Court plan.
The secondary street is now transformed into a flow space that allows circulation in the court, as well as integrating pedestrian traffic from both sides. The new residential development is conceived as a pedestrian based development. There is close proximity to industry, thus establishing a network of industry-housing clusters.

Fig. 21.1
The entrance to the housing does not intersect directly with the road to the residential zone. The integration of public transport and road traffic on the site are parallel to each other.
Case Study 3: Cul-de-sac

The dis-continuation of traffic flow at the cul-de-sac creates different atmospheric changes. Dynamics are created by a dialogue between the cul-de-sac space and vehicles which are moving or stationery. Programs of varying duration such as parking were studied to trace movement patterns. The relationship between the spatial dynamic and these programs is established through observation.

Fig. 22.1
A cul-de-sac scenario on weekdays.

Fig. 22.2
The same scenario on weekends.
Fig. 22.3
Studies of varying programs, duration and traffic movement are mapped. This condition is also suitable for storage. There is a distinct separation between the residential and industrial zones created by the railway and pedestrian bike path.
Case Study 3: Kerb

Referring to the shared apron scenario, kerbs are transformed into a more suitable circulation space for vehicles. The kerb (see Fig. 24.4) is now transformed to allow more space for turning, to set the limits for industrial vehicles from the residential zone as well as integrating pedestrian traffic onto the industrial site.
The service lane acts as pedestrian access from the main road, collection will be from the secondary street. There is also a drop-off point from the court. In contrast to the use of back lane for services, entrance is via the main road, directing trucks to the bay for loading, unloading activity. The new shopfront is now interfacing public space.
Case Study 4: Buffer Space

The transformation of the transition zone begins by densifying the site with buffer strips, occupied mainly by residential units and recreational space. The sectional sequence demonstrates spatial bufferring that demonstrates fluidity and segmentation of zoning. This promotes collaboration between cluster participants, infrastructure and housing. Recreational space is now the interface that recreates the boundary of each zone.

*Fig. 26.1*
*The fourth feature studied is the transition space between two zones which is the buffer space, ideal for storage or circulation use.*
Fig. 26.2
The fourth feature studied is the transition space between two zones, which is the buffer space, ideal for storage or circulation use.
Application 4: Buffer Space

Fig. 28.1
Five prototype modules of the buffer strip which have been derived from the condition interfere studied. It enables various modular arrangements.

Fig. 28.2
Buffer location.
Buffer Space A.
Ambiguous space.

Buffer Space B.
The court separates industrial spaces along the main road and houses.

Buffer Space C.
Segmentation of space is clearly demonstrated from the new residential block, the recreation space and the existing industrial premises.
Application 4: Buffer Space B

Fig. 30.1.1 Buffer space on ground and first floor.

Fig. 30.1.2 Sectional division through the court.
Application 4: Buffer Space C

Fig. 30.2.1 Ratio of residential - open space - industry.

Fig. 30.2.2 Juxtaposition of buffer strips forming the new block.

Fig. 30.2.3 Buffer space interfacing between housing and industry.
Fig. 32.1
The warehouse is located next to the open space to separate residents from industry.
Chapter 2: Oakleigh  

Further Implications

The last chapter discusses urban features in Moreland, also on the method used to distinguish adequacy of re-usage of one particular architectural element of similar qualities on a different context and period of time. This chapter, however, is focusing on modules of two or more programs in depth.

Oakleigh was selected as the second site to further develop the techniques used in Moreland. Retail, industrial, and residential expansion were speculated. Next are studies on scenarios that mediate the shifts of programs between the fringe and core of the activity centre.

Fig. 3.1  
Existing fabric of activity centre in Oakleigh.

Fig. 3.2  
Scenario 1: Montage Residential Expansion.  
This scenario shows the surrounding housing expanding to the activity centre.
Fig. 34.3
Scenario 2: Montage Retail Expansion.
Expansion and contraction of zones on the existing site.
The first scenario shows retail strips expanding into the residential zone along the main street.

Fig. 34.4
Scenario 3: Montage Industrial Expansion.
Referring to those features, the urban fabric and the prototypical roof form of respective zones are stretched on photomontages to form three different scenarios. In this scenario, industrial premises with large aprons re servicing areas expanding from core-industrial zones towards the activity centre.
Chapter 2: Oakleigh

Further Implications

Council Policy
43.02-3 Subdivision
Permit requirement

A permit is required to subdivide land.

