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**WEST HEIDELBERG INDUSTRIAL ESTATE  
CAR PARKING AND TRAFFIC STRATEGY  
STUDY REPORT**

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Prepared for  
**Banyule City Council**

by  
**Arup Transportation Planning**

November 1996

**APPENDIX A**

**TREE PLANTING WITHIN THE STREETS**

## Existing Street Trees by Street

Street	Existing Planting	Comments
Aileen Avenue	Af, Ms	
Bamfield Road	Cc, Fs, Hs, Lc, PRS, Qp	Many recent plantings
Beatrice Avenue	Cx, Ec, Ef, Lc, Mx	
Crissane Road	As, Ms, As	
Culverlands Road	Hs, PRS	
Dougharty Road	Cs, Ls, MI	
Helen Street		No street trees
Kolara Road	Aj, Es, Ms	
Korong Road	Ax, Ex, Hs, Lc, Ma	
Kylta Street	Cx, Ex, Hs, Ma, Mn	
Lilimur Avenue	Hs, Ls	
Mc Ewan Road	Qp	Pin oaks at the front of Stanley factory
Mologa Road	Ax, Ex, Ma, MI	
Northern Road (East)	Ab, Ef, Hs, RpF, Qp, QrF	
Northern Road (West)	Ax, Cx, Ex, Ma, MI	Mostly native species
Orr Street	Ax, Ec	
Orthla Avenue	Ls, Mf	Recent Liquidamber plantings on western end
Percy Avenue	Ls	
Sheehan Road	Ax, Cs, Es, Ex, MI, Mn	
Year Street	Qp	Mature pin oaks
Vernon Avenue	As, Cs, Ef, Ex, Lc	
Waterdale Road	Ab, Px	

## Existing Street Trees by Name

Code	Botanical Name	Common Name	HxW	Comments
Ax	Acacia species	Wattle species	-	Short life span
Ab	Acer buergeranum	Trident Maple	6x4	Poor performance in local conditions
Os	Callistemon species	Bottlebrush Species	-	May obstruct vehicle sightlines
Cx	(Allo)Casuarina species	She-oak varieties	-	May obstruct vehicle sightlines
Cc	Cinnamomum camphora	Camphor Laurel	12x8	Too large for most situations
Ec	Eucalyptus camuludensis	Red Gum	30x18	Remnant stand in Orr St - too large for most situations
Esi	Eucalyptus sideroxylon	Ironbark	15x8	Good performance but too large for most situations
Es	Eucalyptus steedmani	Steedman's Mallee	8x5	Good performance
Ex	Eucalyptus species	Eucalypt species	-	Performance and suitability varies with species
Hs	Hakea salicifolia	Willow-leaved Hakea	5x3	May obstruct
Ls	Liquidamber styraciflua	Liquidamber	15x6	Too large for most situations
Lc	Lophostemon confertus	Queensland Box	15x9	Too large for most situations
Mx	Malus species	Apples, Crabapples	-	Drop fruit
Ma	Melaleuca armillaris	Bracelet Honey-myrtle	5x5	May obstruct vehicle sightlines
Mf	Melaleuca fulgens	Scarlet Honey-myrtle	1.5x1.5	May obstruct vehicle sightlines
Ml	Melaleuca lanceolata	Moonah	7x4	May obstruct vehicle sightlines
Mn	Melaleuca nesophylla	Western tea-myrtle	3x2	May obstruct vehicle sightlines
Ms	Melaleuca styphelioides	Prickly Tea-tree	12x5	Prickly foliage hinders maintenance
PTs	Pyrus calleryana 'Red Spire'	Ornamental Pear Variety	10x6	Good performance
Px	Prunus species	Flowering Plums	-	Good performance
Qp	Quercus palustris	Pin Oak	15x8	Good performance but too large for most situations
Qrf	Quercus robur fastigiata	Cypress Oak	15x3	Susceptible to oak blotch miner/green peach aphid, drops acorns
RdF	Robinia pseudoacacia 'Frisia'	Robinia variety	8x4	Very Hardy. May sucker if roots disturbed.

**APPENDIX B**

**PUBLIC TRANSPORT USAGE FOR EACH PRECINCT**

**APPENDIX C**

**CAR PARKING USAGE PROFILES FOR EACH PRECINCT**



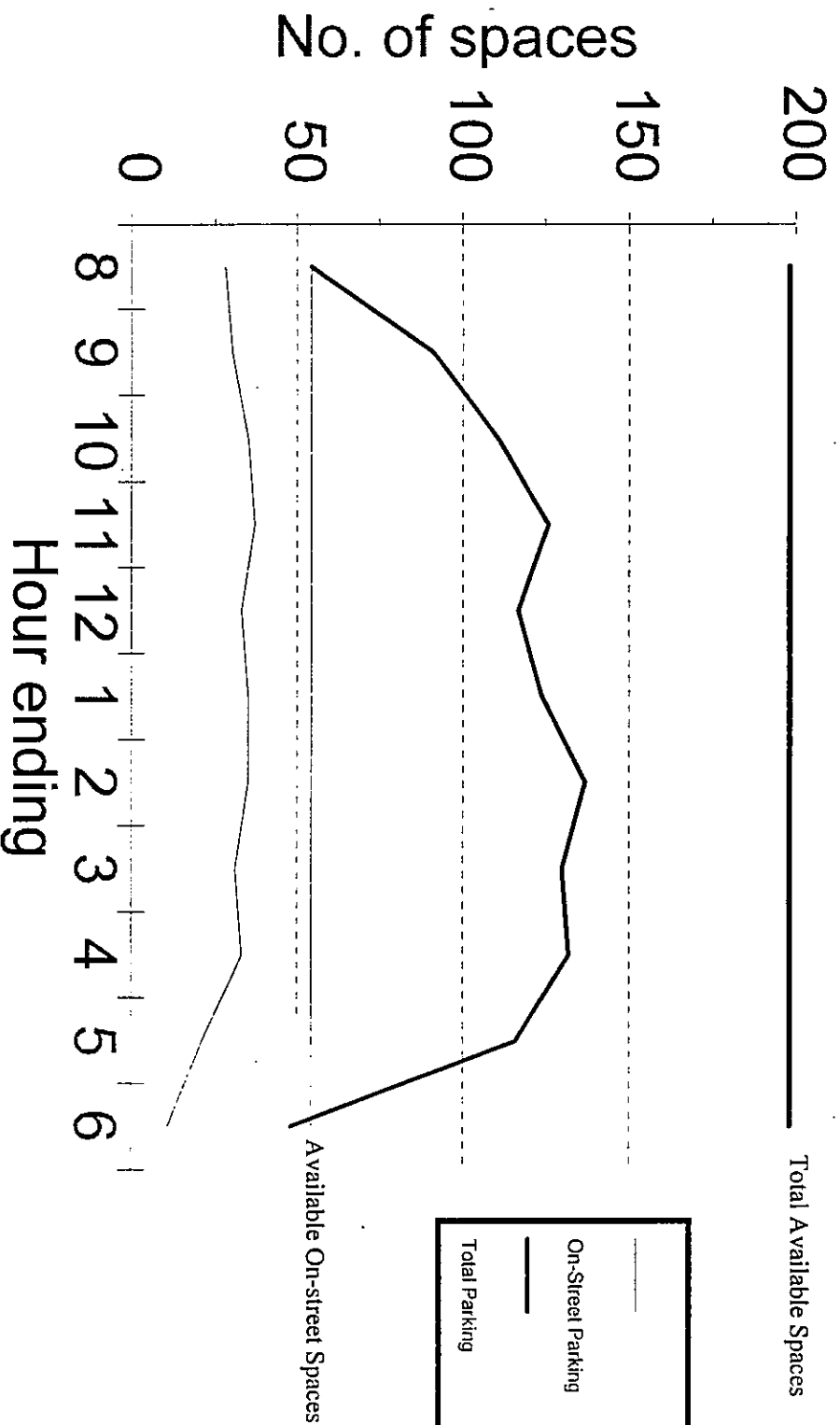
**Utilisation of Public Transport by Precincts  
(Percentage of Employees)**

# **WEST HEIDELBERG INDUSTRIAL ESTATE** **Car Parking and Traffic Strategy**

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 Frank Hanson Pty Ltd Landscape Architects  
 March 1996

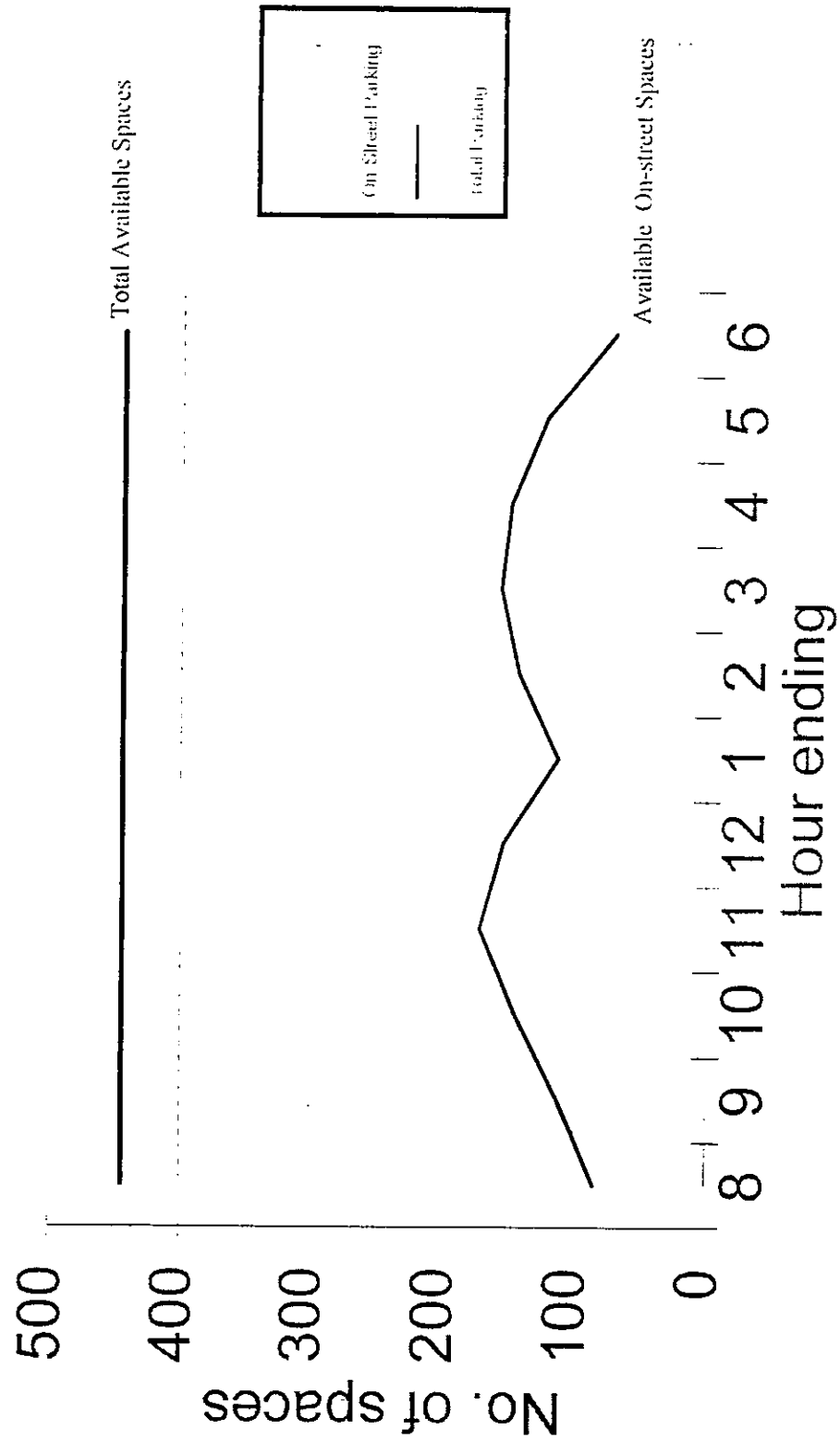


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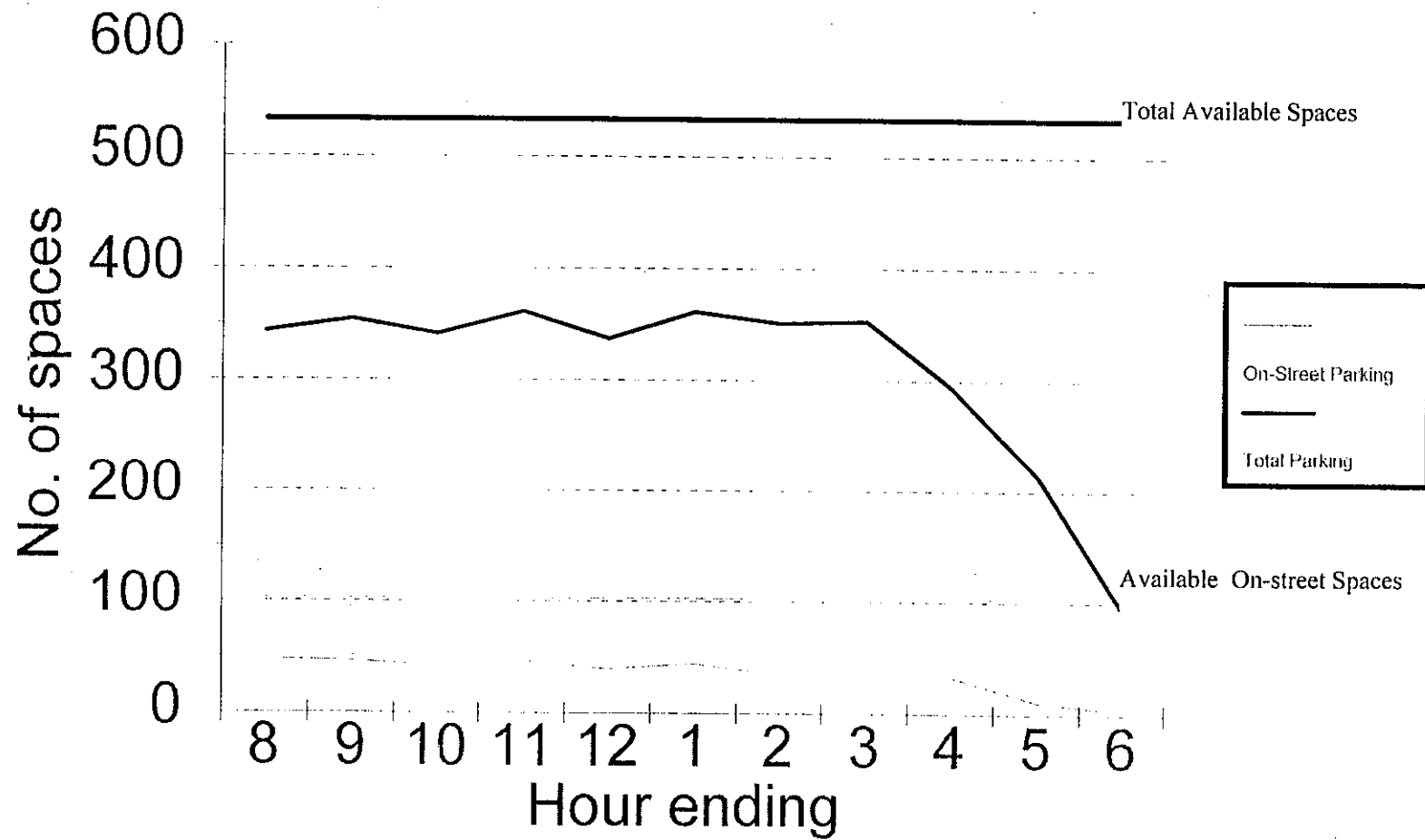




