5. THE RADBURN IDEA 1925 - 1955

5.1 BACKGROUND AND STANDARD PRACTICE

In 1928 there were 21, 308,159 cars registered in the United States. In 1895 there had been five. The traditional grid pattern required a pedestrian to cross a vehicular street 20 times a mile[70]. The notion of peace and the motor car were mutually exclusive to Stein and Wright. The only type of street that was peaceful and suitable for houses was the cul-de-sacs. This street also created a small community of families as only a dozen or so families would live in a cul-de-sacs. The cluster form was quite different from the traditional linear street form.

Stein and Wright sought to build a Garden City in America. They designed Radburn, 'realistically planned for the Motor Age', but not a Garden City as Howard saw it. While the Radburn Idea that emerged in the United States was referred to as the American Garden City, the desire to deal with the impact of the motor car generated the central idea that a distinction between the car and the pedestrian should extend through all aspects of town planning. This had a profound impact on suburban form creating a new form of residential estate – the Radburn Estate.

Furthermore, Clarence Perry developed the neighbourhood unit based on the elementary school, rather than the village core near the rail station. All dwellings ideally should be accessible to the local school and open space without need for a car or crossing a road. In this context the Radburn Plan or Idea emerged. Both Clarence Stein and Henry Wright supported the earlier values and principles endorsed by Ebenezer Howard, but viewed the very rapid rise of the motorcar in the United States as a threat to the family and the community; separating family, especially children, from their community. Their vision sought to re-establish the neighbourhood, centering it on the local school with the children free to walk from home to school in safety (from the motor car).

The value of social life underlies the Radburn model – a social life unimpeded by the car. Security and happiness are also key values espoused. The notion of security and the importance of children and their independence combined to create a planning model that was extreme in its separation of the car and the pedestrian. From this evolved the neighbourhood unit as an organising element in planning suburbs that continues in contemporary planning including New Urbanism.

The value of economy was important as a result of the depressed economy of the time. Like the Rail Suburb proposed by Sulman in Botany, Radburn also sought to lower development costs, taking space from roads and giving it to open space.

Five key physical elements underpin the Radburn Idea:

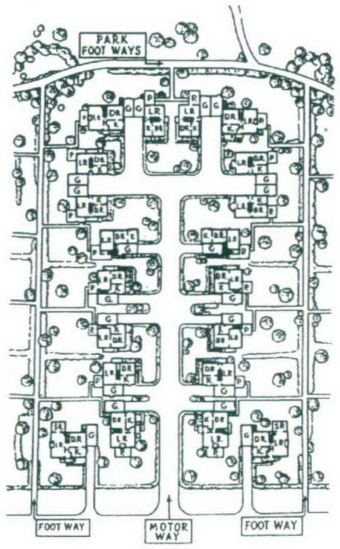
1. The Super Block – Small blocks were consolidated to reduce the number of roads
2. A Specialised Hierarchy of Roads – From service lanes to each building, secondary roads around the super blocks, main through roads connecting neighbourhoods, and pathways for connection to other communities
3. Complete Segregation of Pedestrians and Cars - Over and underpasses were used at necessary intersections
4. Houses Turned Around – Living and sleeping areas faced towards the garden and pedestrian path and the service rooms towards the access roads

70 C.S. Stein, Towards New Towns for America (1989 edition quoted), MIT Press 1957, P.19

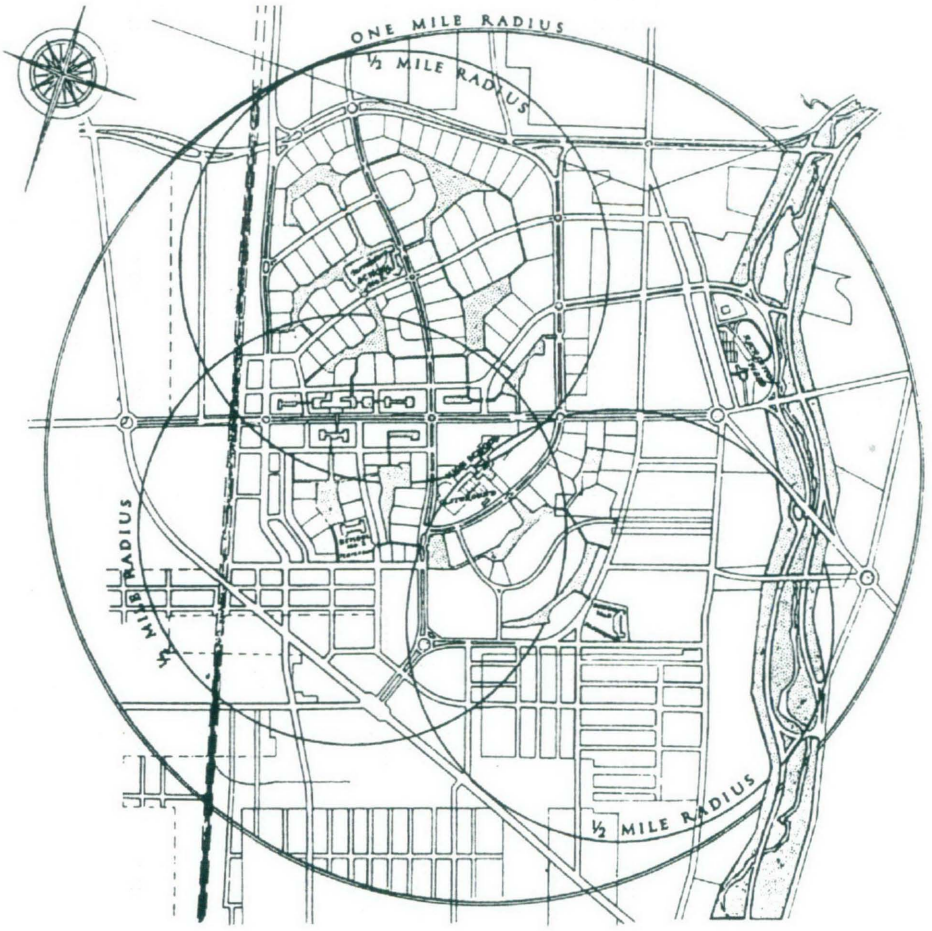
5. The Park as the Core of the Super Block – The super block as a neighbourhood unit in Radburn was to influence Stein who defined the neighbourhood in 1929 as ' a group of houses and apartments large enough to require a primary school' in the first regional plan for New York City