This does not apply if a schedule to this overlay specifically states that a permit is not required. Subdivision must occur in accordance with any lot size or other requirement specified in a schedule to this overlay. A permit may be granted to subdivide land which is not in accordance with any lot size or other requirement in a schedule to this overlay, unless the schedule specifies otherwise.


Responding to council policy;

Residential Zone 1- Largely represented by single dwellings on large blocks.

To provide housing options, I would provide prototypical housing units for a range of lifestyles that accommodates anything from large to much smaller household. This is to cater for the housing needs of Monash population in the future. Medium-density developments are ideal to bring residential developments closer to transit points or activity centres that are connected with extensive bus and train routes.

Industrial Zone 1- Mainly accustomed for general and light industries such as medical centres, businesses and offices.

The new design is to install a wider range of services and facilities within the fringe of the technology precinct. This is to support specialized function, and institutions while enhancing the cosmopolitan range of economic activity and type of retail. Architecture features include adjustable floor levels and flexible floor layouts.

Business Zone 1- Highly accustomed for retail – active local community shopping centers such as an indoor shopping complex and a street facing retail spaces.

The type of buildings proposed here is a lively commercial hub as a public domain for small businesses, large businesses, multi-national corporations with flexible building characteristics such as mixed-usage of space, accommodation, and community based open spaces.

Fig. 36.1
Zone breakdown in Monash.
Case Studies - Mixed-Use Models

Below are precedents of mixed-use buildings.

Fig. 37.1
House + parking. A private dwelling located next to semi-public parking spaces. “Jig”, Japan
Atelier Bow-wow

Fig. 37.2
Retail + parking. Retail floors on top of parking site on street level. Baumax Hypermarket, Maribor, Slovenia.
Njiric + Njiric

Fig. 37.3
Cultural Centre + restaurants. Multi-complex houses communal spaces for performing arts.
Centre national de la danse a pantin, Pantin, France.
Peripheriques Architects

Chapter 2: Oakleigh Further Implications

The pie chart below shows land use areas in Monash. For each zone, there are new amplified characteristics in response to the growth of activity centre as a transit point. The zone break-down constitutes:

- Residential: 76%
- Open Space: 10%
- Technology Precinct: 7%
- Other Industrial: 6%
- Business: 1%
- Technology Precinct: 7%

Fig. 37.0
Source: Monash Planning Scheme, Total Zoned Area Breakdown, 1997
“Activity centres provide the focus for services, employment and social interaction in cities and towns. They are where people shop, work, meet, relax and live. Usually well-served by public transport, they range in size and intensity of use from local neighbourhood strip centres to traditional universities and major regional malls. They are not just shopping centres, they are multifunctional.

Activity centres attract high numbers of people, and generate a significant volume of trips in metropolitan Melbourne. Because of the vital role played by activity centres in everyday urban life, their planning is always important.

Since the 1950s, activity centre policy has been a feature of urban planning in Victoria. Essentially, this is a matter of clustering – rather than dispersing – uses and activities to derive social, environmental and economic benefits for the community and business generally.”

http://www.dse.vic.gov.au/melbourne2030online/content/implementation_plans

These suburban models were chosen based on the qualities of each and on the relevancy each combination to the scale and size of the activity centre in Oakleigh.

The similarities of the modules start from the location, which is on the fringe of respective activity centre and suburban fabric. Each consists of a combination of a few retail strips that are facing the main road and one or two other programs. The models are facing the secondary road that knits the housing edge together.

The first model is a combination of shops and housing units in Moonee Ponds, which spatially shared the use of structural element such as the roof covering the walkway and the balcony on the first level.

The second model in Camberwell is a group of shops that has a laneway in between for porosity and the parking spaces at the rear which is flexible in usage as a market space.

The third model is also a flexible combination of retail and industrial spaces. The service area is shared between the shops and the market.
A prototypical module of retail spaces with residential units are based on a scenario in Moonee Ponds. The housing units are facing the minor street with open spaces in between. There is also a balcony on the upper floor, sharing the structural quality provided by the roof of the shops on the ground.

Moonee Ponds: A few retail strips are juxtaposed to form a row of retail spaces with parking facilities at the rear. There is a pedestrian link through to the shops.

Camberwell: A composition of industrial and retail space is modelled from a scenario with a service area that is accessible through a shared space between both.