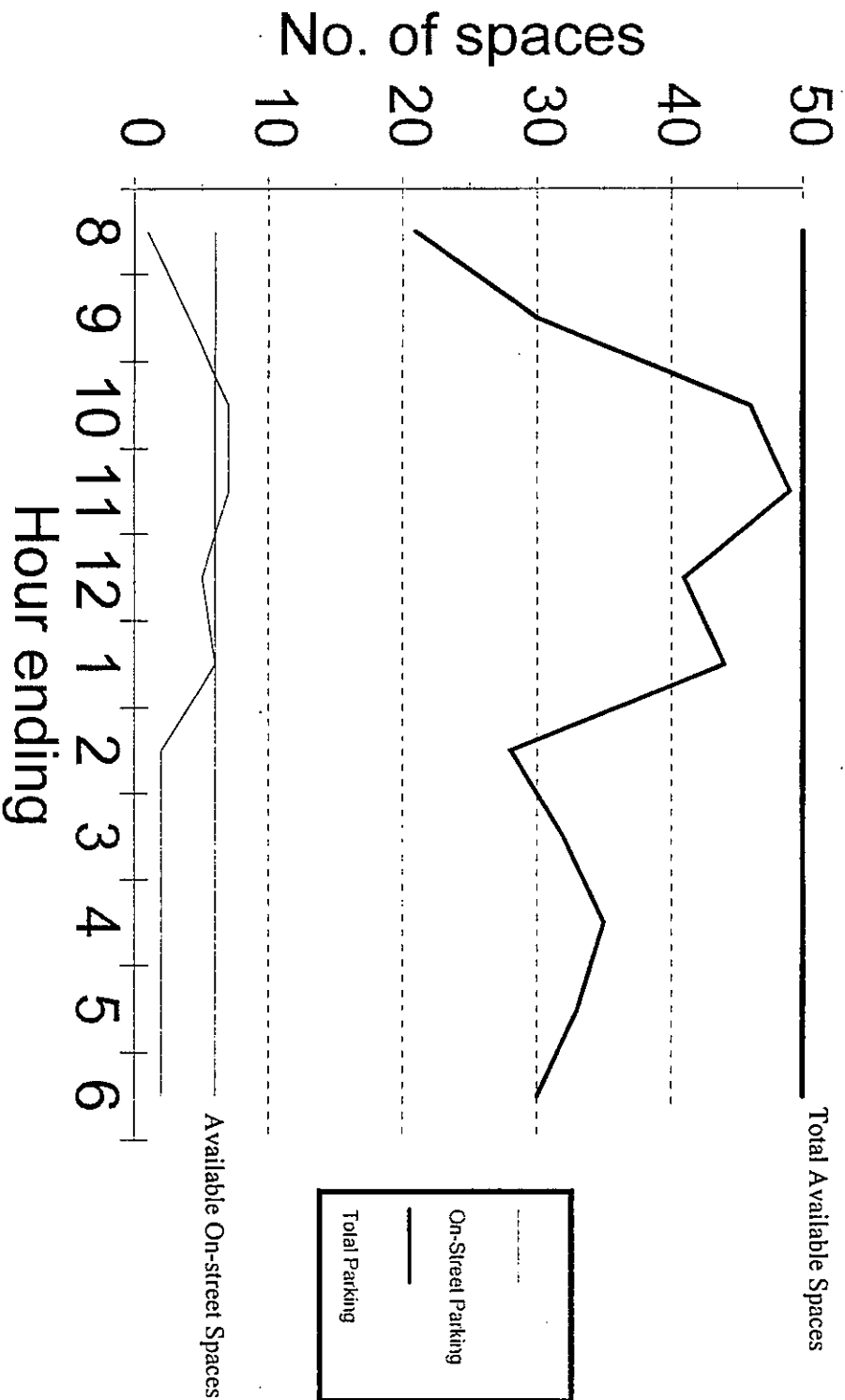
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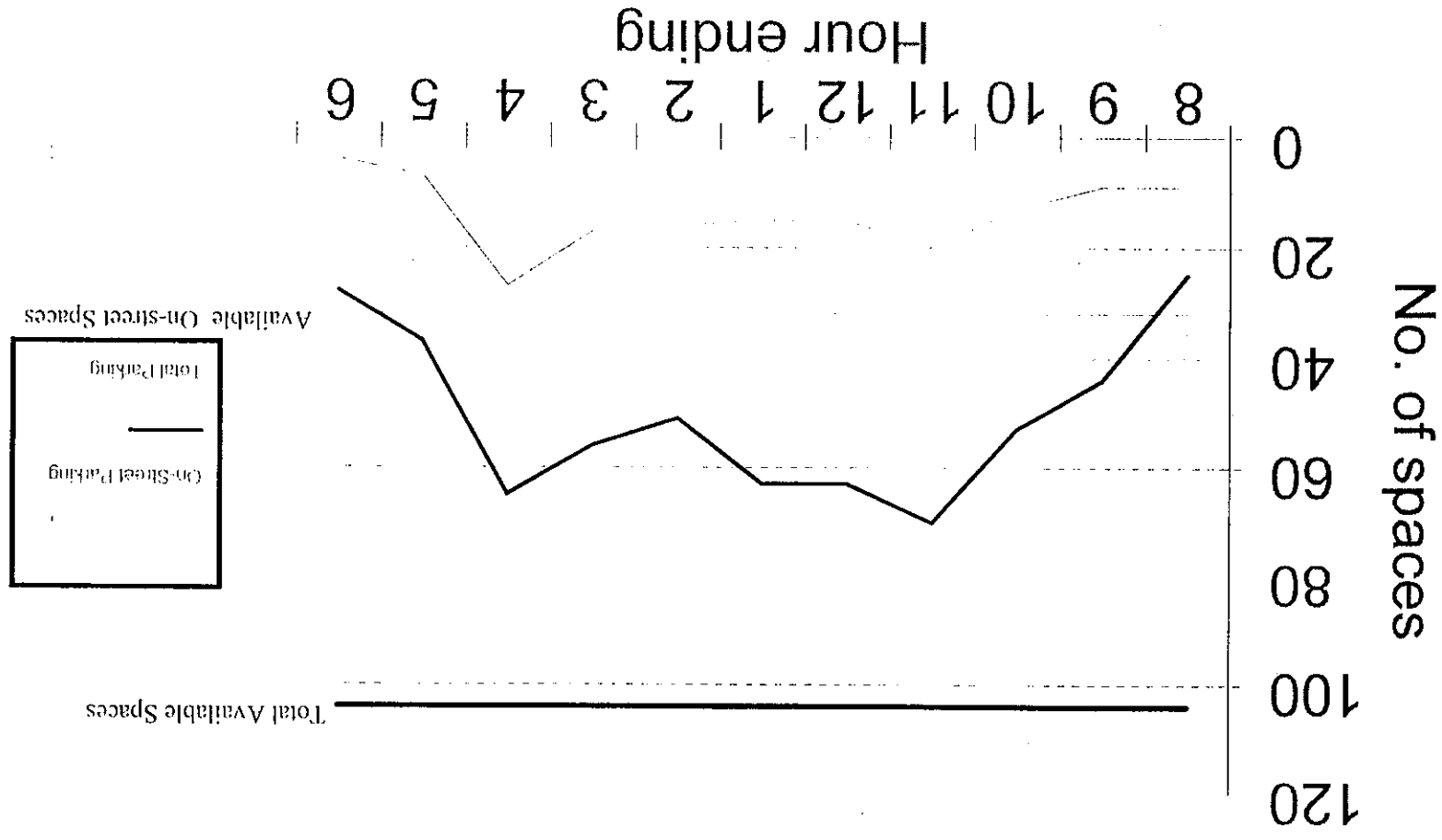
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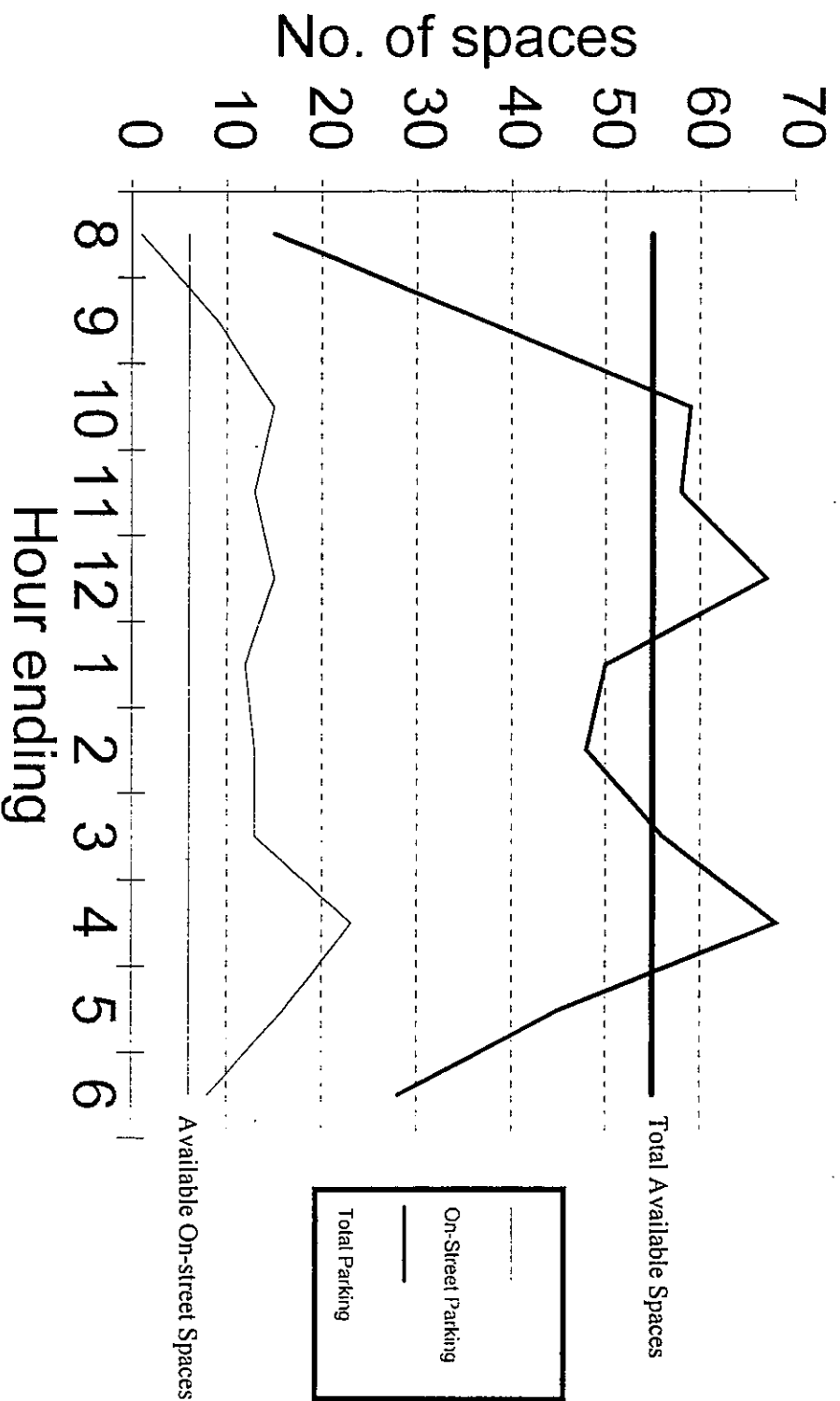
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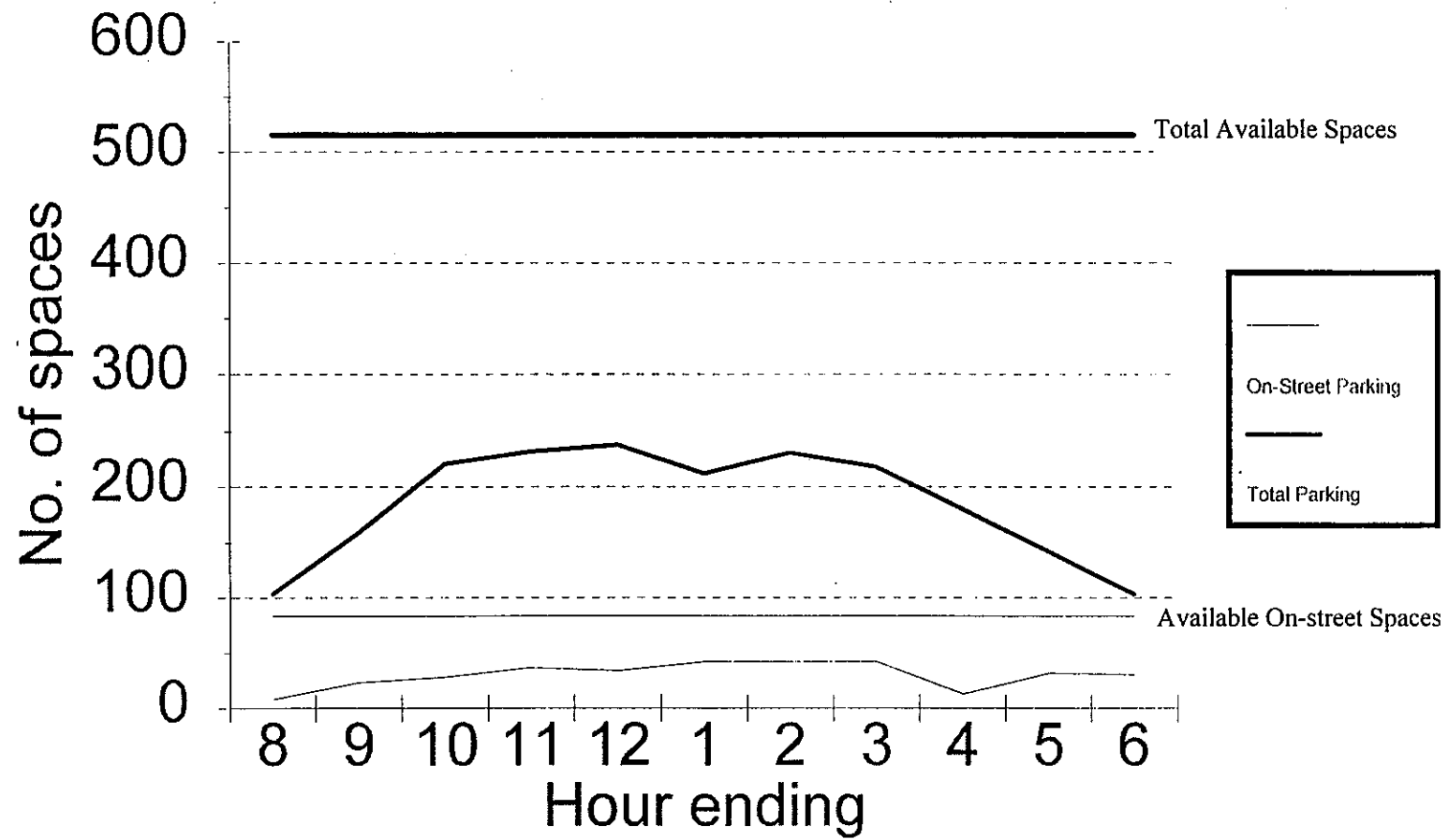
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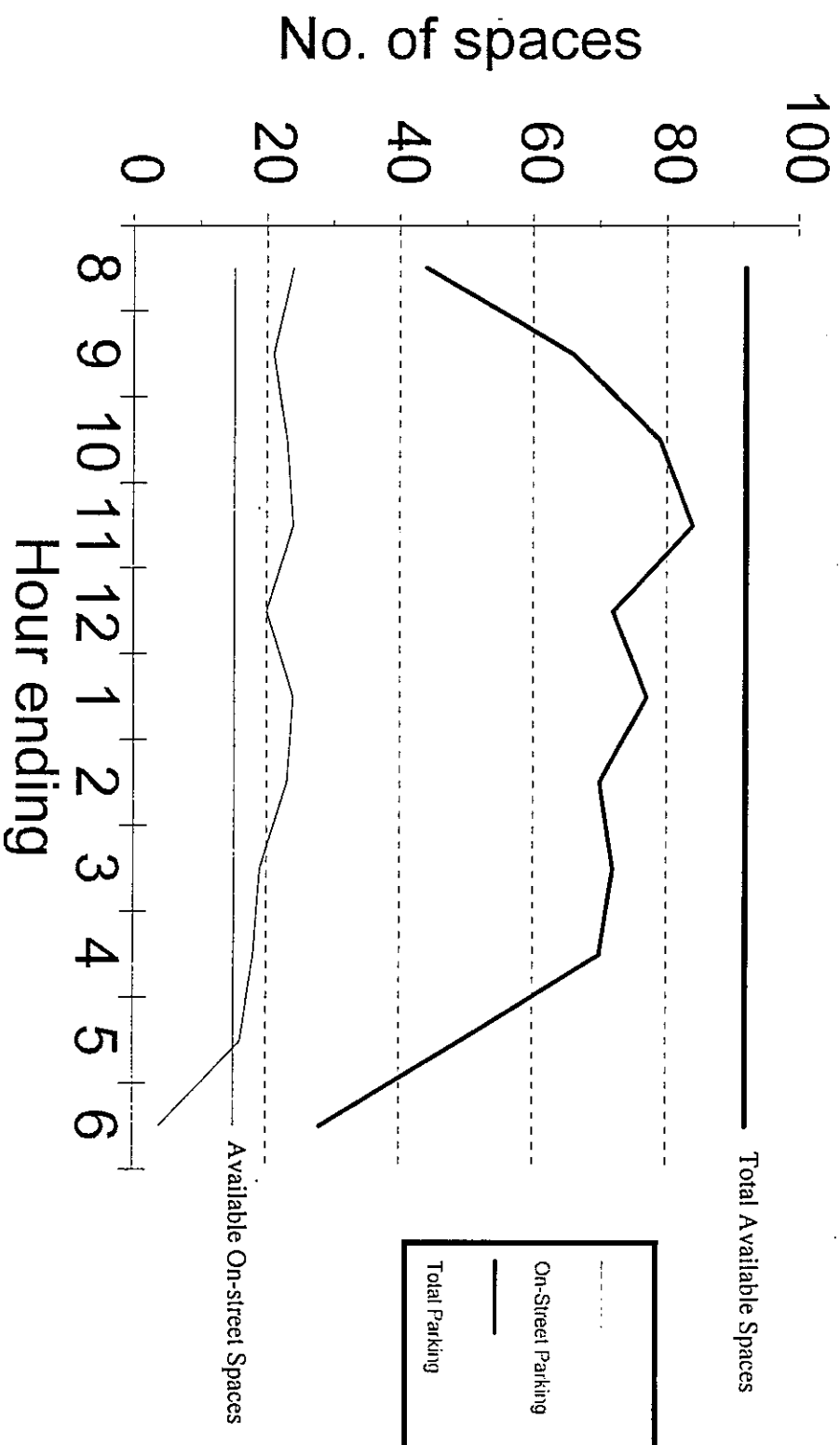
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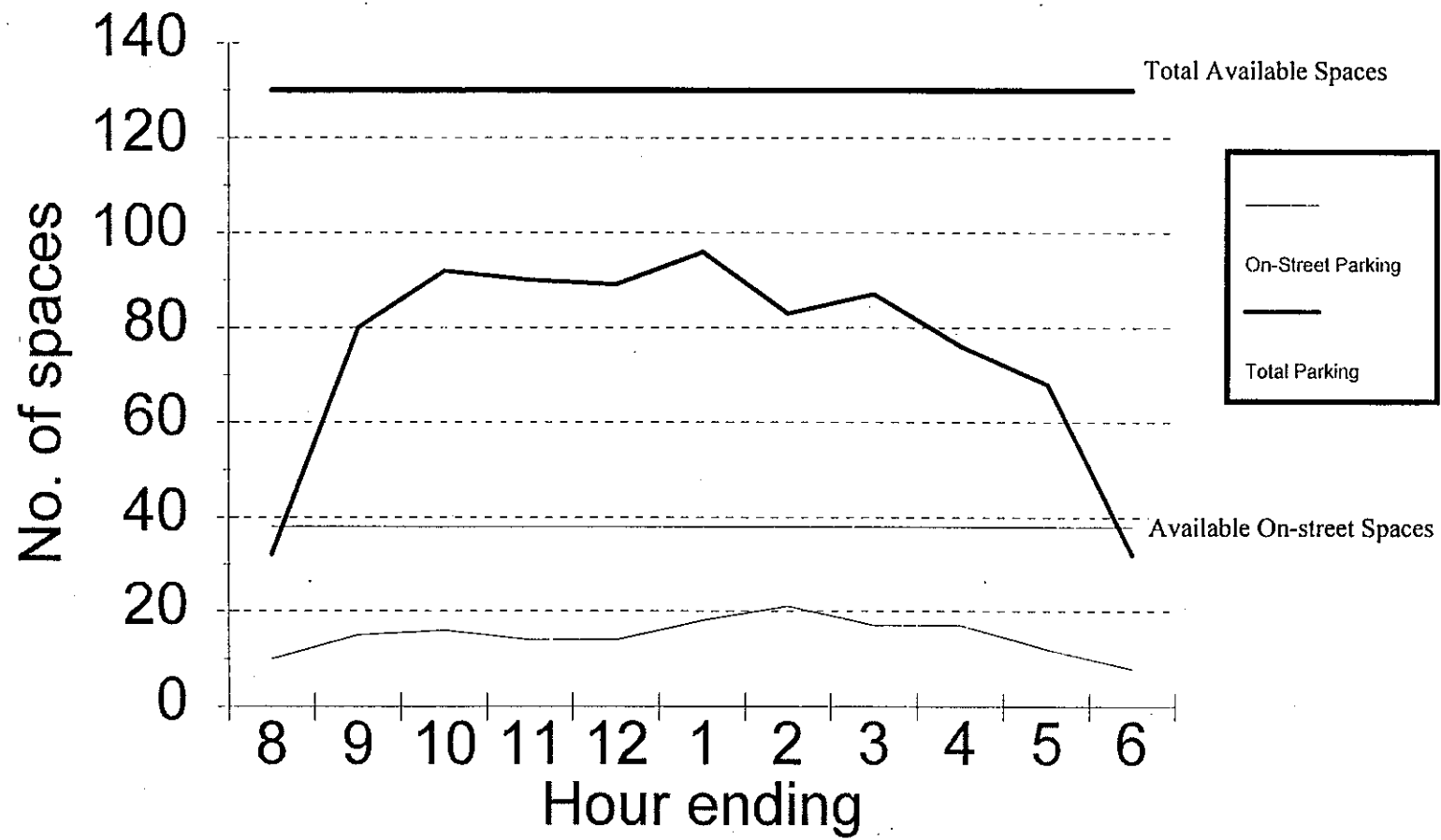
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# Precinct 7