While this form of planning was adopted widely in the United States, it was adopted largely in public housing estates in the United Kingdom and Australia. Elements of the Radburn model, especially the cul-de-sacs were subsequently adopted in a piecemeal fashion in many private developments.

The post war boom following the advent of Radburn increasingly saw the need for highly efficient land subdivision which could deliver large amounts of housing quickly. The increasing availability of the car meant that space was not really a constraint and low density family homes were quite affordable as a result. Large tracts of land were subdivided primarily by surveyors and built by engineers. Standard practice subdivisions however adopted many Radburn principles, especially the cul-de-sacs. Rather than the innovative open space system seen at Radburn, curvilinear streets were used to create interest and slow traffic, rather than separate it. Housing was then built speculatively by house builders who developed a suite of products which could be selected by the home buyer independently of the lot selected. This method of providing very affordable housing quickly became the predominant form of housing in the United States, Canada, and Australia. It has remained a preferred market choice till the present day.



Plan of a typical "lane' at Radburn.



Clarence Stein's Plan

5. 2 INTERNATIONAL EXEMPLAR - RADBURN 1928

5.2.1 BACKGROUND AND VALUES

Radburn put into practice Stein and Wright's vision for an American suburban community. While none of the individual elements of the Radburn Idea as set out above were new (streets and paths had been separated by Olmsted in Central Park), the combination of them was. Importantly Radburn is not a Garden City – there is no green belt, there is no industry. It is however the only model apart from the Garden City to have had a profound influence on the form of the contemporary suburb.

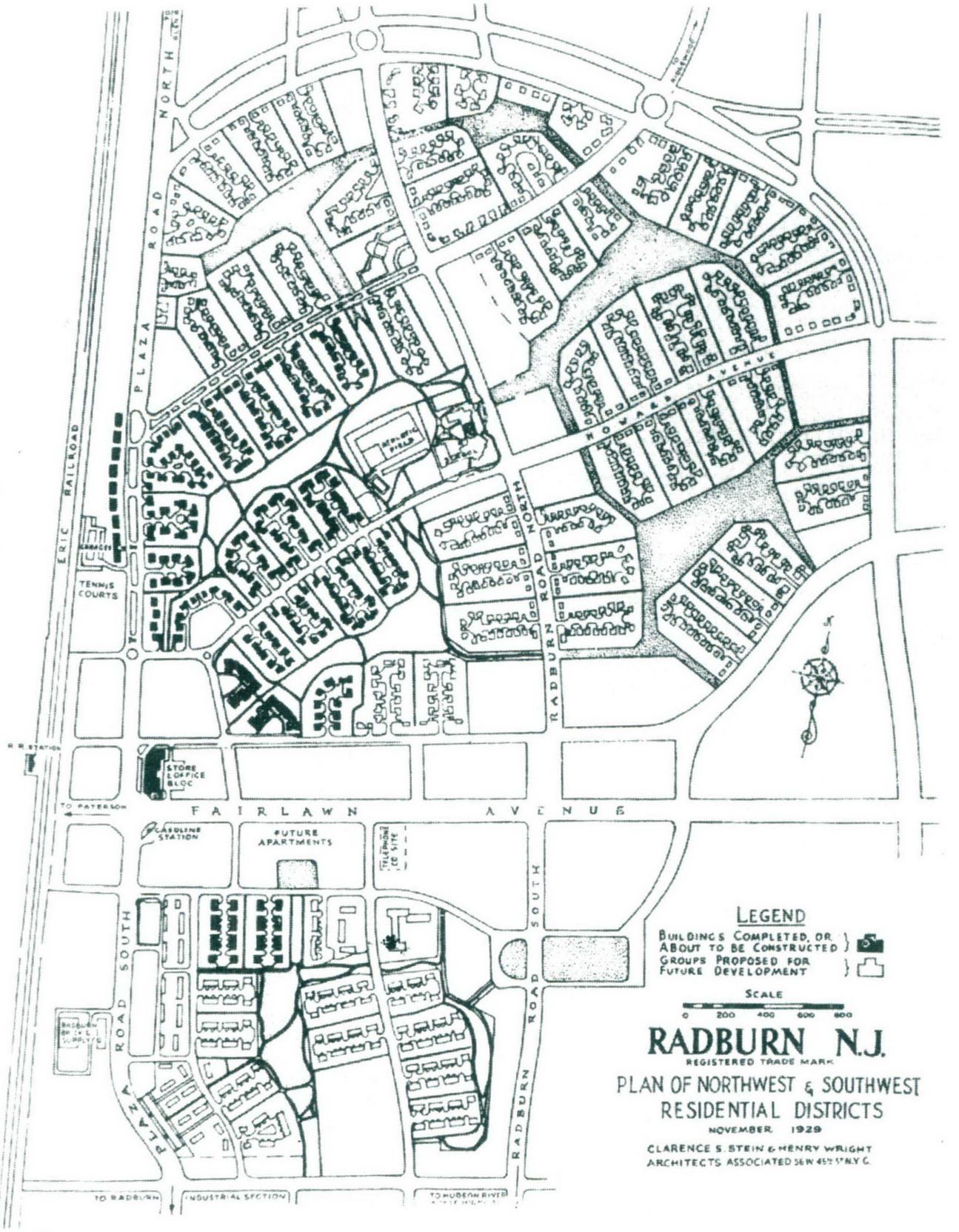
While current literature on Radburn indicates that community organisations within the estate are strong, a number of problems have been identified including:

- Small houses that do not meet current market expectations
- The relative closeness of houses (small lots) that create privacy issues compared with housing nearby
- Cul-de-sacs that have become congested as car ownership has increased
- Houses with main entries away from the the cul-de-sacs do not work because car use dominates pedestrian use

On the positive side the impact of Radburn's urban form on energy consumption for short local trips was considered in a 1970 study by John Lansing of the University of Michigan[71]. The study found Radburn's design to have important implications for energy conservation, recording that 47% of its residents shopped for groceries on foot, while comparable figures were 23% for Reston, Virginia (another Radburn-type development, but more car oriented) and only 8% for a nearby unplanned community.

Interestingly, this model has not been successfully interpreted in Australia as a public housing model. The example of Macquarie Fields included here, is one example of this.

71 John B. Lansing, Robert W. Marans and Robert B. Zehner, Planned Residential Environments (Ann Arbor: University of Michigan, 1970), p. 213



Historic Plan

5.2.2 ELEMENTS

Element 1- Master Plan Structure (Internal Core Connected – B)

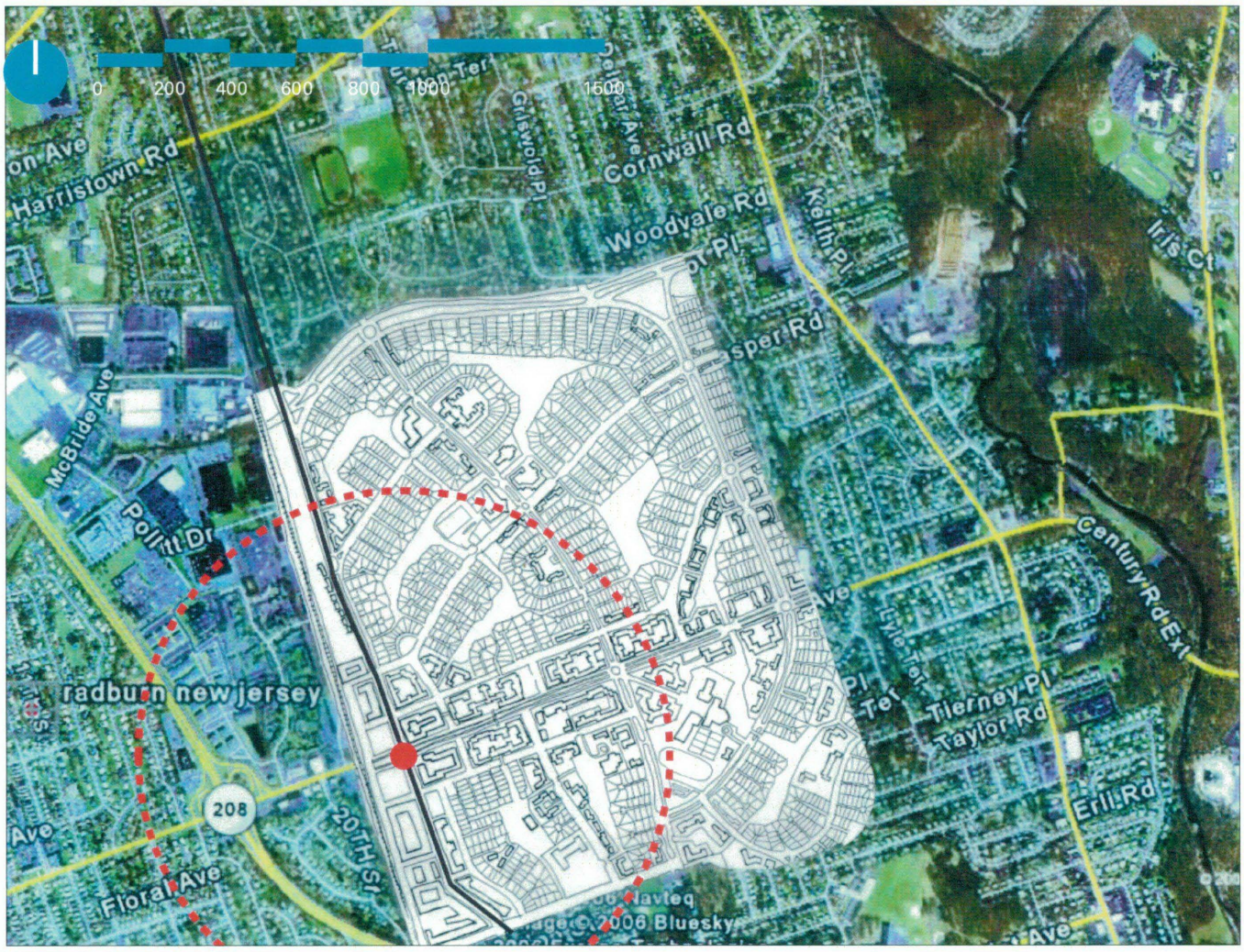
Radburn is located 20 kilometres from New York City and is 2 square miles in area. Radburn was planned around three neighbourhoods of 7,500 – 10,000 people each, a total of around 25,000 residents. The neighbourhoods were laid on a half-mile (800 metres) radius from the elementary school. There is a primary school at the centre of each neighbourhood. There is also a high school at the intersection of the three neighbourhoods. The commercial centre was located at the edge of the site near a state highway to serve a regional market. It was assumed that people would go there primarily by car.