South Yarra: A prototypical module of retail spaces with residential units are based on a scenario in Moonee Ponds. The housing units are facing the minor street with open spaces in between. There is also a balcony on the upper floor, sharing the structural quality provided by the roof of the shops on the ground.
Fig. 40.1
Parking + Parking
The focussed site in Oakleigh is on the periphery of the activity centre. It is also an interface between retail and residential zones. The transformation of the plots over a period of time can be seen on these three diagrams. The pre-existing plots are the given subdivisions of different shapes and sizes whereas the existing sub-plots are based on current programmes.
Chapter 2: Oakleigh Further Implications

Re-configuration Techniques

Palette: Those prototype modules were then extracted into different typologies to develop a hybrid composition.

Every strip is a composition of a number of program. Program are selected from a palette of open space, green space, parking space, residential, industrial and retail. A single plot would then be juxtaposed to be inserted onto available space.

Fig 42.1
Palette: Those prototype modules were then extracted into different typologies to develop a hybrid composition.
Diagrams constitute space allocation for respective programmes which are autonomously developed in various orientations, forms, scales, styles and identities, subject to tenancy and other factors. These three compositions are a ration of housing, retail and industrial space that are responding to pressure from the respective zones.

Fig. 43.1
Three scenarios.
The point of this modular arrangement is that any of these scenarios are feasible within the new 'bufferzone' site. The expansion of retail, residential and industrial zones can be created based on modular compositions.

The first scenario is the expansion of the residential zone which can be achieved by inserting a combination of prototype modules into each strip. Strips of different plot shapes and sizes are then juxtaposed to create a new composition.

The second scenario is retail expansion. Most sites along the street are turned into retail space to catch street traffic on ground level and the open space is allocated for public-use.

The third scenario is industrial expansion. This turns most of the sites into industrial space, which sees more of the open spaces shared between retail and industry like the service areas.
Scenario 1: Residential Expansion
Scenario 2: Retail Expansion
Scenario 3: Industrial Expansion
Based on the first scenario which is the expansion of the residential zone, I would be focusing on two major parts of the site, particularly on consolidating, as well as subdividing plots into regions.

The first is a consolidation of plots as an apartment block, opposite the retail centre, across the main road, whereas the second is an elongated housing development from residential to retail zone.
Plot arrangements constitute 11 series of juxtaposed modules to form a planar composition, taking account of the spatial quality of the site.

Fig. 46.2
Plot arrangement constitutes 11 series of juxtaposed modules to form a planar composition, taking account of the spatial quality of the site.

This results in a few different programmes sharing a circulation space or a public open space by maintaining fluidity in both directions. The contrast of positive and negative space is minimised by allowing porosity through internal space.

Fig. 46.3
This results in a few different programmes sharing a circulation space or a public open space by maintaining both directions. The contrast of positive and negative space is minimised by allowing porosity through internal space.
The residential block is a group of several housing units stretched along the retail and industrial model. There is an adaptation of the use of the shades of the retail space such as a balconies for the apartments.
Fig. 48.1.2
The apartment block consist of six housing units with private gardens and communal open space. There is an access for residents from both sides.

Fig. 48.2.2
Prototypical floor plans for residential block facing north.

Fig. 48.1.3
Prototypical floor plans for six units next to the retail and carpark combination.
Investigation on prototypical building facades and openings.

Fig. 50.1
Prototypical building facades and openings.

Volumetric Studies

The ratio of programs (residential-office/commercial-retail) to spatial arrangement of proposals is clearly demonstrated in section. The segmentation of zoning within an enclosed space is enhanced by introducing flexibility within a division. The scenario in Section e-e in which a balcony is placed above retail is borrowed from one of the investigations done in Moonee Ponds.

Fig. 50.2
The scenario in Section f-f is on the edge of two plots which are of similar height, scale and proportions for a few types of tenancy. The tenancy is subject to a different usage of the juxtaposed plots. The office space and the housing unit in the first diagram have a possibility of being converted into retail space, and vice versa, to suit future changes.
Taking a composition here for example, there is a greater flexibility of its programmatic structure. This is to suit the different occupancies and tenancies over a period of time. Positive, and negative spaces are transposed towards achieving alternative composition. It can be demonstrated by taking over programs within allocated space, creating a new ratio for each particular strip.

The second scenario is an expansion of retail programs along the street on ground level.