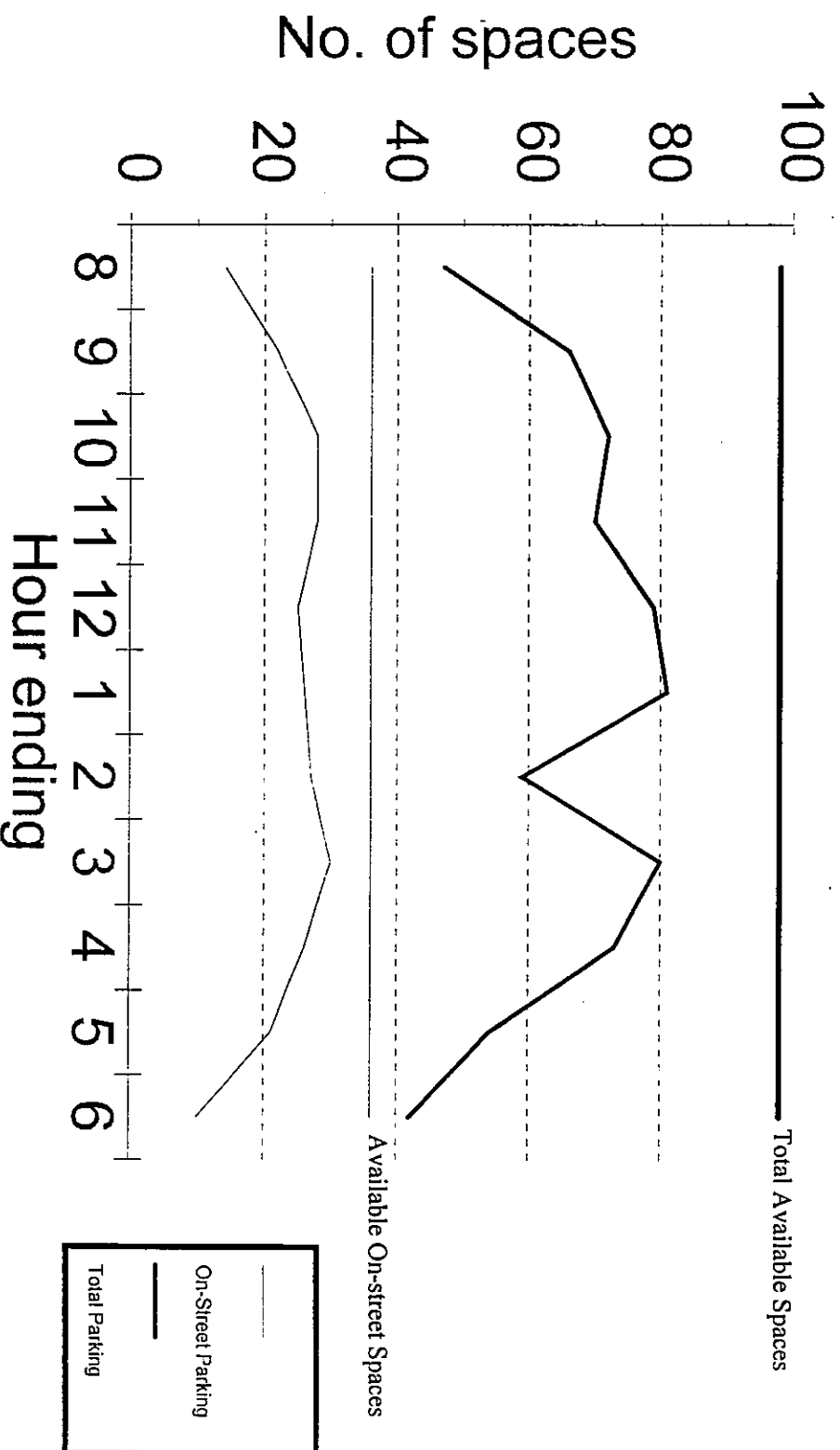


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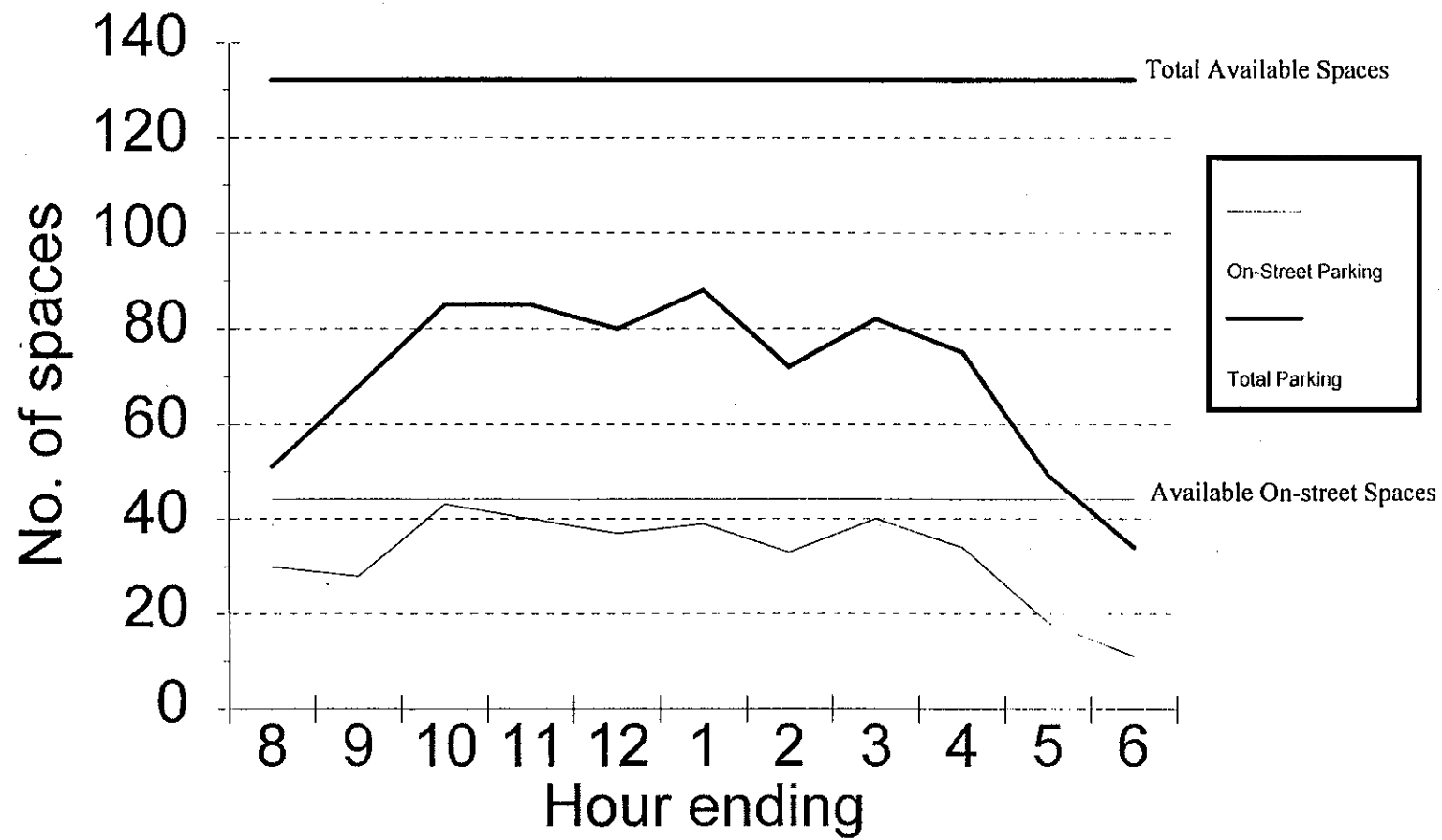