The Radburn plan or 'idea' created a significant shift from traditional street patterns. It extended the cul-de-sacs, first used at Hampstead Garden Suburb, so that a green space system could contain a continuous pedestrian network without being crossed by streets.

Unlike Hampstead, Radburn developed an entire pedestrian and open space system separate to the street system. Radburn was planned to have 25% less street frontage and then deliver 12 – 14% more open space than a comparable conventional community of the time. There were some 35 – 50 families on a cul-de-sacs consisting of a service road with a carriageway of some six – eight metres.

Key elements are:

- Plan structured into neighbourhoods, each with a radius of 800 metres (1/2 mile) centred around primary schools
- Total separation of pedestrians and vehicles resulted in a separate system of streets and open space
- This separation extended from the overall plan down to the plan of the individual dwelling



Element 1 - Master Plan Structure

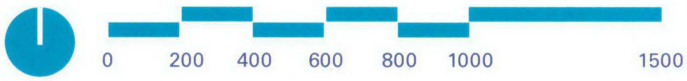
Element 2- Street Pattern (Dendritic – B)

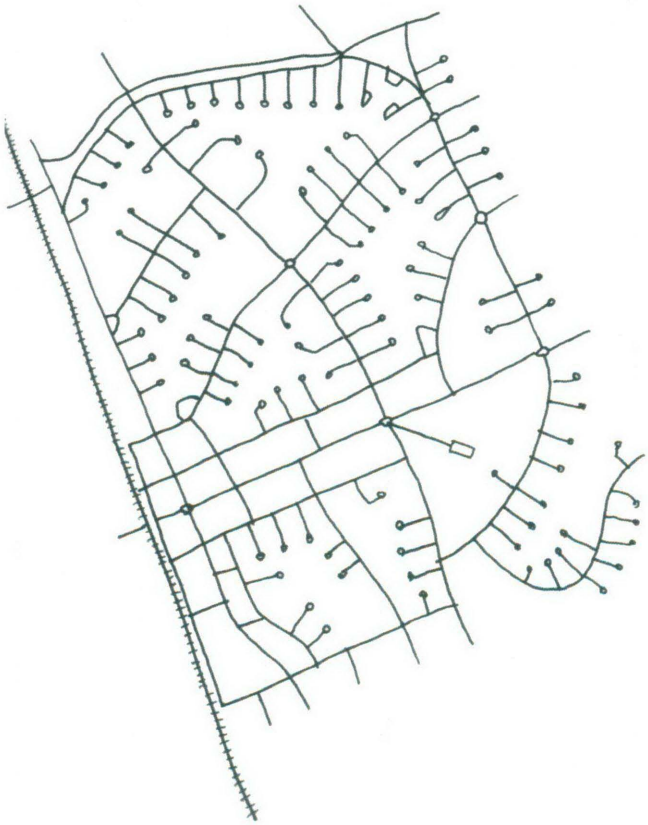
Radburn has a grid of collector streets at approximately 500 metre intervals. Within the grid is a further connected grid of local streets. These streets however do not have houses addressing them. From each local street run a number of cul-de-sacs where all dwellings are located. The street pattern is therefore connective at the level of collector and local streets like Hampstead Garden Suburb. Radburn introduces a street type between collector and cul-de-sacs. Radburns, while quite connective at the street level, is very connective at the pedestrian level. What has been questioned however is whether such connections with no passing traffic, are safe. This raises the question of what is is an acceptable level of surveillance.