The third scenario is when most of the spaces are turned into industrial sites. This requires consolidation of a number of premises as well as the use of the upper floor as an office space. Parking facilities will then be turned into a service/delivery area.
Chapter 2: Oakleigh
Spatial Juxtaposition

Further Implications

Fig. 52.1
Housing + Retail.
The module is then inserted into the context as a projected space to create a composition of different programs.

Spaces are composed into different ratios of open space. Juxtaposition of space within respective plot shapes and sizes has increased porosity through combination of shared and exclusive open space.
Compositional studies.
Different modules are grouped on the allocated site to form a spatial juxtaposition of different programs. The scale and height of the modules are consistent to allow flexibility of space within two or more compositions.

Fig. 53.1
The three dimensional organisation within a plot is subject to future demands, as the value and quantity of programmes are determined by site augmentation. The site is now porous in two directions, particularly responding to the demand of circulation space from retail centres to residential areas. The park serves as a reserve for public as well as for the residents.

The edges of plots are of similar height and level, regardless of the program and industry, they accommodate, allowing flexibility across site boundaries.
Space within the plot is arranged to create a shared open space. The entrance to the housing is also a major transition between the two retail spaces and the retail centre. Next to the housing is a two-storey section of retail strips which are built on three different plots.
The insertion of different types of buildings -apartment units, shops and warehouses- allows an inter-changing use of space. For example the warehouse could be turned into a living space, and the shop could be turned into an industrial site.
Fig. 57.1
Overall composition.
This is a model which demonstrates programmatic adjacency in an urban context. The site is now a resonance of pressure from all three zones: retail, residential and industrial. There is a hierarchy of spatial arrangement that plays a substantial role in resonating the transformation within the zone interface. In detail, the transposition of space at an urban scale is derived by manipulating existing spatial typologies that have been shaped by their on-going uses. The prototype modules described here are applicable to other scenarios of spatial arrangements that require transformation. The modular composition would remain the focus in developing changes responsive to zoning effects. Within these possibilities, occupants will have more options of hybridising the space.
The first thesis project is a mixed-use carpark located within Broadmeadows suburban centre. It is a re-distribution of car-parking spaces within the centre. The capacity of growth in Broadmeadows has contributed to the increased use of public infrastructure: including civic buildings, shopping mall, institutions, recreation space and transport interchange. This is to link this suburb as a transit city to metropolitan Melbourne via train and road networks.

The proposed mixed-use carpark is for communal use within the civic centre, which is an entry for an inaugural national design competition, proposition 3047. This is to cater the demands for designated car parking areas. The civic centre groups council office, the town hall, and the global learning centre together. In the competition brief, several parcels within the civic precinct were collectively developed as a multi-storey carpark building that also houses commercial spaces.

Parking was distributed aptly within the centre to address the increase of capacity. Apart from that it also provides more parking spaces for visitors from other network-based communities towards achieving status as a transit city, accessible with integrated transport as outlined in Melbourne 2030. This is to introduce a concentrated parking with close proximity to the civic buildings and public transport infrastructure rather than field parking that diffuses away from transit points, which in this case is the Broadmeadows Station.
Strategic approach

Fig. 61.1
Analogy of the ‘magnet’ quality of Bunnings in relation to lower-profile retailers is reflected in the carpark, in relation to civic and community programs. (Above)

Fig. 61.2
Parking + Civic:
Parking adopted the ‘magnet’ program while civic buildings act as fringe programs. (Left)

Existing parking facilities are mostly connected to retail programs at the shopping mall particularly along pedestrian and vehicular routes to the shopping mall entrance. The proposed mixed-use carpark is modelled on Bunnings as a ‘magnet’ that draws traffic to the civic precinct and other community programs. Which in this context act as the fringe programs.

Parking has been distributed within the civic precinct. This is to respond to ‘Proposition 3047’ that encouraged the merge of different land parcels nominated in the competition brief. Three major parcels were selected; both on the edge and one in the middle, between the town hall and council’s office.

Fig. 61.3
Spatial relationship between Bunnings and fringe programs. In this scenario, Bunnings is a magnet directing pedestrian circulation towards it and other fringe programs are catching pedestrian traffic.
Prior to re-configuring the carpark scheme, I have studied three carpark models in the Melbourne CBD. The first is the re-utilising of an existing envelope on Little Collins Street. The second is an infill above a department store and the third is the Queen Victoria building, stitching the parking plates above the shops. These examples are related to the contextual relationship between the carpark and the civic buildings. The models were then incorporated into forming the mixed-use carpark as an interface between parking and existing public buildings.
Fig. 63.1

Comprising a marina, retail space, spiral carpark and housing which are combined in each tower, battling zoning restrictions.