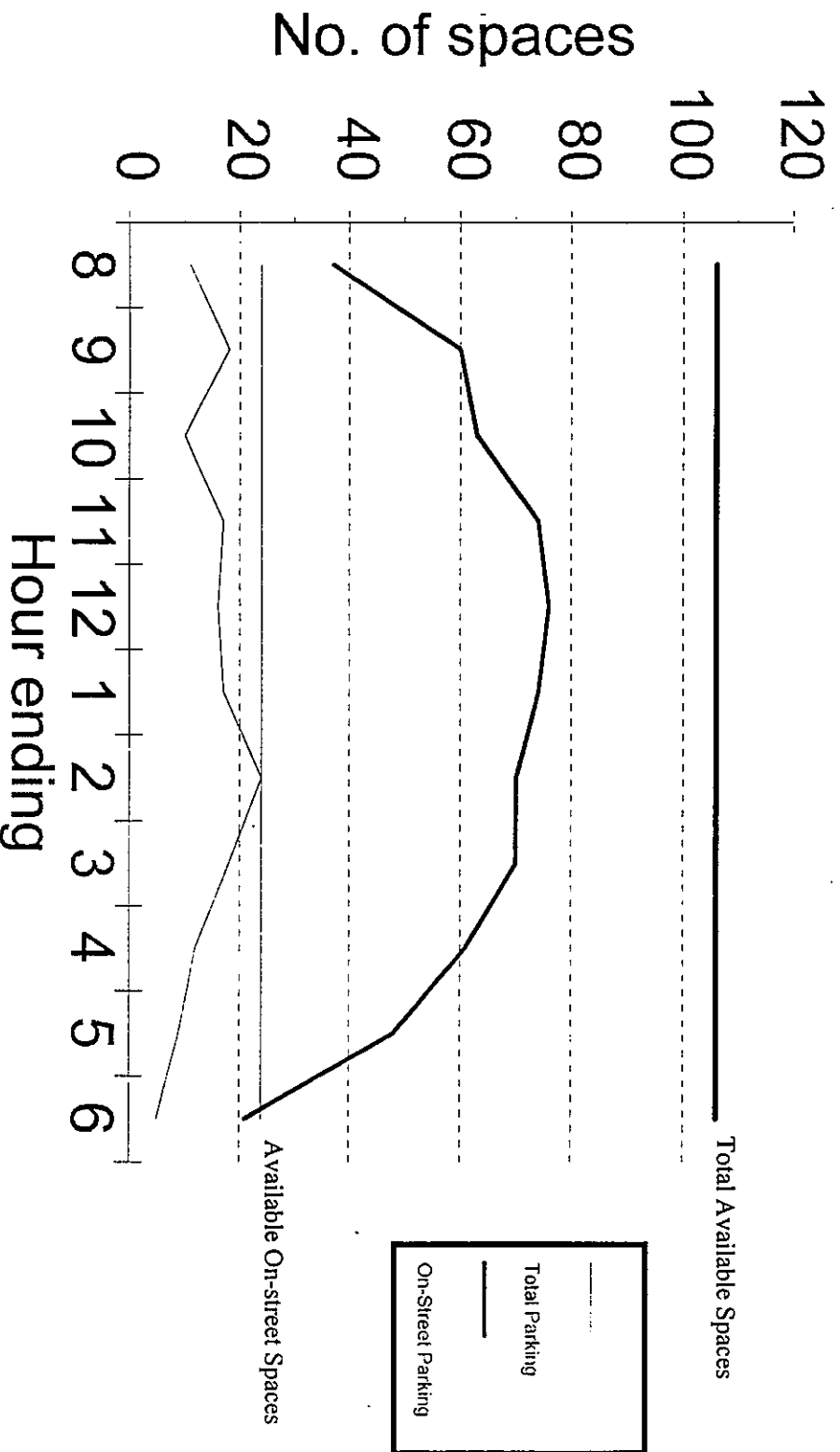
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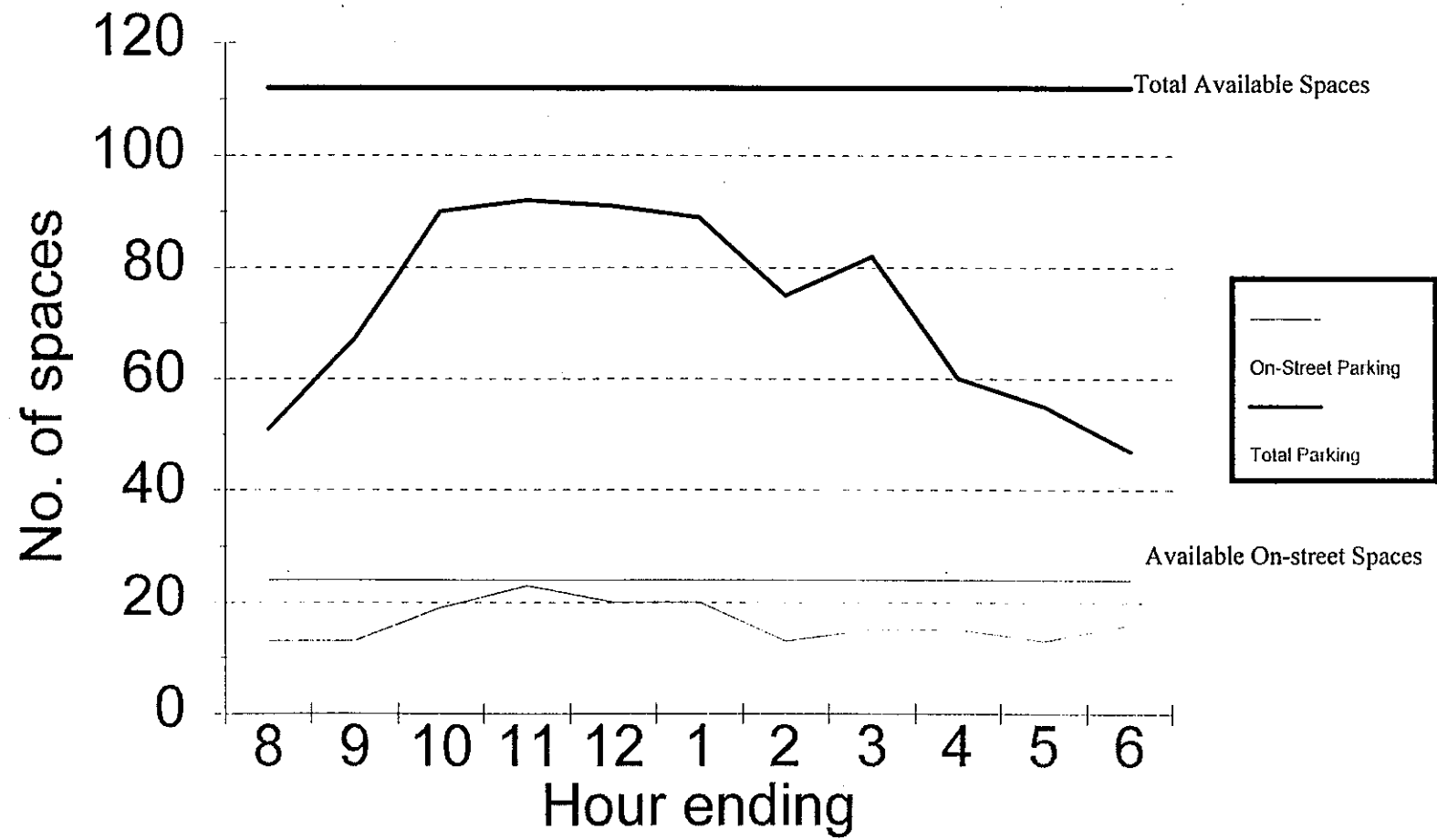
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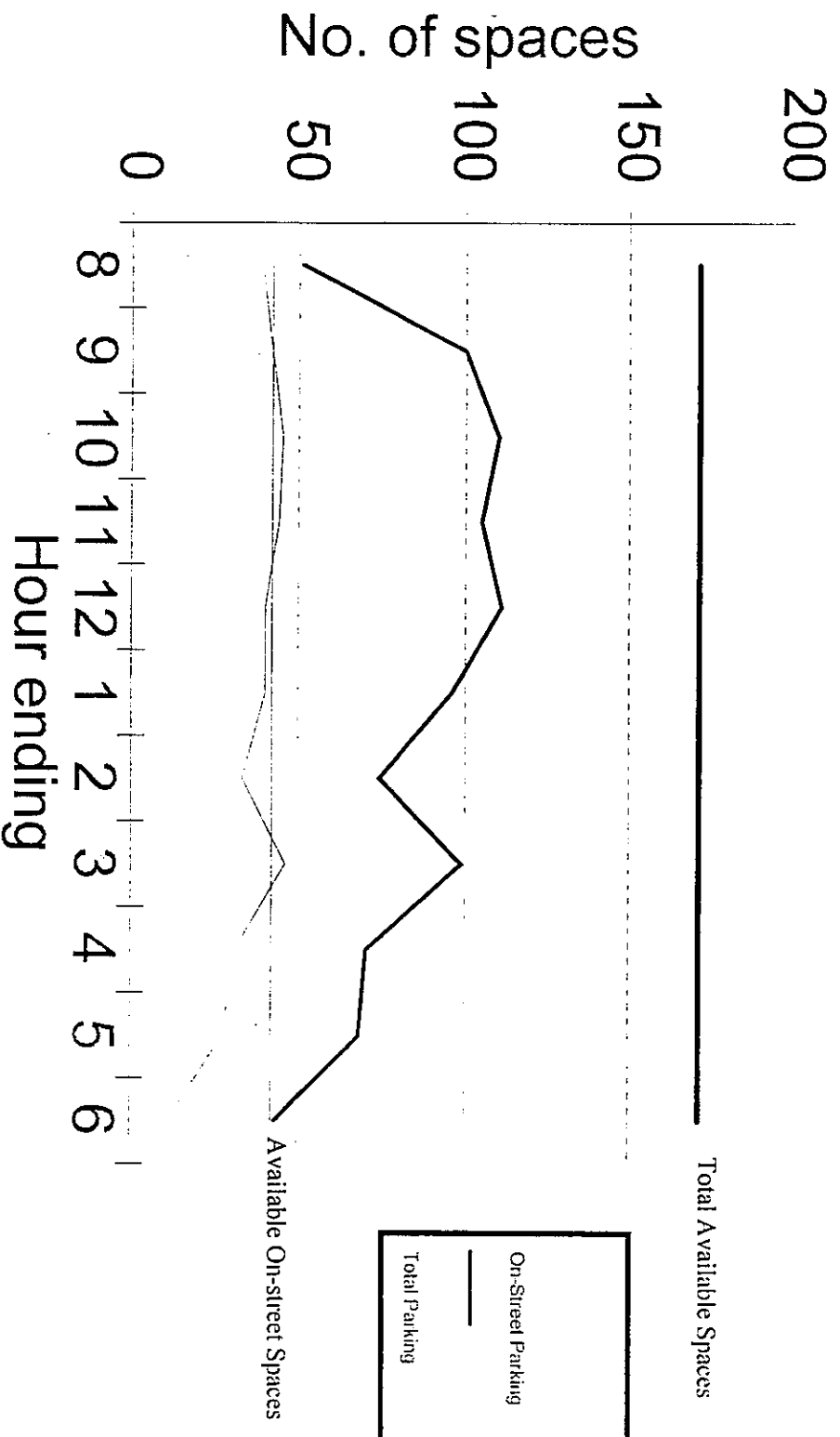
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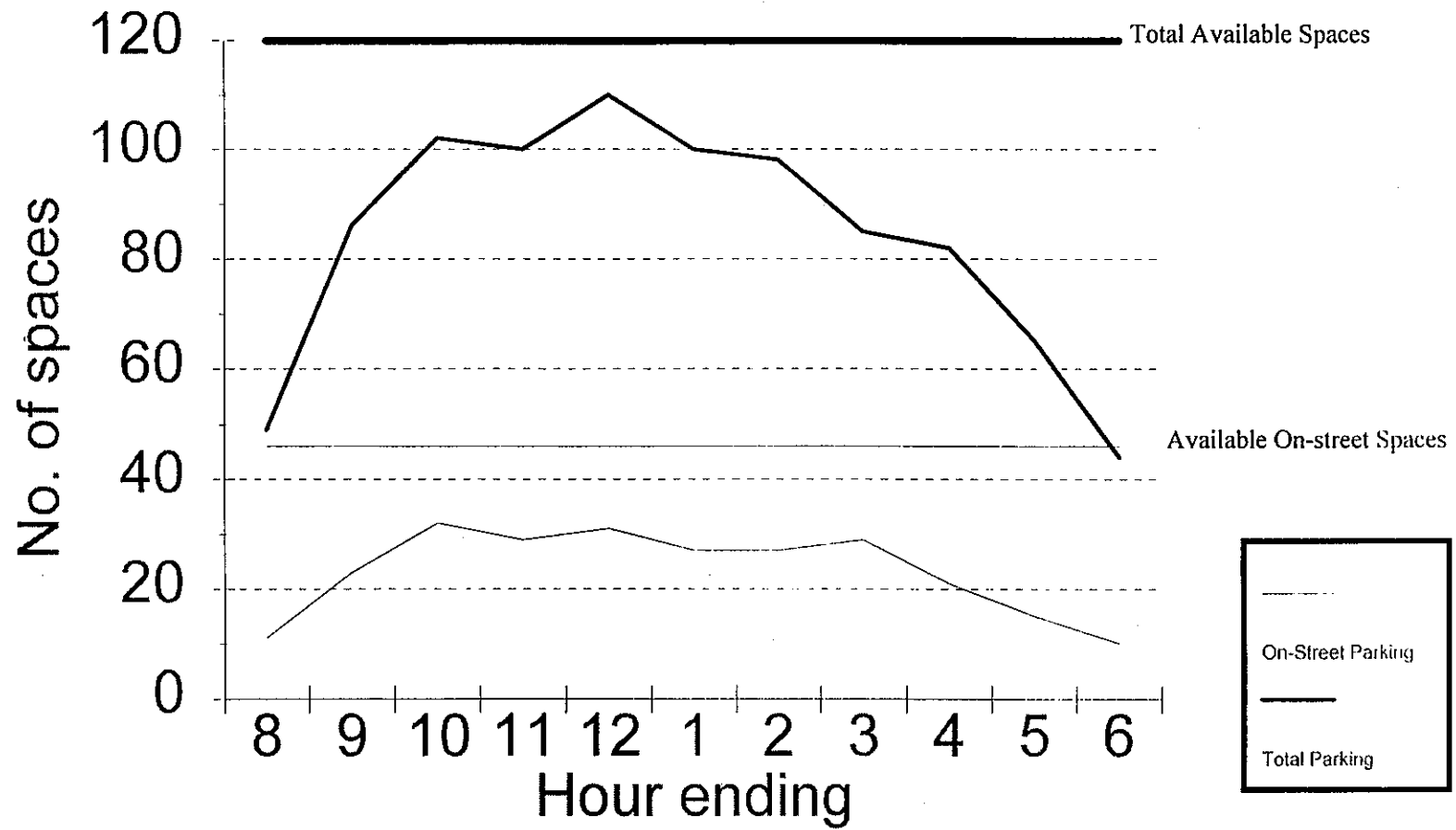
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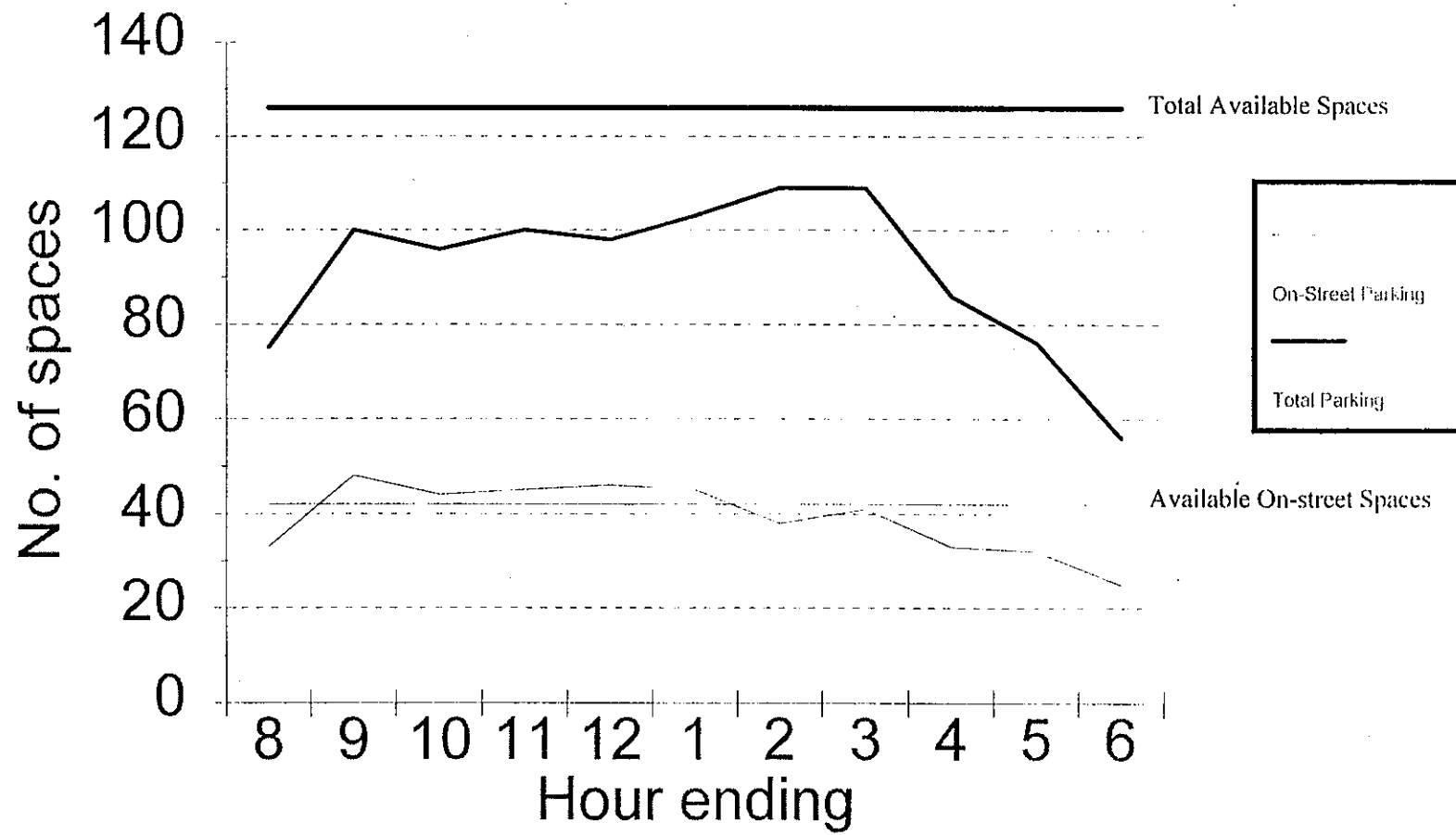
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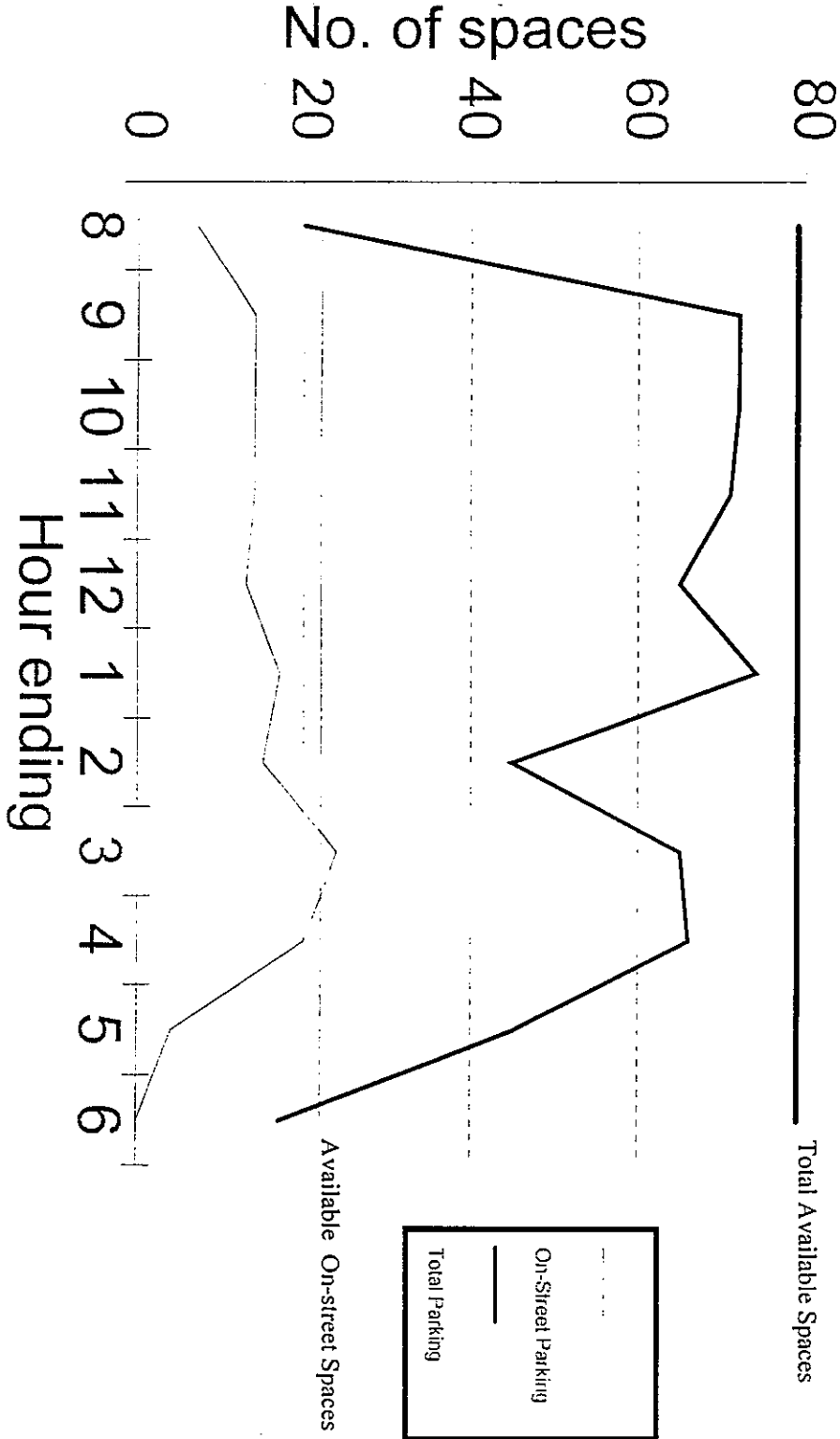