While similar to some so called Radburn estates in Australia such as Macquarie Fields and Bonnyrigg, the street pattern at Radburn is significantly more connective than its Australian counterparts. (Refer Macquarie Fields case study below)

Key elements include:

- Strongly hierarchical street network
- Grid of through traffic collector streets at 500 metre intervals
- All residential streets are cul-de-sacs
- Collector streets create limited connectivity
- High pedestrian connectivity via a separate pedestrian path network
- No rear lanes
- Houses back onto reserves





Element 2 - Street Pattern

Element 3- Block Pattern (Irregular – B)

The extensive adoption of the cul-de-sacs at Radburn resulted in a block configuration similar to Hampstead garden suburb in some ways. The difference is that a rear pedestrian only spine extends through all the blocks at Radburn. Because the streets are generally gridded, the blocks, while unusual in form, are quite regular. This is consistent with the area's relatively high density. There are also superblocks containing higher density housing.

Key elements include:

- Typical block based on the cul-de-sacs as a unit
- Typical block also includes a pedestrian only spine
- Some blocks treated as super blocks with private common open spaces and higher density housing

Element 3 - Block Pattern

Element 4- Subdivision and Lot Pattern (Irregular – B)

Radburn is subdivided similarly to Hampstead Garden Suburb in that the cul-de-sacs cluster is the primary organiser. The lots are significantly smaller at Radburn to accommodate far more modest dwellings for typical young American families seeking more affordable housing and perhaps a more community based lifestyle. Key elements include:

- Generally small subdivision lots
- Super blocks are generally subdivided conventionally
- Some super blocks incorporate shared open space

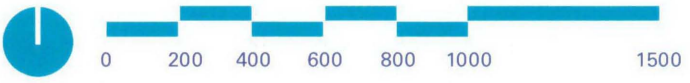
Element 4 - Subdivision & Lot Pattern

Element 5- Open Space Pattern (linear – B)

Each open space reserve at Radburn is the heart of its neighbourhood. Apart from playing fields associated with schools, all open space is structured as linear reserves surrounded by dwellings. While such linear spaces may be seen in other well known examples prior to Radburn, at Olmsted's Riverside development in Chicago, or even Walter Burley Griffin's Castlecrag in Sydney; at Radburn they are the primary open space element around which the plan is structured.

The reserves are accessed from small pedestrian paths as well as the surrounding dwellings. Each reserve within a neighbourhood is configured into a common, either rectangular or triangular, to facilitate sport and community activities. The spaces then narrow down to narrower green links to surrounding local streets. The links generally connect across to adjacent reserves via street underpasses. This allows pedestrians to walk throughout Radburn avoiding cars altogether. None of the spaces addresses a street; rather they address houses and schools. Key elements include:

- Continuous linear reserve behind residential blocks widening to accommodate recreation
- Reserves function as the 'heart' of a neighbourhood
- Reserves are linked by continuous pedestrian paths and underpasses
- Reserves do not address the street
- Private gardens facing the open spaces provide surveillance having low hedge edges
- Some private common open spaces within super blocks



Element 5 - Open Space Pattern

Element 6– Built Form (High Density Linear – B)

Unlike the earlier examples there is no clearly defined urban core at Radburn. Because of the prevalence of the car, the rail station loses its importance as an arrival point to the suburb. In contrast, the neighbourhood concept internalises the focus within each neighbourhood around the primary school, which sits within an open space, rather than defining it. There is a linear concentration of higher density apartments and duplexes between the neighbourhoods along the major east west avenue.

The remaining built form is generally small detached and semi detached dwellings, coupled at the garage or porch/breezeway. Cheaper dwellings were created that attached two – three dwellings together. Key elements include:

- Generally detached and semi detached dwellings with some attached dwellings (duplexes and apartments) on the main collector road (density)
- The house form was changed to orientate kitchens and garage to the street and living areas to the rear garden and common open space
- Community uses planned at collector road intersections. Retail located at the edge of the site
- A primary school at the 'heart' of each of the three neighbourhoods and a secondary school at the intersection of the three neighbourhoods. They are located at street intersections

Element 6 - Built Form

Element 7 – Housing Design (Site Specific – A)

The houses at Radburn were specially designed. Wet areas were designed to be as small as function would permit. The small wet areas and garages have proved to be too inflexible over time as technology changed and cars became bigger. A major departure from the traditional house plan was the orientation of the living room, porch and as many bedrooms as possible facing away from the street towards the rear garden and common open space. The kitchen and garage were placed on the service street or cul-de-sacs for ease of function. Like Forest Hills Gardens the project was too expensive for low cost housing, attracting many white-collar workers from New York City.

Radburn Neighbourhood Centre

Open Space

5.3 AUSTRALIAN CASE STUDY - MACQUARIE FIELDS 1972

5.3.1 BACKGROUND AND VALUES

Macquarie Fields is one of five broadacre public housing estates built between 1972 and 1978 in the Campbelltown Local Government Area on the south-western fringe of Sydney. Macquarie Fields has a total of 1542 dwellings, including 572 townhouses (one third). Based on the Radburn model, it was planned as a public housing estate.