Uniformity of skin that wraps different programs in mixed-use development (Marina City and Mixed-use carpark) is distinguished here.

The skin is a repetition of floor plates projected consistently to the top level.

Fig. 63.2.1
Proposed Mixed-use Carpark, Broadmeadows. Parking + program.

Fig. 63.2.2
Proposed Mixed-use Carpark, Broadmeadows. Re-applying stacking of parking plates. Layers of spaces are configured accordingly for a mixed-use a carpark, ramps, and fringe programs.
Plates are stacked for adequate capacity that supports the growth of the suburban centre. Vertical links from floor to floor are formed into ribbons within the allocated space. Insertion of commercial spaces layering between plates thickens the layers with stacks of shops and offices. Whereas the top level remains vast to allow cultural activities to be held temporarily.

Slopes on the top level allow recreational programs such as skateboarding. The surface can also be an amphitheatre for a large audience. The program interchange is co-ordinated by the dynamism of the parking space.
Spaces are re-configured based on selected plates. Newly transformed plates are combined and inter-stitched with fixed commercial programs. The composition of each level is shaped by threads of the vehicular circulation systems such as a two-way movement, turning circles and the vector relationship between the carpark and existing Town Hall, Council offices and the Global Learning Centre.
Fig. 67.1
Ground Floor Plan
Circulation diagram on street level with two access points.
Fig. 68.1
Roof Plan
The top floor is a shared space for parking and cultural programs (car-parking spaces and amphitheatre).

Fig. 68.2
Mass form is inspired by Zaha Hadid’s BMW plant in Germany.
Fig. 69.1
A combination of fixed (parking) and temporal (community, cultural) programs inserted.

Fig. 69.2
Section A-A: Spaces are fragmented according to the capacity of parking-commercial ratio. This is however flexible the insertion of fringe programs varies according to different building adjacencies.

Fig. 69.3
Section B-B: Spatial quality.

- stacking form
- shading
- air-flow, ventilation
- parking + programs

natural light
The vast open space on the roof comprises temporal and fixed programs, cultural, recreation and parking respectively. The form of the carpark surface, with its slopes, enables a dynamism for passive and active synergy between the two. The carpark will be fully utilised throughout the week, its capacity will be mostly occupied by cars in the day and on the weekends. The top level will be utilised as a skate park in the afternoon. It is turned into an amphitheatre for scheduled shows. This configuration considers a combination of different types of programs, fixed, temporal and flexible.

Interior spaces

This image is showing crowd passing through shops from the carpark, obstructed by bollards at the entrance. Internal spaces are a product of stacking parking plates that allows ventilation and air-flow through negative spaces.
Fig. 71.1
Parking is distributed from one end to the other within civic area.

Fig. 71.2
Front elevation.
The scheme is responsive to the height of adjacent civic buildings.
Intervention Broadmeadows 2: Industrial Retail Outlet

The activity centre in broadmeadows is the threshold between the surrounding suburb and its transit point to metropolitan Melbourne. Broadmeadows has close proximity to Melbourne Airport at Tullamarine and is easily accessible via the Western Ring Road.

The Kraft factory was the core of its industrial precinct, but has been closed down due to the removal of its operations, the building made redundant. It is an interface between retail and residential zones. It can be seen here that the factory is a large industrial building within its own compound.

Fig. 72.1
Redundant Kraft Factory.

Fig. 72.2
Main entrance to Kraft Factory.
The first strategy is to move Bunnings and other large-scale retail premises into the Kraft factory, in order to allow residential and recreational activities to infiltrate the main shopping centre. This is in line with the aims of Transit Cities and consistent with Melbourne 2030, which locates Broadmeadows as a key point in the network of activity centres.

The Kraft site has been left redundant due to relocation of operations abroad. The infrastructure, though, remained kept within the compound. The re-use of the factory building establishes a formal and programmatic connection with the west side of the town centre, across the railway.

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Fig. 73.1
Strategy 1 is to relocate large-scale retail premises into the newly redundant factory.
The overall transposal strategy proposed for Broadmeadows is initially modelled on one in Northland, which has a distinct separation between the shopping mall and large-scale retailers. In contrast to that, a model in Watergardens is of dispersed premises that houses each facility or retailer.