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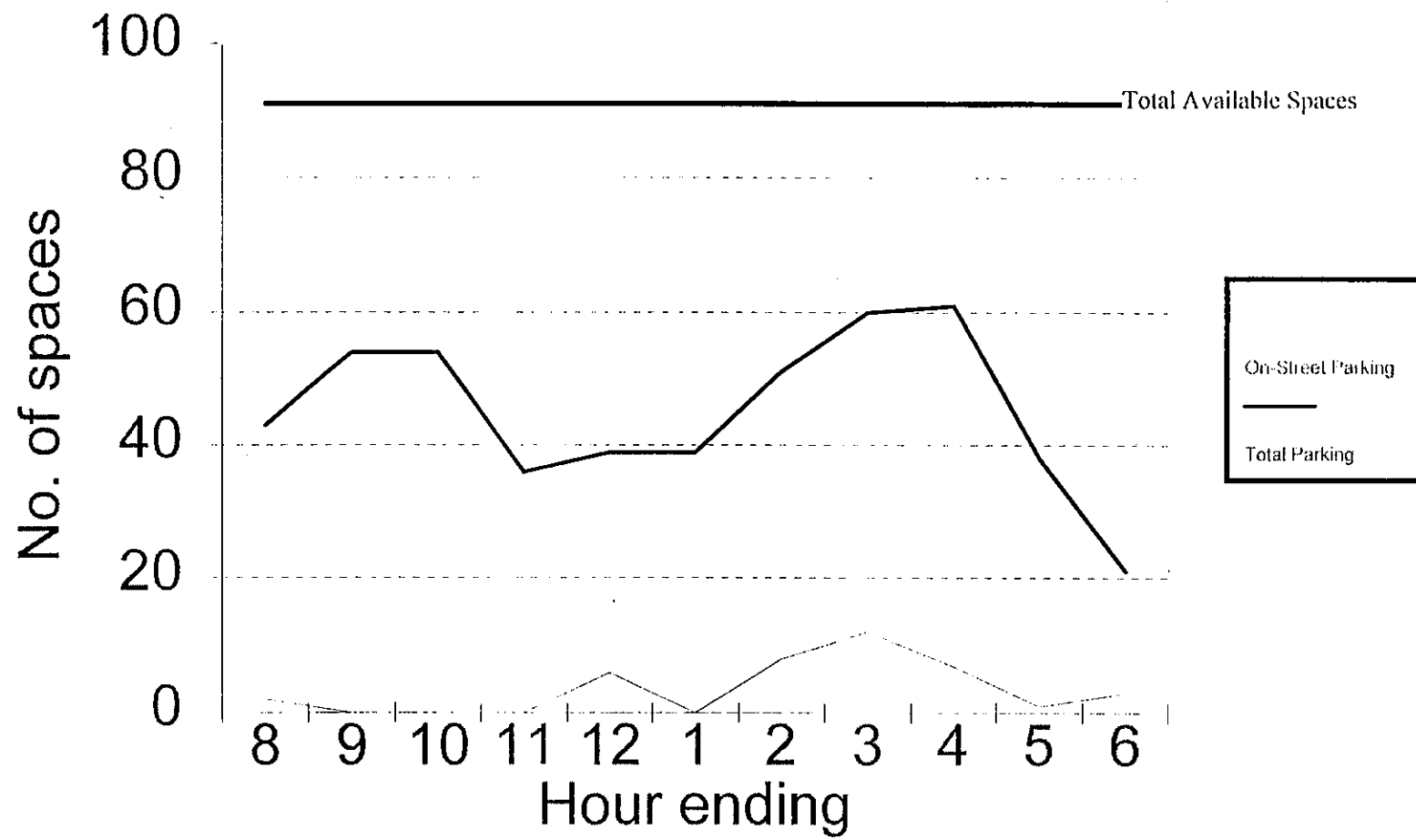