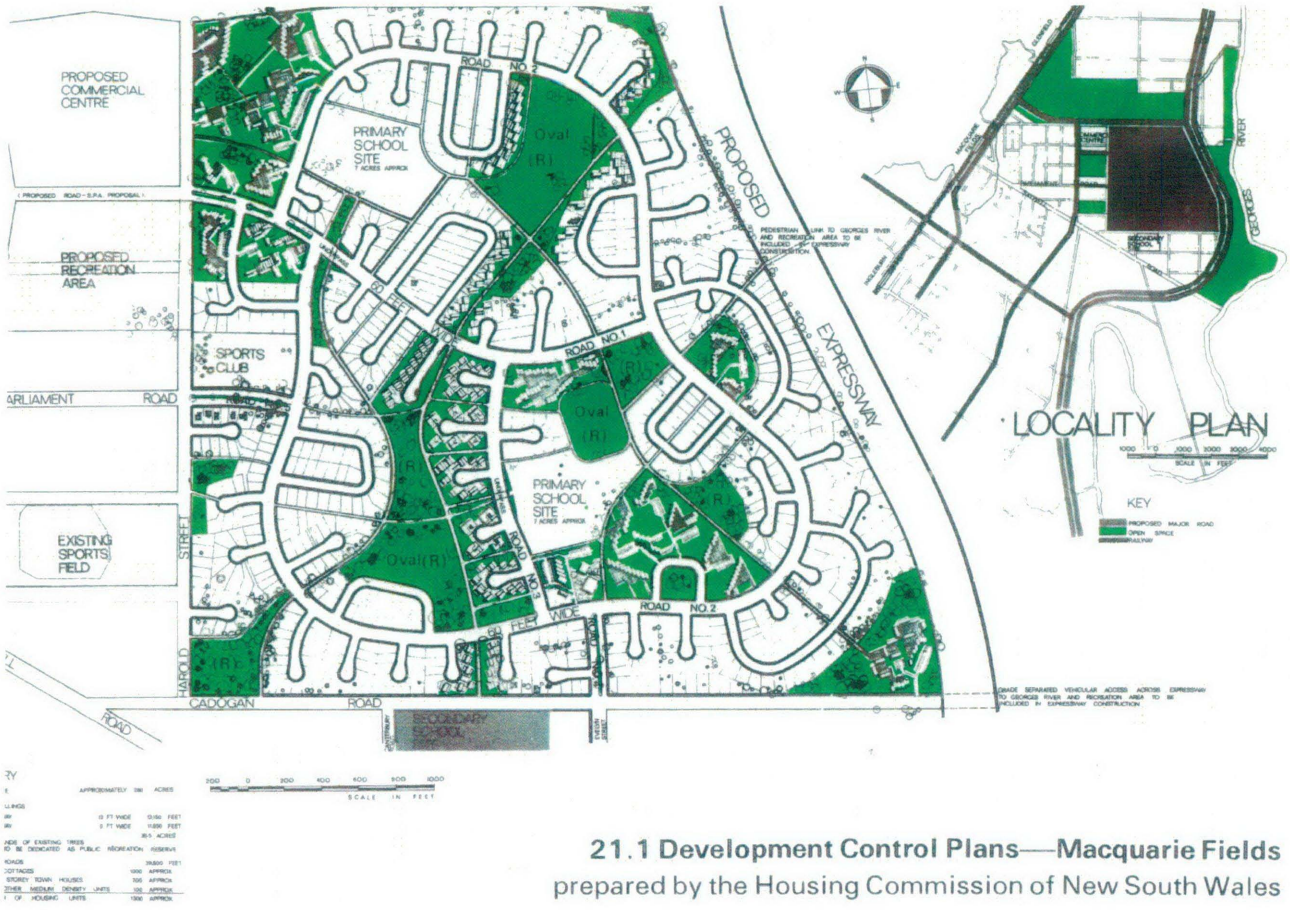
Macquarie Fields was developed by the NSW Department of Housing as one of the corridor estates along the Liverpool - Campbelltown corridor, after the great estates such as Green Valley where *Radburn principles were applied* (author's italics)[72] . The analysis of elements and comparison with Radburn in this study reveals a number of significant differences between Radburn and Macquarie Fields.

The Radburn model was not developed specifically for disadvantaged communities; rather it was developed to regain a sense of community at a time when the motor car was seen as a threat to community. Radburn was developed around a strong community focus, the school, and open space where families would be able to meet and socialise without the need for the car. The values underpinning Macquarie Fields are consistent with those of Radburn itself. These include the neighbourhood unit based around the primary school, the separation of cars and pedestrians, and the cul-de-sacs as the basic residential street. Unlike Radburn however, Macquarie Fields is not seen as a planning success.

Is the Radburn model a failure generally or just when applied to public housing, or was the model translated poorly in Australia? The planning shortcomings of Radburn have been noted above. There are additional problems noted at Macquarie Fields. It is outside the scope of this study to examine the question of tenure, and whether this has contributed to the shortcomings at Macquarie Fields. What is important is to identify whether characteristics or elements have proved durable. The answer to this lies in comparing both Radburn and Macquarie Fields to the other Case Studies, as well as comparing Radburn to Macquarie Fields, examining their elements to understand where they are similar and different.