Another example nearby is the re-usage of an existing structure for a retail space. This example is to be implied to re-utilise the factory as an outlet for large-scale retail premises as it requires high ceilings and open plan retail-storage, based on the Bunnings Warehouse, across the main road from Kraft Factory.
Case study 3: Existing Bunnings Warehouse. Other qualities of Bunnings which provide adequate composition for large-scale retail premises, including high ceilings and open space lay-out.

Fig. 75.2

Case study 4: A warehouse that stocks industrial clothes for retail sale. the warehouse is a reutilisation of a redundant factory nearby.

Fig. 75.1.1

Case study 4: Factory re-used as clothing retail.

Fig. 75.1.2
All case studies have prompted further discussion on re-utilising the redundant Kraft factory. Several attempts have been made starting with camouflaging the factory core with a uniform skin that creates obscurity amongst skin that wraps the programmes. This is to test consistency of formation of an envelope to suit current proportions.

The second attempt is to modularise all the groups based on the existing envelope and proportions. This enables the modules to be sub-organised and sub-developed independently or otherwise.

Fig. 76.1.1
Experiment 1: Camouflage; one large roof plane was spread on top to cover internal spaces as well as linking one roof structure to another, regardless of the programs contained underneath or above.

Fig. 76.1.2
Experiment 2, Process 1: Retaining proportioned roofing system to existing angles.

Fig. 76.1.3
Experiment 2, Process 2: Taking out circulation space.

Fig. 76.2
New scheme (Experiment 2): The roof dynamic differs from one adjacent spatial group to another, based on existing proportioned grid that projects both positive and negative space vertically.
The re-configuration of internal spaces is based on the insertion of typological spatial models, like the court, to suit a particular program, such as large-scale industrial retail. It considers circulation systems for industrial vehicles. Internal spaces are arranged so that they respond to the outdoor circulation introduced for large-scale retail. For the court, a flexible lay-out between modules has been organised, to widen the thorough-way and to create another link to the linear group on the left. The linear group is then sub-divided into several tenancies.
Fig. 79.1
Traffic flow throughout the factory is now increased with a major change of access from left (the highway) and to the right (the industrial precinct).

Fig. 79.2
Internal spaces are consolidated and subdivided to allow flexibility for retail and display. Flexible lay-out of retail outlets in the centre enables different type of usage of the space. Fluidity of circulation and flexibility of spatial arrangement between modular units.

Fig. 79.3
Internal spaces are sub-divided to suit type of tenancy.

Fig. 79.4
There will be more open space for circulation use.
Broadmeadows 2: Industrial Retail Outlet
Spatial Organisation

Fig. 80.1
All groups are then re-configured into modular units. The existing factory is subdivided into six different groups.

Fig. 81.1
Modularity.
Each grouping of modular units is based on a combination of existing skin and the insertion of new interior. The entire factory is modularised in such a way to be sub-developed for a specific retail program that requires a range of tenancy types, flexibility, and facades treatments.
Each modular system consists of units which have been sub-developed with projected facades. These facades interface between interior and exterior spaces by responding to pressure from each side. Types of facades are determined by the degree of permeability required through the surface.

I started to clad the whole factory uniformly, and focusing on one modular unit for multi-cladding. The depth of the unit is suitable for storage and the curtain wall is mainly designed with suitability for displaying goods.
Multi-cladding

Fig. 81.1
Multi-cladding, Deconstruction
Royal Ontario Museum, Ontario, Canada.
Daniel Libeskind

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Fig. 81.2
"Emotional Parameters of Holocaust"
Jewish Museum, Berlin, Germany.
Daniel Libeskind

Mono-cladding

Fig. 81.3
Geometrical
Federation Square, Melbourne.
LAB Architecture Studio

Fig. 81.4
Wall Plants
Tokyo, Japan.
Toyo Ito

Fig. 81.5
Fish Skin
Prada Tokyo, Japan.
Herzog & Meuron
Portions of the factory are dominated by retail activity, which mostly requires large enclosed spaces, ambiguous for both storage and display. The existing envelope is incorporated into the scheme which wraps the factory at an adjustable angle for shading purposes. Whereas the internal spaces are turned into a warehouse-like atmosphere.

Maintaining the proportions of the factory with new and existing skin, translucent or opaque, allows the factory to project a new image for retail-warehouse goods.
Nine scenarios were set up to demonstrate skin change. This is based on segmentation of the whole factory. Skins are chosen from the pallet on page 82.
Fig. 86.1.1
Storage tanks located near the highway.