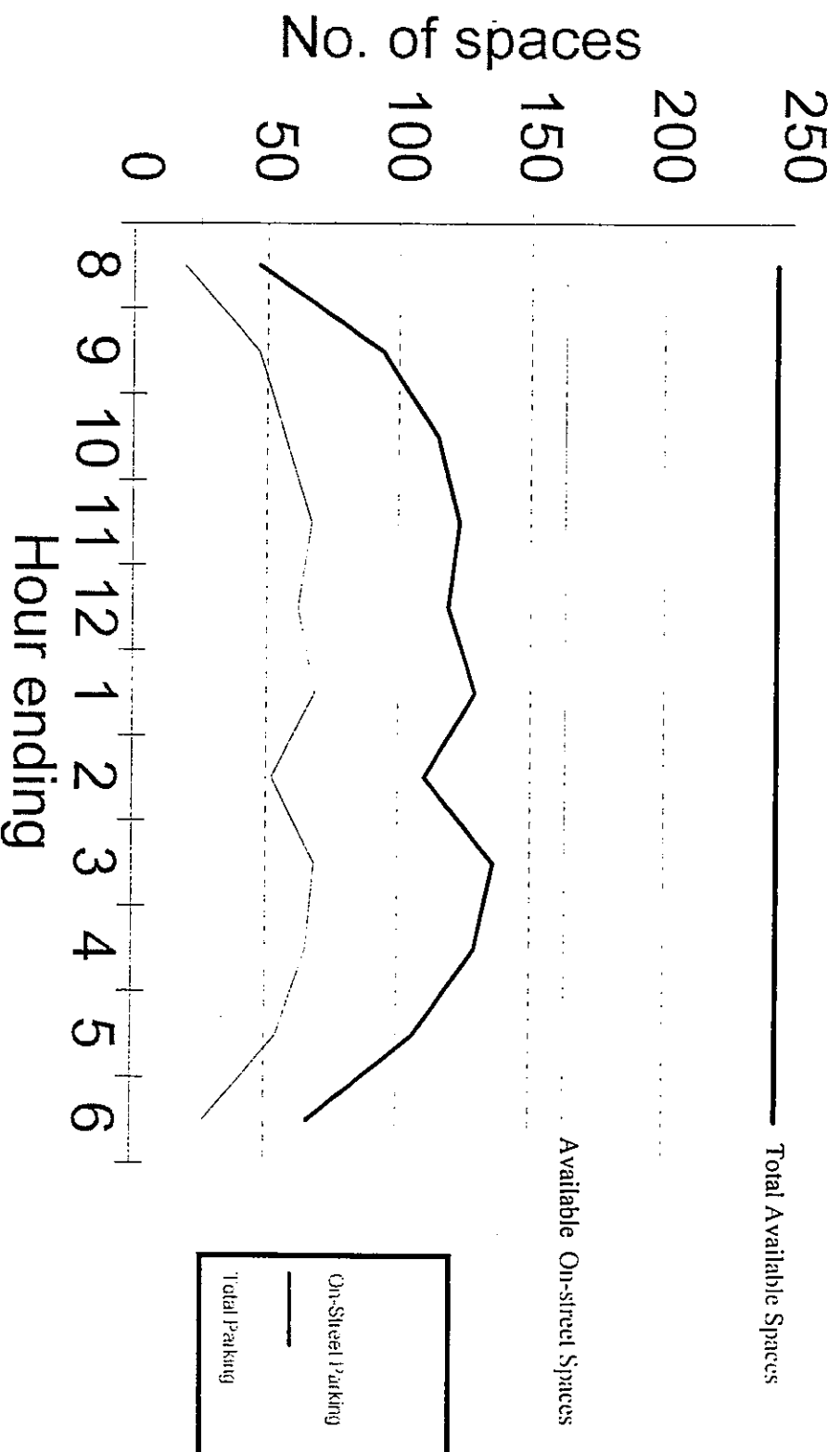
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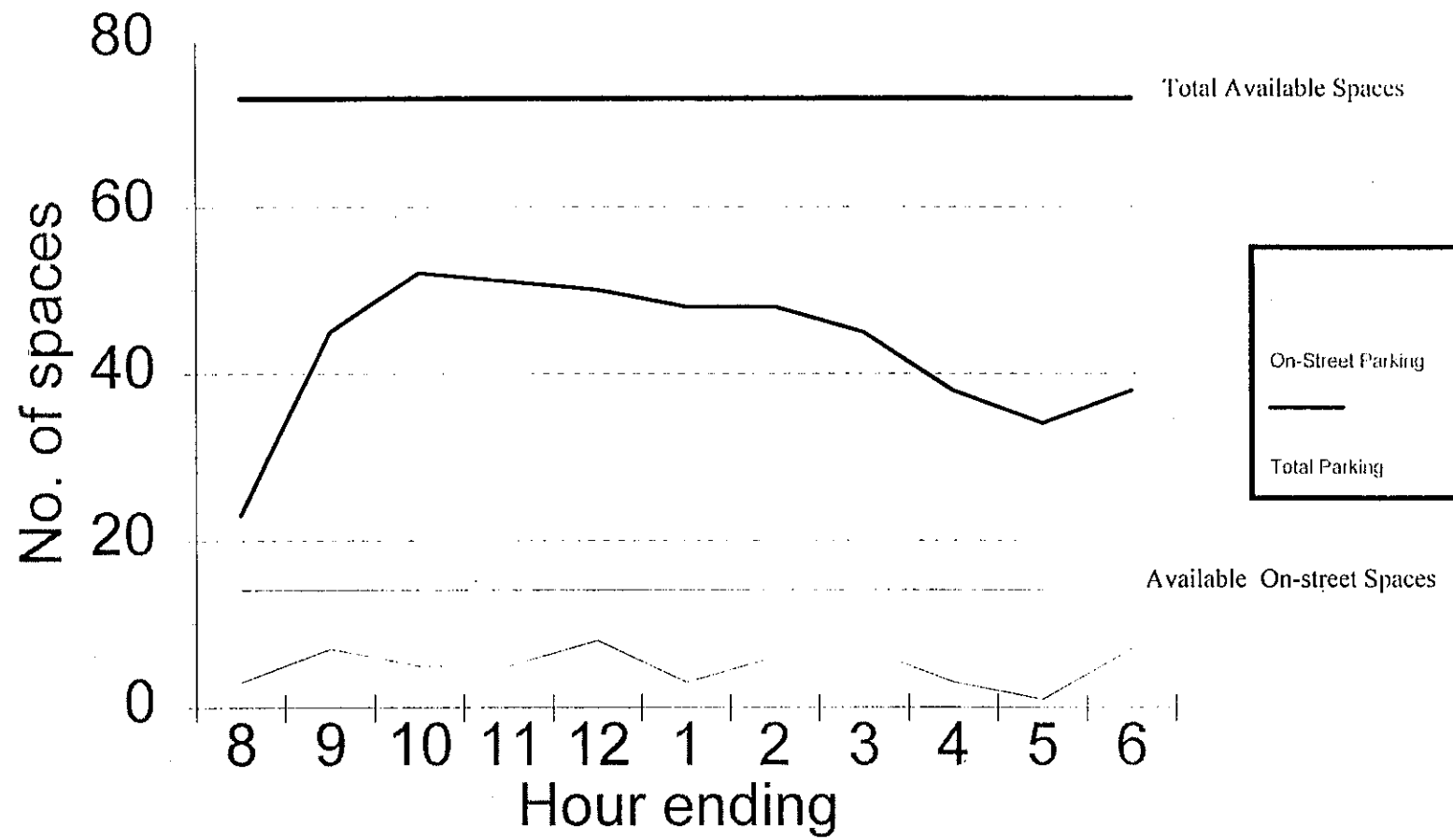
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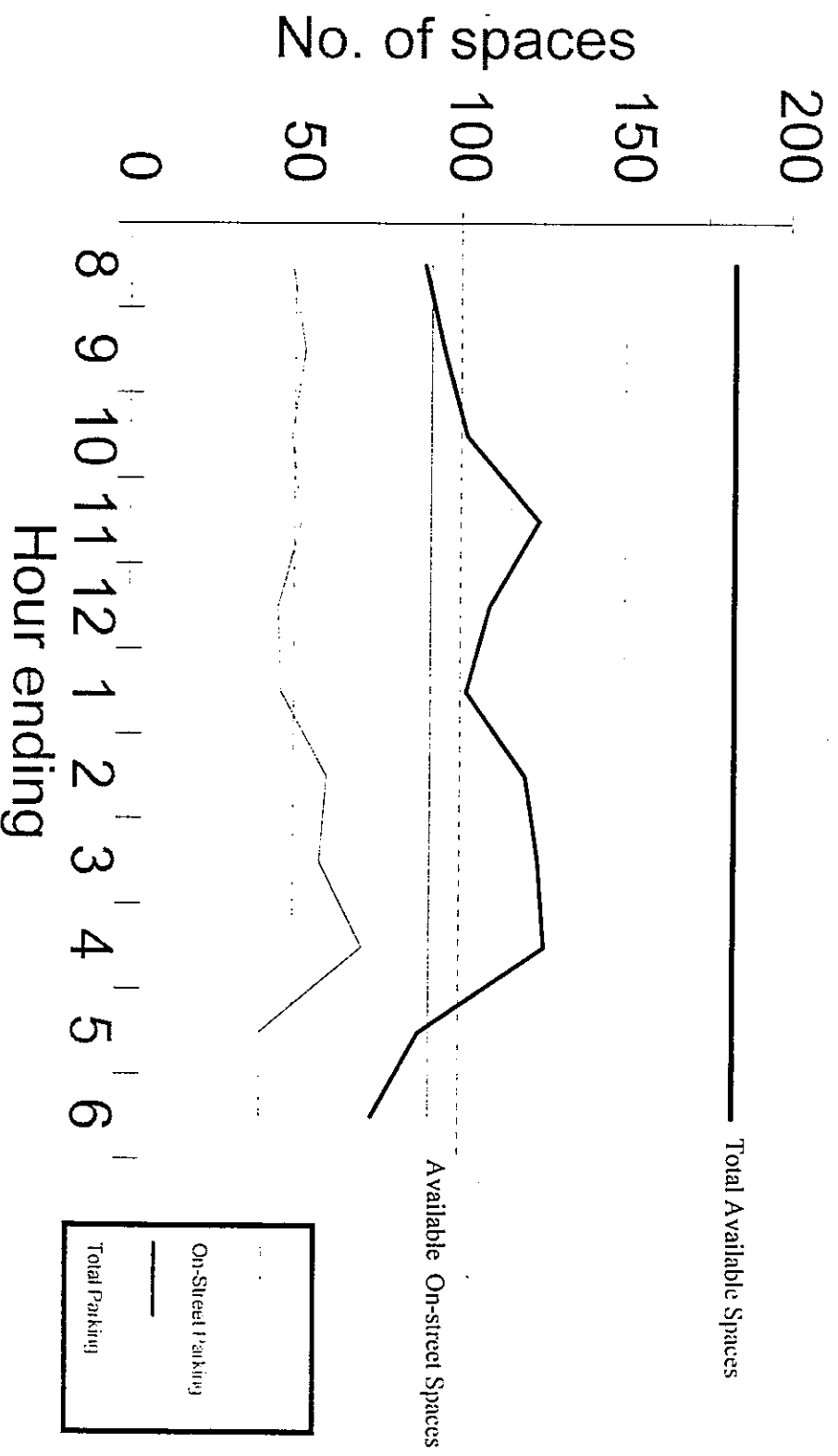
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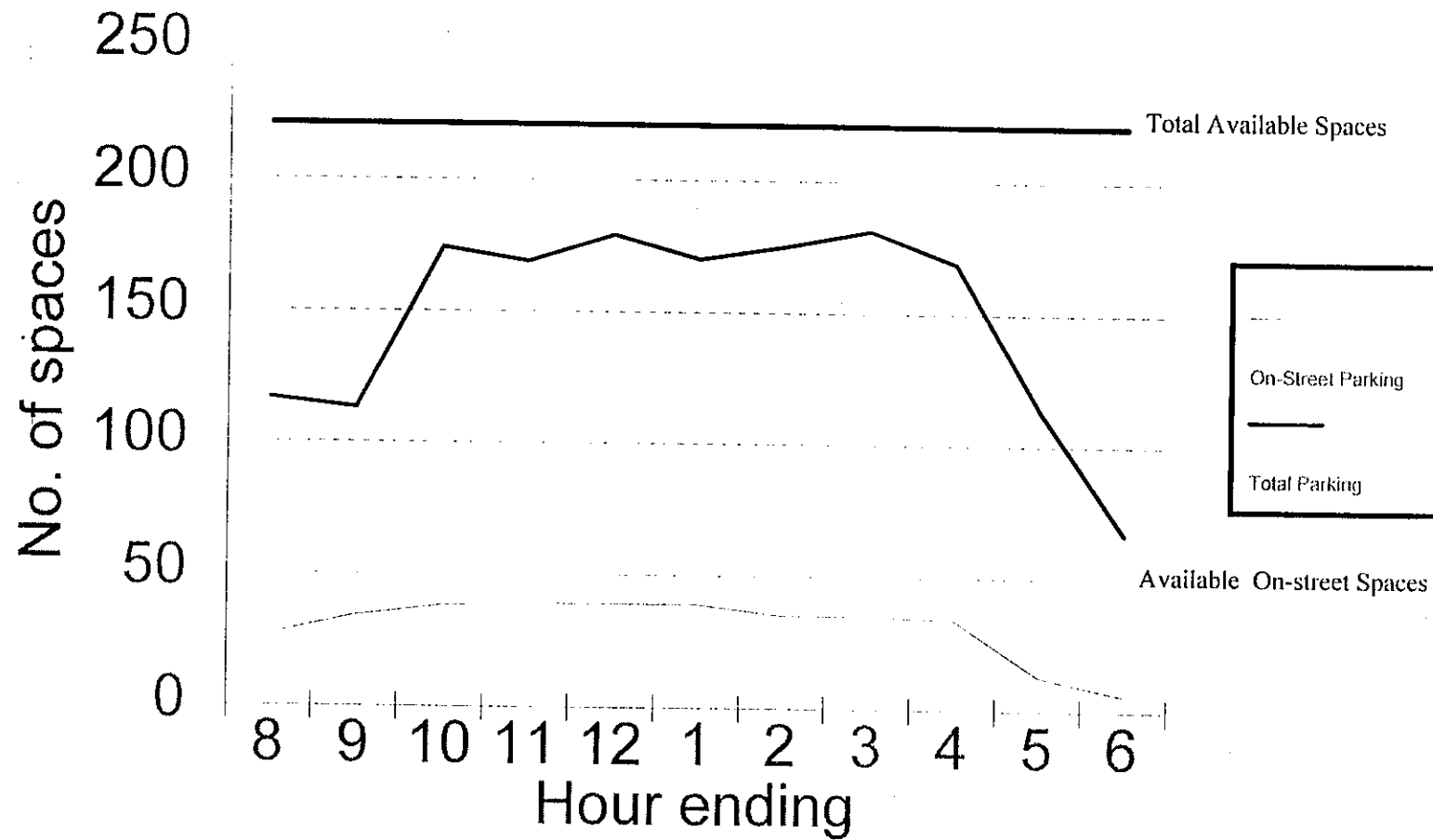
# Precinct 22



# Precinct 25



# Precinct 24



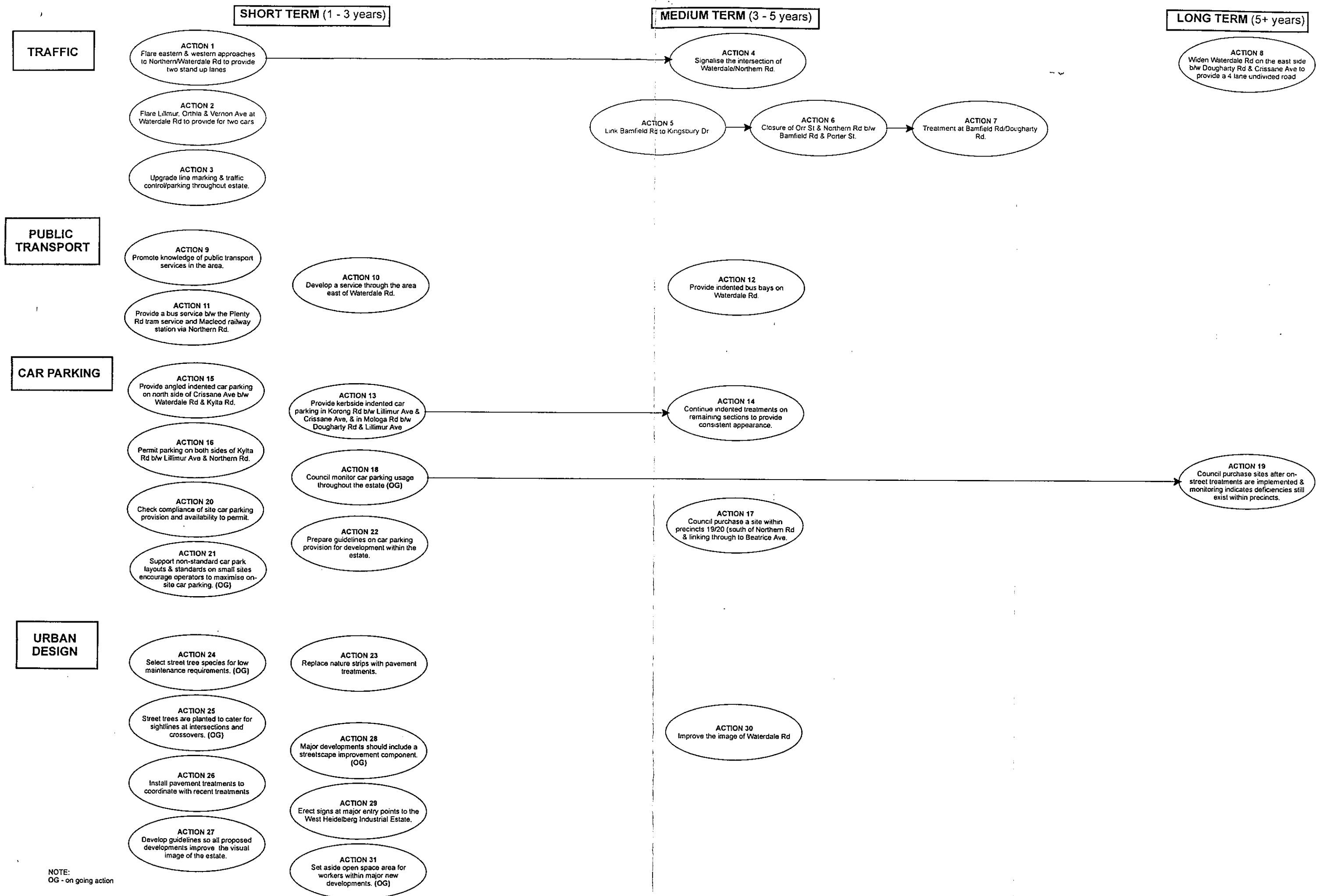
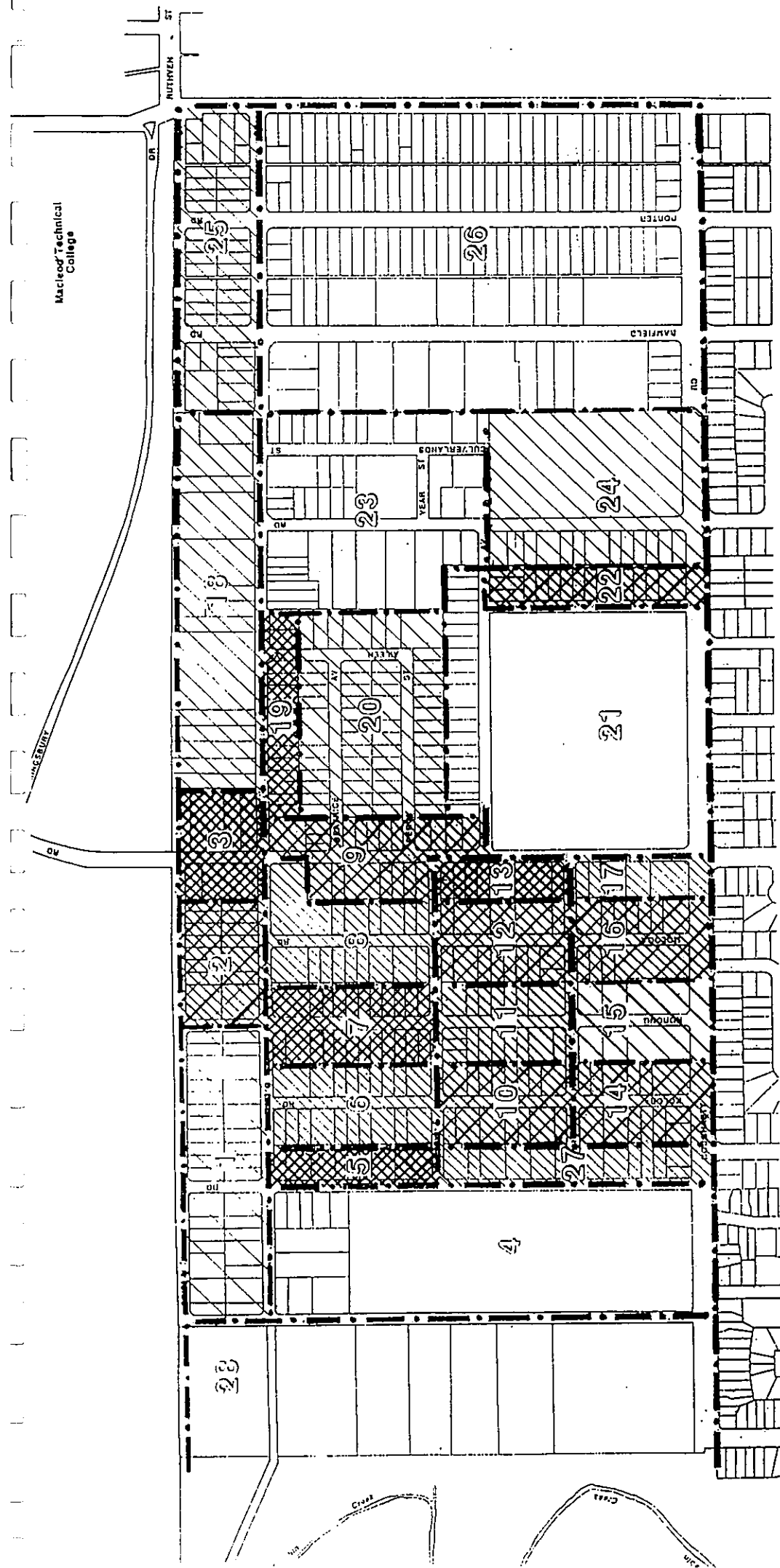