While the plans of both Macquarie Fields and Radburn are quite different in form from the immediate surrounds, they are also different in how they connect to their surrounds. The street pattern, open space configuration and built form differ as described below. Macquarie Fields has retained much of the existing topography and vegetation, which may have had an impact on both the open space and street pattern. Finally, as noted above, the tenure of the two projects is very different, with Macquarie Fields being public housing whereas Radburn is private.

72 John Gregory and Jennifer Campbell, New South Wales Public Housing Design, A Short History, , New South Wales Department of Housing 1996



21.1 Development Control Plans—Macquarie Fields
prepared by the Housing Commission of New South Wales

Historic Plan

5.3.2 ELEMENTS

Element 1- Master Plan Structure (Internal Core Limited Connectivity – C)

In analysing the design structure of Macquarie Fields and then comparing it with Radburn, a number of significant differences arise.

The Macquarie Fields plan creates an estate of approximately 1,500 dwellings organised on a series of cul-de-sacs accessed by a loop collector road that connects to the surrounding street grid in only two places. As with Radburn the open spaces are generally not located on streets but behind private dwellings. There are however a number of significant differences in layout between Radburn and Macquarie Fields as follows:

- While the Radburn Street pattern consists of cul-de-sacss directly linked to a connective grid of streets, at Macquarie Fields the cul-de-sacss connect to a loop road that has only two connections to the surrounding street grid
- The connective street grid at Radburn is spaced at approximately 300- 400 metres, significantly less than the 800 metre grid at Macquarie Fields
- Community facilities at Radburn including the schools are located in open space on the connected avenues near the intersection
- Community facilities at Macquarie Fields are located in open space on the loop road
- At Radburn the open spaces are not associated with streets, but have surveillance from houses
- At Macquarie Fields the open spaces are not associated with streets and have no surveillance from houses as 1.8 metre back fences obscure the open spaces from view

At Macquarie Fields the Radburn structure has been blamed as a significant reason for the very serious social problems that have emerged. . While it needs to be acknowledged that social factors such as the high concentrations of social housing, rather than layout issues may be the key cause, the above comparison highlights a number of layout issues that relate to issues noted below raised by the community. A number of similar problems have arisen with other large (over 100 dwellings) public housing estates in Sydney developed on the 'Radburn' model from the 1950's to the 1980's. Physical problems related to planning, that have been highlighted by the community include[73]:

- Housing that is poorly designed and maintained
- Poor access and linkages to necessary services –health, transport, family support
- Lack of surveillance

Note also that at Radburn the commercial facilities were on the edge of the site on a street so that the adjoining areas and passing trade would have easy access to ensure viability.

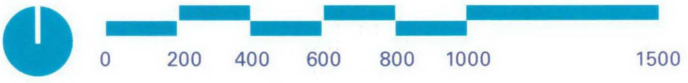
73 Housing NSW, Public Housing Fact Sheet, Community Renewal in Macquarie Fields (undated) Spring 1999

Element 1 - Master Plan Structure

Element 2- Street Pattern (Dendritic – C)

While the design structure of Macquarie Fields appears to derive from the Radburn Idea, and both include a connective pedestrian network, the street pattern at Radburn is significantly different in that it is more connective. A grid of collector and local streets, not a loop system, bound a typical neighbourhood. The street pattern at Macquarie Fields is organised around a curving loop collector road which branches out into a series of cul-de-sacs. The street system at Radburn is more connected to the surrounding street system. The curving loop road at Macquarie Fields connects to its surrounds in only two places. At Radburn the collector road connects in eight places. Key elements include:

- Strongly hierarchical street network
- Loop collector road for local traffic with 2 connections to surrounding streets
- All residential streets are cul-de-sacs or short loop roads
- Collector streets create limited connectivity
- Connectivity depends on a separate pedestrian path network
- No rear lanes
- Houses back onto reserves

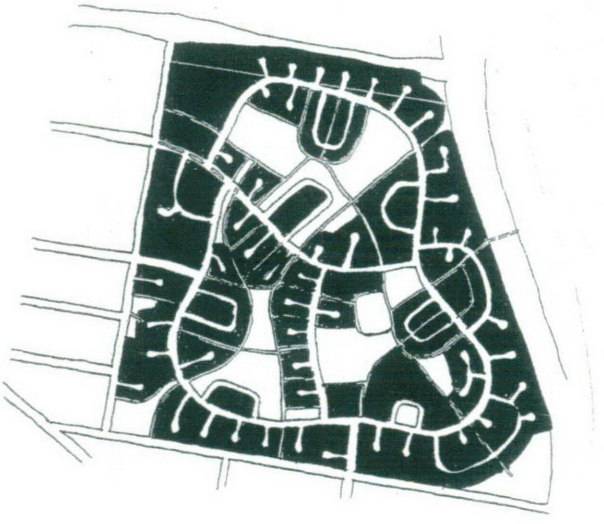


Element 2 - Street Pattern

Element 3- Block Pattern (Irregular – B)