Fig. 86.1.2
Piping structures welcome traffic flow.

Fig. 86.1.3
Storage tanks next to the pipes.

Intervening Broadmeadows

Fig. 86.2
Relationship of the new scheme to existing structures and remnant industrial objects retained
Remnant structures such as tanks and pipes representing the history of the site are included within the new scheme. Most of the building's skin is retained to provide proportioned structure that holds all three systems; the cul-de-sac, the court, and the through-way together.

Fig. 87.1
relationship of the new scheme to existing structures and remnant industrial objects retained

Fig. 87.2
relationship of the new scheme to existing structures and remnant industrial objects retained

Fig. 87.3
relationship of the new scheme to existing structures and remnant industrial objects retained
The third strategic outcome relative to the mixed-use carpark and the retail outlet is a development of housing and recreation at the fringe of the Broadmeadows suburban centre. The mixed-use carpark concentrates on inPilling new parking within existing programs, whereas the retail outlet focuses on one program and different types of circulation and open space. The housing and recreation spill-over is to conclude the transposition of programs in response to the growth of Broadmeadows. The suburban centre is the transit point to metropolitan Melbourne. There is a demand for a different type of housing to accommodate future capacity towards shaping Broadmeadows as a Transit City.

Fig. 88.1
Proposed site for new housing and recreation development.

Fig. 88.2
Parklands with amenities for adjacent institutions.
Strategic Approach

As all of the large-retailers have been relocated to the Kraft factory, the opportunity exists for residential and parkland activities to spill into the existing Bunnings site.

The spill-over point starts from the top-left corner of the activity centre. By interacting with the existing carpark and highway-based facilities, such as the service station and restaurants, the new recreation centre will stage outdoor sports programs. Comprising sports courts and double-sided terraces, the facility will be shared by the public and the institutions nearby. The idea of distributing recreation space onto the suburban centre is to provide a more ideal outdoor-indoor ratio within the centre. With this, there will be a more formal knitting between the fabric of the fringe and the core.

Fig. 89.1
Spill-over of housing and recreation onto the suburban centre.

Fig. 89.2
One of the types of housing at the fringe of activity centre.
The spill-over of housing and the parklands has been modelled on the levitation of floors: 2 to 5 storey-high apartment blocks and a separate sub-floor for the courts.

The skin is draped onto the facilities and the housing, consistent throughout the site. Orientation of the apartment blocks is set to allow penetration of light and frame views depending on floor levels. These two blocks are north-facing. Floors are vertically stacked and rise up to 5 storeys in the southern block.

The overall roofscape makes a formal link between recreation, housing and landscape. Most of the exterior surface is an outdoor space for public and residents. It is to be used by both to suit temporal demand.

Fig. 90.1.1
Drape
Overall skin is draped over recreation centre and housing blocks. The external surface is for outdoor use.

Fig. 90.1.2
Levitate
The skin then raised to wrap stacks of housing units and recreation space.

Fig. 90.1.3
Unwrap
Formation of negative and positive space.

The scheme:
An abstract model showing the formal relationship between the new housing blocks and the recreation centre.
The recreation facility consists of two outdoor sports courts and a gymnasium. The rooftop garden is suitable for secondary use to support on-going programs, and can be viewed from the terrace.

Fig. 90.1
The roofscape is layout provides additional facilities to support outdoor sports programs.

Fig. 90.2
Housing units are arranged to address light orientation.
Two blocks of apartment units and one large recreation centre replace the Bunnings building and other large-scale retailers. The spatial configurations are based on horizontal layering of greenspace and apartment units, topped off with a communal roofscape. The semi-public greenspace is shared between residents.

The open-top recreation space is slightly sunken beneath ground level, in response to the existing contour of the adjacent parklands. The slope of greenspace is flexible for outdoor use, for example as an alternative training pitch to support the enclosed capacity required by the recreation centre. The external use of the roof of the recreation space is for viewing active and passive programs in the carpark or on the highway.
The proposed medium density housing comprises two apartment blocks, both north-facing. On ground level semi-public recreation spaces have been inserted to form a continuity of use from the adjacent recreation centre. The roof top is landscaped for communal use as a deck. There are also layers of garden for the residents on the first floor. Taking one section unit for example, further spatial studies have been carried out to distinguish vertical composure of the carpark, apartment units and the open spaces.