Figure 6.2



PARKING AVAILABILITY IN  
INDUSTRIAL ESTATE AT 11A.M

# WEST HEIDELBERG INDUSTRIAL ESTATE

Car Parking and Traffic Strategy

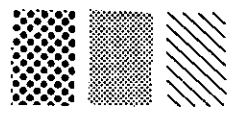
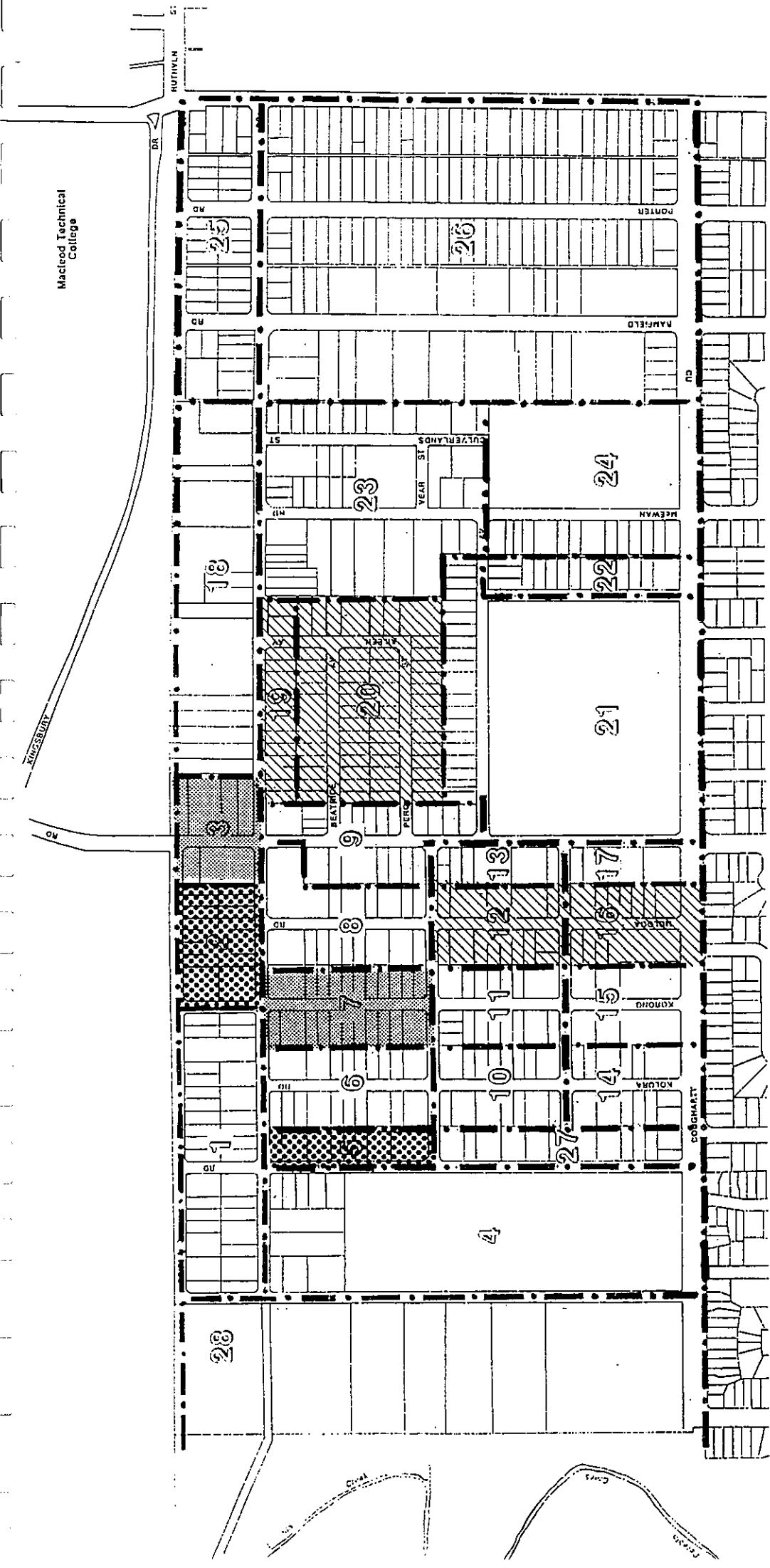
Prepared for Banyule City Council  
by: Atup Transportation Planning  
Frank Hanson Pty Ltd Landscape Architects  
March 1996



LEGEND	
	< 10
	11-30
	31-50
	51-70
	71-99
	> 100

Figure 2.11





- Both on-street and off-street at capacity
- On-street at capacity, off-street almost at capacity
- On-street near capacity, some off-street still available

PRECINCT PLAN

**WEST HEIDELBERG INDUSTRIAL ESTATE**  
Car Parking and Traffic Strategy

Prepared for Banyule City Council  
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Frank Heineken Pty Ltd Landscape Architects  
March 1996



Figure 2.12



ROAD ACCIDENTS IN  
INDUSTRIAL ESTATE 1990-1994

# WEST HEIDELBERG INDUSTRIAL ESTATE

Car Parking and Traffic Strategy

**LEGEND**

(3) No. FATAL ACCIDENTS

2 TOTAL No. ACCIDENTS  
(NOT INCLUDING PROPERTY DAMAGE)

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Frank Hansen Pty Ltd Landscape Architects  
March 1998

0 50 100 200 METRES

NORTH

Figure 2.13



### 3. ISSUES

Issues to be addressed in this study relate to three areas:

- concerns of the stakeholders in the area - businesses, residents, and bus operators
- future regional development around the area which will increase traffic demand through the area
- actions from the previous estate strategy prepared in 1986.

#### 3.1 Issues Raised From Community Input

Forums were conducted with business operators/site owners and residents from the area east of Bamfield Road and along the south side of Dougharty Road. Separate discussions were conducted with the Ivanhoe Bus Company and National Bus Company.

##### Business Operators and Owners

A discussion forum was conducted with those present at the West Heidelberg Estate Committee Meeting on 18 March 1996.

The following issues were highlighted during the forum:

- difficult accessing and crossing Waterdale Road from the estate roads, particularly Northern Road
- impact of future development in the surrounding area, particularly the institutions to the north
- the one-way network of roads in the estate
- on-street parking restricts access for commercial vehicles
- on-street unloading/loading of commercial vehicles restricts traffic flow
- insufficient car parking is available in the area (eg Beatrice Avenue)
- cars park up to the cross-overs restricting access in/out of site by trucks
- removal of "No Parking" signs on McEwan Road
- insufficient parking for visitors
- public transport access needs to be improved
- width for trucks to manoeuvre on roads (eg Lillimur Road/Kolora Road)
- increased use of Waterdale Road by emergency service vehicles.

Some actions proposed by attendees were:

- linkage of Kylta Road or Korong Road to Kingsbury Drive
- develop a one-way couplet with Waterdale Road and Kylta Road (or other)
- sale of Nielsen Australia site provides opportunity to improve Dougharty Road intersection and road widening
- provide mountable kerbs
- remove nature strips
- undertake more treatments similar to Bamfield Road
- link over Darebin Creek to the west
- provide trees rather than nature strips and grassed areas.

Some points raised relating to these issues were:

- there is a flow of fork lift trucks across Kylta Road which would be of concern if Kylta Road was linked to Kingsbury Drive
- use of Waterdale Road by emergency service vehicles relates to access changes as a result of the Bell Street-Banksia Street link
- should not encourage through traffic into the estate.

### Residents' Forum

A discussion forum was held on 21 March 1996 for residents in the primary study area east of Bamfield Road and along the south side of Dougharty Road.

The following issues were highlighted during the forum:

- parked vehicles, speed of vehicles and commercial vehicle usage of Porter Road
- poor sightlines at Northern Road/Porter Road
- intersection of Northern Road/Waiora Road - delays, usage by traffic accessing industrial area, accidents
- number of commercial vehicles using the residential section of Northern Road
- delays at Waterdale Road/Northern Road intersection
- traffic using Orr Street to bypass Northern Road and travelling in the wrong direction
- young drivers accelerating cars and noise disturbance due to industrial collection late at night
- additional traffic generated by future developments within the estate
- should improve shops at Kingsbury Drive/Orr Street/Waiora Road
- problem of providing visitor parking for residential properties on corner of Dougharty Road/Waterdale Road.

Actions proposed by attendees were:

- widen Waterdale Road
- provide a link from Kingsbury Drive to Bamfield Road
- close Northern Road east of Bamfield Road to separate the industrial and residential areas
- provide indented parking at the northern end of Bamfield Road and along Dougharty Road
- provide additional parking in the vicinity of the ICI site on Northern Road.

### Bus Operators

Discussions were conducted with representatives of the Ivanhoe Bus Company and National Bus Company. The following points were raised in these discussions:

- service emphasis is to LaTrobe University
- commercial vehicles restrict traffic flow in Waterdale Road when loading/unloading due to lack of off-street facilities
- acknowledged that buses restrict traffic flow when stop to pick-up/drop-off passengers in Waterdale Road
- prefer to have a partially indented bus bay at stops on Waterdale Road.

Possible actions that could be investigated were:

- divert services to penetrate into the estate
- provide linkage to Plenty Road tram
- link emphasis of service to Alphington Railway Station.

### 3.2 Regional Development Implications

The main development opportunity within the Estate is the Ministry of Education site on the north-east corner of Waterdale Road and Dougharty Road. This site provides the principal area for increased development and associated traffic generation. The site directly abuts both Waterdale Road and Dougharty Road, as well as Vernon Avenue. The traffic impacts of development on this site can be minimised by distributing traffic access around the site via these three roads, as well as controlling the actual location of the access points on the respective roads.

There are several major developments within the surrounding region. Due to the limited number of north-south routes within this area, the traffic from these developments will impact on Waterdale Road in particular, as well as Waiora Road. The major developments within the area include:

- expansion of facilities within the Latrobe University site
- development of the Mt Cooper Estate on the Bundoora Repatriation site providing in the order of 600 households
- development of Gresswell Granges to provide 280 households
- the Larundel Psychiatric Hospital site for student accommodation and urban village development concept with residential
- Mont Park Hospital site which it has been suggested could be used by Latrobe University for university purposes and student housing.

The latter two developments are different to proposals from several years ago. The timing, actual facilities and access arrangements are unknown at this time.

In addition, traffic growth will occur on Waterdale Road, Waiora Road and Kingsbury Drive as a result of general growth of regional travel through the area.

Due to the unknown nature of some of these proposals it is difficult to quantify specific figures. It is also considered that growth of regional traffic will be a major impact. On this basis an assessment was undertaken of regional traffic growth to quantify possible increases in traffic flow on Waterdale Road. The assessment was undertaken using the TRIPS computer modelling package to compare existing and future traffic patterns in this corridor. The TRIPS package is used by VicRoads in its regional strategic planning analysis.

The analysis undertaken by Arup is based on the following approach:

- comparing the traffic increase between the modelled 1991 and 2001 network and development scenarios
- estimating the annual growth rate for this period and applying it to the current surveyed traffic flows
- using the combined figures for Waiora Road and Waterdale Road, rather than the

modelled figures for the individual roads.

The latter approach is used to address variations that could occur in the assignment of traffic on parallel roads due to congestion at particular points along the roads. In reality traffic will be split reasonably evenly across the two roads, although recognising that Waterdale Road provides better access to Bell Street than Waiora Road.

Table 3.1 indicates the expected change in traffic flows from the model and corresponding annual traffic growth. The figures indicate that traffic growth on Waterdale Road could increase by 1.4% - 1.8% per annum over the next 5 - 10 years. Kingsbury Drive could experience growth of 0.9% - 1.4% per annum in this period.

**Table 3.1 Expected Changes in Traffic Flows**

	DAILY VOLUMES			INCREASE		
	1991	2001	2011	1991-2001	2001-2011	1991-2011
Waterdale Rd/Waiora Rd (south of Kingsbury Rd)	26,100	29,700	35,600	3,600 (14%) (1.4% p.a.)	5,900 (20%) (2% p.a.)	9,500 (36%) (1.8% p.a.)
Kingsbury Drive (west of Waterdale Rd)	21,800	23,700	27,900	1,900 (9%) (0.9% p.a.)	4,200 (18%) (1.8% p.a.)	6,100 (28%) (1.4% p.a.)

Thus, traffic flows on Waterdale Road (immediately south of Kingsbury Drive) could be expected to increase from the current 18,000 vehicles per day to over 19,300 vpd by the year 2001 and to 23,000 vpd by the year 2011.

Current traffic flows with the associated delays and accidents require additional capacity on Waterdale Road. These levels of traffic growth support the need for an additional lane in each direction to accommodate the future traffic flows on Waterdale Road.

Similarly the expected growth of traffic on Kingsbury Drive (0.9% - 1.4% per annum) over the next 5 - 15 years will require additional capacity for this east-west arterial road. Traffic is expected to increase from the current 20,300 vpd to 21,200 vpd by the year 2001 and 24,600 vpd by the year 2011.

The growth in traffic is principally due to growth of regional traffic and proposed developments in the secondary study area north of Kingsbury Drive. The increased capacity by widening of Waterdale Road relates to the role of Waterdale Road as a principal traffic route through this area and serving the region rather than attributed to the specific traffic generation of the Estate or any other individual facility within the area.