While the block pattern has some similarities with Radburn, the curvilinear loop road generates a less regular block pattern. There is a mixture of blocks containing detached dwellings and super blocks containing townhouses. The townhouses sit within the larger super blocks as freestanding elements surrounded by landscaped area rather than in the more conventional terrace house block where the buildings with small individual front gardens and rear courtyards, define the block. Key elements include:

- Typical block based on the cul-de-sacs as a unit
- Blocks contain a pedestrian spine similar to Radburn
- Some blocks treated as super blocks with ill defined private common open spaces



Element 3 - Block Pattern

Element 4- Subdivision and Lot Pattern (Irregular – B)

The subdivision pattern is largely a result of the cul-de-sacs and continuous open space reserves to the rear of dwellings. There is a mix of traditional detached lots and larger super blocks containing attached dwellings grouped in discrete clusters. As noted above the subdivision pattern is being changed to reduce the amount of public space without surveillance and consolidate it into private back yards. While commonly owned open space was a key element of the garden city, it was generally surrounded by streets with good surveillance. Key elements include:

- Generally standard subdivision lots
- Super blocks generally contain higher density housing
- Some super blocks incorporate shared open space that is ill defined

Element 4 - Subdivision & Lot Pattern

Element 5- Open Space Pattern (Linear - B)

The open space system extends throughout the site and contains the pedestrian network within it. While the open space structure is similar in both plans; those at Macquarie Fields are wider and less structured.

The state government has developed a Community Renewal Strategy since 1994[74] to address identified key planning and social issues. The principal change being made at Macquarie Fields and some similar public housing states is to either privatise or re configure the common open space areas that are not 'owned' by individual residents and have little or no surveillance, as well as reconfiguring dwellings so that the front door is on the street. This program is known as 'neighbourhood' or 'community' renewal.

'Our young children can play in safety and our homes are no longer vandalized. Before we had a dangerous lane, now we have a lovely backyard'.[75] It is difficult to understand whether the problems that have arisen are 'inherent' in the Radburn model itself. Because all of the large estates that have created large concentrations of disadvantaged households were developed on the Radburn model we cannot compare them to conventional planning models. There is little doubt however that large areas of common open space with little surveillance cause significant crime and security problems in a context of social disadvantage. Key elements include:

- Discrete reserves behind residential blocks to accommodate recreation
- Reserves function as the 'heart' of a neighbourhood
- Reserves are linked by continuous pedestrian paths
- Reserves do not address the street
- Common open spaces within super blocks not as well defined as Radburn

74 Ibid
75 Ibid

Element 6 – Built Form (Dispersed – C)

There is no defined urban core. Higher density townhouses are grouped into three linear super blocks within the site, as well as in a group on the south eastern corner of the site. There is a range of densities and dwelling types, from detached houses to attached townhouses and cluster dwellings. The medium density townhouses depart from the lower density subdivision pattern of streets and cul-de-sacs, being placed within semi private open space areas. The built form is therefore very different from both the typical Australian suburban form and the more traditional high-density inner city areas. The medium density dwellings do not define streets or open space edges.

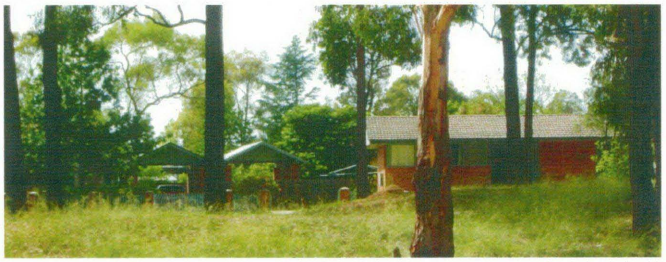
Element 5 - Open Space Pattern

Because the 'rear' of the dwellings face the public open space areas, these spaces tend to be defined by rear fences. This is again different from Radburn where the house actually addressed the open spaces, rather than being separated by high fences. The back yard was therefore an Australian adaptation of the Radburn model. This creates a lack of surveillance, which is exacerbated by the larger open spaces at Macquarie Fields creating a significant safety problem that is still the subject of modifications to the plans some three decades later.

In addition to the adoption of Radburn principles, higher densities were achieved by using townhouses as a significant proportion of the total housing mix. Whereas earlier subdivisions with cottages had facilitated individual sales to public housing tenants the new townhouse suburbs with 'super block' development did not. The gradual development of more mixed tenure, which characterised Green Valley and most of Mount Druitt, is missing in the 'corridor estates'. Key elements include:

- Generally detached dwellings with some attached dwellings (townhouses) on the main collector road
- The house form has subsequently been reversed to orientate kitchens and garage to the street and living areas to the rear garden and common open space

Houses



Houses

Element 7 – Housing Design (Site Specific – A)

The dwellings include both low and medium density housing. Both were designed for the Department of Housing. The low density dwellings are standard cottage designs that conform to department standards and are similar in appearance to other cottages in the area.

The medium density townhouses were architecturally designed specifically for the site to department space standards and construction budget.

While both dwelling types were designed to minimum space and construction standards, the cottages are flexible as they can be extended without difficulty, while the townhouses cannot be easily expanded. Key elements include:

- Housing designed specifically for the site
- Both low and medium density housing was designed to minimal space standards
- The medium density housing is more difficult to adapt or expand

House Form