Fig. 94.1
Spatial studies of housing units, carpark, semi-public recreation space and communal gardens. (to be replaced with developed scheme)
Studies in this section relate to the segmentation of indoor-outdoor ratio of space. The apartment block is sliced horizontally by communal garden from the northern facade through to the southern facade. This allows for formal continuity from the rooftscape of the recreation centre.

The hierarchy of use is based on exclusivity for residents. It is partially roofed by the apartments and accessible from the second floor. The garden houses children’s playground, communal vegetation and shared outdoor dining.

Fig. 95.1
Slice of housing units, carpark and communal garden.
Broadmeadows 3: Housing + Recreation

Spatial Organisation

Roofscape

The external surface has shaped the transformation according to a new roof-form and land movement. This is in order to wrap the mass of housing and recreation space; to establish a formal representation for the two. The tip of the suburban centre is then engaged in an effective way with its fringe which is normally belted by road infrastructure. The surface is a landscape; a spill-over of the adjacent parklands. The stretch of existing fabric, the housing and the recreation, brings a different sample of programs to the suburban centre.

The centre which used to be dominated by retail and civic programs, is now is a mixture of civic, retail, housing and recreation.

Fig. 96.2
Highway-based facilities such as service station and restaurants act as gateways to the existing carpark, recreation centre and the housing blocks.

Fig. 96.3
North facade is inspired by Jean Nouvel's Eurallile, Lille, France with graphic prints that gives mural effect.
Conclusion

Through the implementation of these three interventions, the Broadmeadows suburban centre is transformed into a more balanced ratio of mixed-use programs of civic, retail, housing, and recreation, to suit a growth in overall capacity. Program-specific spaces for parking and recreation are turned into flexible spaces for shared use.

Looking at a larger scale, metropolitan suburbs are more networked and inter-connected than before via threads of road infrastructure including the Western Ring Road and other major train and tram networks. This has enabled progressive development to be amplified among network participants which is the suburb and other suburban components including suburban centres, shopping malls, institutions, and public spaces.

Fig. 97.1
The Kraft Factory is now the gateway to industrial precinct, joining this zone of production to the commercial-civic hub.
The cluster of industrial sites in Moreland which interfaces housing and industrial zones is a condition that sees shared spaces being developed. Zoning regulations that segregate housing and industry have been given a different notion in clustering.

Interface studies in Moreland provided an ideal method for investigating spatial models. These demonstrate their adequacy when applied to various geographic locations. Street details from the circulation system such as kerbs and bollards, were incorporated into a new interface used to validate its subtlety in urban-scale development. This prompted speculations on expansion and shift scenarios in Oakleigh.

A set of studies concerned with spatial mediation at the fringe of activity centres in metropolitan Melbourne has been looked at. Mediators between programs have been categorised into properties such as open space, parking, housing, retail and industry. This set was then hybridised in Oakleigh to suit amplified changes such as zone expansion and shift. These changes are speculated in the shift of three zones, retail, industry and housing.

The shift between retail, housing and industry in Oakleigh provides a field to test flexible and inter-changeable combinations of space. Public space, which is often program specific, has been re-introduced within contemporary mixed-use of space in Oakleigh.

These series of urban investigations led to derive the transposition of facilities within the Broadmeadows suburban centre.

Parking facilities near the mall are now highly concentrated in specific locations rather than dispersed over fields. It has the capacity to suit future demand. There is also a knit of open recreation space and different types of housing.

To conclude the transposition of programs, the redundant factory has been re-utilised to activate the less-apparent linkage from the shopping mall to the industrial precinct which has local amenities such as institutions and recreation facilities embedded into the zone. By distributing retail to the industrial precinct with a large-scale retail outlet, the factory can reactivated. Through this, it interfaces retail, industrial and residential precincts.

These transformations are parallel to the growth of the suburban centre as a multi-centre, which is mainly concentrating on the public networked realms.

In the beginning, there was a discussion on the growth of transit cities as outlined in Melbourne 2030 with the aim to refocus on the expansion of each, which has raised many possibilities to re-shape suburban centres in the future. To recapitulate this subject, this research provides a platform that implements the shifting of a new paradigm.

It is to respond to an ideal model of transit city that is under-going pragmatic changes over this duration of time which reflects the outlook of contemporary urban-scope.
Fig. 99.1
Transformed suburban centre in Broadmeadows.

- recreation centre + housing
- mixed-use carpark
- retail outlet
- shopping mall

- recreation centre + housing
- mixed-use carpark
- retail outlet
Bibliography