### 3.3 West Heidelberg Industrial Estate Strategy 1986

The West Heidelberg Industrial Estate Strategy prepared in 1986 made 12 recommendations. These recommendations are indicated in the following section with comments on action undertaken and if the recommendation should still be considered.

*Recommendations 1, 2 & 3: Prepare a detailed design for widening of Waterdale Road and amend the Planning Scheme to show the widening.*

There is a traffic capacity issue along this road. Prior to this study no action appears to have been undertaken on these tasks.

A widening provides an opportunity for significant streetscape improvements to this particularly unattractive part of the industrial estate. Such a proposal should include an integrated streetscape/landscape proposal and address ways of best presenting the Industrial Estate at its most public interface.

A concept scheme was prepared by Arup during this study and submitted to Council. The scheme incorporates landscaping. Variations were also prepared based on combinations of reduced nature strips and reduced pavements.

*Recommendation 4: Signals be installed at the intersection of Northern Road and Waterdale Road.*

No action appears to have been undertaken. Delays and accidents are issues at this intersection. Signalisation is an appropriate option but requires widening of Waterdale Road to provide two lanes on the Waterdale Road approaches.

Flaring of the approaches on Northern Road may be adequate as an initial action.

*Recommendation 5: Restrict parking to encourage VDO employees to use alternative parking.*

The north side of Northern Road is "No Standing", whilst the south side opposite VDO is also "No Standing".

*Recommendation 6: Install rollover kerbs and modify naturestrips.*

This recommendation has been translated successfully on the ground in various streets. The treatments have actually been carried out on different streets to those mentioned. They could be extended to cover other streets within the estate.

*Recommendation 7: In considering future developments Council needs to consider availability of parking in the vicinity and apply maximum requirements.*

Consideration of availability of parking in the immediate vicinity of a proposed development is typically reviewed. This study has provided survey information to assist assess the issue raised. The surveys indicate that some areas, particularly the areas at the western end of the estate, have scope to accommodate some on-street parking. There are some areas where there are parking problems and reduced parking will exacerbate the problem.

Precedents and equity issues need to be considered. Cash in lieu schemes could also be considered.

*Recommendation 8: Identification signs be permitted in accordance with a standard design.*



The proposed policy of preparing a standard property identification sign for erection at the front boundary of each property seem too restrictive and regimented. Clear guidelines are provided for signage in industrial areas (and signage in general) in "Outdoor Advertising - An Urban Design-Based Approach" which have been produced by the Victorian and NSW Departments of Planning.

*Recommendation 9: Amend the Planning Scheme to prohibit A-frame signs.*

A-frame signs, where used, are an unwelcome visual intrusion that add to the general clutter of signage in the area. These signs should generally be rejected in favour of simple clean signs placed on buildings, particularly as access to most sites is by vehicle rather than pedestrian access, which these type of signs primarily cater for. An exception to this policy could be made for milk bars as this type of business caters to pedestrian as well as vehicle-based customers and such signs indicate that they are open for business.

*Recommendation 10: That street numbers be installed on lamp posts.*

It is understood no action has been taken on this recommendation. An action that could assist identify properties for visitors, but not necessarily a high priority task.

*Recommendation 11: Attention be paid to building design, materials used, street facades and landscaping when considering development applications.*

Aside from streetscape improvements, the biggest impact on the appearance of the Industrial Estate would be the improved design of any development/redevelopment of existing sites. This recommendation is still appropriate. Applications should be reviewed to ensure that the proposed development has a positive influence on the visual image of the estate.

*Recommendation 12: Council support development of a Science Park at LaTrobe University.*

This recommendation was dropped.

*Recommendation 13: \$50,000 be allocated in 1986/87 for implementation of the strategy recommendations.*

This was undertaken and funds have been allocated for 1996/97 and for subsequent years for implementation of works.

### 3.4 Summary of Issues

Based upon the material presented in Section 2 and from the discussions with the various community sectors and based on the surveys, the following issues have been identified to be addressed in the Strategy Plan. These issues are grouped under the following headings:

#### Car Parking

- Insufficient car parking in the estate particularly west of Waterdale Road.

- Insufficient on-street car parking specifically in the following precincts:  
2, 5, 7, 12, 13, 16, 17, 19 and 20

#### **Traffic Access**

- Accessing and crossing Waterdale Road from estate roads especially at Northern Road where delays are common.
- Delays for traffic turning out of Northern Road into Waiora Road.

#### **Local Street Issues**

- On-street parking restricts the width of the road and parking up to crossovers restricts access for commercial vehicles
- On street unloading/loading of commercial vehicles and buses picking up passengers restricting traffic flow on Waterdale Road

#### **Residential Amenity**

- Traffic accessing the industrial estate via the abutting residential areas to the east.

#### **Regional Traffic**

- Impact of future development to the north of the industrial estate and growth of regional traffic.

#### **Urban Design**

- Built form is generally poor in appearance. The combination of poor design, cheap construction and the multitude of businesses/factories on small allotments often give a cluttered unattractive presentation to the street.
- Yards, loading bays and car parks are generally poorly screened or not screened at all and are in an unsightly condition.
- Nature strips and kerbs are in poor condition and poorly maintained.
- Many different species of trees have been planted giving a disjointed effect. Some trees are past maturity and will require replacement. Dense low habit of many trees impede sightlines for traffic within the estate exiting or entering properties.
- The planning requirement for a 3 metre garden buffer strip for all industrial land within the former City of Heidelberg has resulted in a legacy of mostly poorly maintained and ineffectual strip planting.

## **4. DIRECTIONS**

### **4.1 Aims of Strategy**

Based on the issues identified, the aims of the Strategy Plan are:

- to improve the level of service along Waterdale Road and at Waiora Road/ Kingsbury Drive
- to improve the level of service onto the arterial roads from the local streets in the industrial precinct
- to increase the provision of car parking in the estate
- to protect the residential amenity in the abutting residential area principally east of Bamfield Road but also along the south side of Dougharty Road
- to improve the visual amenity and achieve a more harmonious visual character in the industrial estate
- to improve general traffic circulation within the estate
- to improve access into sites from local streets.

### **4.2 Objectives of Strategy**

To fulfill the identified aims the following objectives are proposed as the basis of the Strategy Plan.

- increase the traffic capacity of north-south arterial roads to reduce delays due to turning traffic and increase the capacity of through movements
- to provide an additional link from Kingsbury Drive into the industrial precincts of the estate
- to reduce delays for traffic turning from the industrial estate into Waterdale Road and Waiora Road
- to reduce industrial traffic accessing the industrial precincts from Waiora Road
- to provide additional parking within the precincts west of Waterdale Road bounded by Kyla Road, Northern Road and Dougharty Road and also in precincts 19 and 20 east of Waterdale Road
- to reduce demand for car parking by improvements in public transport services and facilities
- to encourage shared use of existing car parking infrastructure to reduce the need to provide additional car parking areas

- to reduce accidents in the area
- to facilitate movement of commercial vehicles from the local roads in/out of industrial premises
- to ensure future developments provide appropriate levels of on-site car parking and satisfactorily facilitate access by commercial vehicles
- to develop low maintenance/ low water use street tree and landscape treatments
- to develop landscape treatments which are both attractive visually and robust enough to withstand the wear and tear of heavy traffic
- to ensure that redevelopment, refurbishment and infill developments enhance the overall appearance of the estate
- to provide urban guidelines and action plans for street scape, built form and signage treatments.

#### 4.3 Principles

In developing actions to achieve the indicated aims and objectives, a number of principles have been adopted. These principles are:

- not to encourage regional traffic onto residential streets south of Dougharty Road
- not encourage regional traffic onto roads within the primary study area which have an emphasis for local access
- visitor car parking is predominantly on-street
- to use existing public road reserves for car parking where possible
- to have consistency in parking restrictions in the estate
- not to install road treatments such as roundabouts and splitter islands that restrict manoeuvring of commercial vehicles on roads within the estate
- maintain and facilitate access for local residents
- all street scapes and urban design treatments must be cost effective and low maintenance while being of high quality
- treatments of individual buildings or sites should be coordinated to develop an integrated, cohesive urban design framework for the industrial estate.
- that street trees and other landscape treatments are cognisant of safety requirements such as sightlines at intersections
- the area is an industrial estate and therefore on-street loading/unloading and circulating traffic movements are reasonable expectations

- the area is an established estate and major changes involving significant infrastructure within the local precincts is not proposed
- all actions cannot be expected to be funded or undertaken by Council and VicRoads, actions need to be undertaken by business owners/operators.

## 5. ACTIONS CONSIDERED

This section presents various actions that have been considered and developed in order to address the objectives identified in Section 4.2. For each action its impacts on and implications for the West Heidelberg Estate have been reviewed and comments provided.

There are also options for some of the actions. These are discussed under the respective action. Some actions also provide an alternative to other initiatives, whilst some actions address more than one objective.

These actions are not the recommended strategy. It presents the range of actions considered and presents reasons for and/or against each project.

The overall recommended strategy, with time frames and indicative costs are presented in Section 6.

### 5.1 Increase the traffic capacity of north-south arterial routes to reduce delays due to turning traffic and the capacity of through movements

*Action 1      Widen Waterdale Road on the eastern side along its entire length to four traffic lanes through the industrial estate.*

#### Impacts

- Increases the capacity of Waterdale Road for through traffic
- Reduces delays for through traffic caused by traffic turning right into local streets
- Reduces delays for traffic exiting from the estate
- Requires property acquisition on east side.

#### Options

There are various options that can be considered in this action:

- widening on the west side
- widening on both the east and west sides
- variations in the width of lanes and kerb treatments to change the overall width of reservation required.

#### Implications

- Acquisition of up to 7.5 metres of land on the east side of Waterdale Road, which would involve approximately 18 properties between Vernon Avenue and Crissane Road
- Negotiation with VicRoads is required to facilitate agreement and purchase of land
- Provides the opportunity to develop an upgraded image of the estate
- The principal issue is whether to widen the road or retain the current reservation
- The southern section of Waterdale Road has been programmed to be widened to provide a four lane carriageway.

## Comments

Waterdale Road is designated by VicRoads as a Principal Traffic Route through the region. This is appropriate recognising its role in providing a regional link between Bell Street and Plenty Road, access to Latrobe University, access to this important business and manufacturing area, and the constraints in providing other road connections through the area.

The emphasis is to provide additional lanes to cater for the expected future traffic volumes, reduce delays to through traffic due to turning vehicles, and improve safety by reducing the delays for traffic exiting the estate.

Any widening would be a medium to long term action due to the number of properties along Waterdale Road from which site frontage would have to be acquired. Because only a small portion of the sites are required there is scope to reduce the cost of widening by consolidating the sites and reselling the purchased land. This also provides the opportunity to orientate and facilitate development on the land to be compatible with Waterdale Road. This could include development of portion of a site for car parking for the immediate precinct.

Widening is recommended on the east side because of the scope to immediately obtain portion of the former Department of Education site. The general expectation has also always been that this would be the side to be widened. Purchase of properties on the west side would involve negotiations with more property owners. \*

Purchase of land on either the west or east sides will result in disruptions to businesses. The disruption occurs due to either loss of part of the building or loss of frontage currently used for parking. \*

Smaller widenings on both sides is not supported because it increases the number of properties and businesses affected, and would still impact on the frontage and operation of properties. Some buildings are up to the property line and others use the frontage for car parking. Reduction of the frontage would reduce the scope to provide parking. \*

Current owners/operators of properties have indicated an acceptance of the scheme if it can be arranged for them to relocate into a site within the Ministry of Education area when it is subdivided and developed. This would minimise disruption to their business operations and custom. Council and VicRoads should jointly investigate opportunities to minimise the disruption to existing businesses affected by the widening. This could involve actions such as facilitating relocation to new premises on the Ministry of Education site, staged widening of Waterdale Road, purchase and lease back arrangements until construction, providing advice on status of programmed works, purchases, etc to keep owners advised of actions. \*

An indicative treatment of Waterdale Road is shown in Figure 5.1. The provision of a nature strip provides a number of benefits:

- improved image of the road
- scope to provide indented bus stop

- better separation of pedestrians and traffic
- improved visibility for/of vehicles accessing abutting properties
- improved scope for cars and commercial vehicles to manoeuvre onto the abutting sites.

#### Variations to width of widening

##### *Major Widening*

A concept for the widening of Waterdale Road has been prepared by Arup for Banyule City Council. The scheme provides a footpath on both sides (1.5 metres), landscaping treatment on both sides (2.5 metres), kerb lanes of 4.2 metres and centre lanes of 3.3 metres. This requires a reservation of 23.0 metres. The current reservation is around 15.5 metres. Therefore, this proposal requires a widening into the existing properties of around 7.5 metres.

The construction cost for this scheme would be in the order of \$1 million. This excludes allowance for land acquisition and service relocation.

This proposed treatment provides a 4.2 metre kerb lane to:

- facilitate trucks turning into the side streets and access into properties fronting Waterdale Road
- facilitate future access by B-Double vehicles
- scope for quick unloading/loading from the road out of peak periods
- provide extra width for cyclists using Waterdale Road (cyclists travelling to/from Latrobe University)
- allow for a half indent bus bay and traffic to pass whilst bay is occupied
- allow for cars reversing from properties onto Waterdale Road.

The nature strip treatment also provides scope to facilitate the latter aspect for properties on the west side of Waterdale Road.

##### *Alternative 1*

An alternative treatment would be to reduce the nature strip to 1.5 - 2.0 metres, whilst not reducing the road pavement. The minimum width should be 1.5 metres as this provides the minimum setback requirement of 1 metre from kerb to trees and a tree with a trunk of 0.5 metres.

This proposal would reduce the widening by 2.0 metres with a corresponding reduction in land acquisition cost. Compared to the above option, construction costs would be reduced by around \$60,000, whilst the land acquisition costs a more significant figure. The overall encroachment into properties would be reduced to 5.5 metres.

Although a narrower landscaping treatment, the image of the road and estate entrance would still be enhanced.

##### *Alternative 2*

A further reduction in widening could be achieved by reducing the lane and overall pavement width in conjunction with the reduced landscaping strip. If the kerb lanes are



reduced to 3.3 metres and the centre lane to 3.2 metres, the overall reservation would be 19 metres. This would require a widening of 3.5 metres.

The construction cost would be in the order of \$0.85 million, with land acquisition and consolidation cost applicable to 3.5 metres. Again, the reduced land acquisition costs are likely to be more significant than the reduced construction costs.

The implications of this treatment would be:

- tighter turns for trucks accessing side streets and properties
- need for property acquisition on the corner sites to facilitate left turns into side streets
- cramped and tighter cross section for cyclists.

#### *No Widening*

To provide a four lane treatment within the existing road reservation, the cross section would consist of a footpath on both sides of 1.5 metres, kerb lanes of 3.2 metres and centre lanes of 3.0 metres.

This treatment has many disbenefits:

- still difficult for trucks to access side streets
- no enhanced image
- property acquisition required on corners to facilitate truck access into side streets
- loss of scope for quick unloading/loading to properties abutting Waterdale Road out of peak periods
- no provision for cyclists.

The estimated cost for construction works would be in the order of \$0.6 million. The significant reduction in cost is that there is no land acquisition and relocation of businesses.

#### *Action 2 Construction of partially indented bus bays on Waterdale Road*

##### **Impacts**

- Reduce delays to through traffic caused by buses stopping to pick-up and drop off passengers

##### **Implications**

- Requires cross section design of Waterdale Road to include nature strip
- Should be undertaken in association with the provision of improved bus facilities such as bus shelters.

## **5.2 To provide an additional link from Kingsbury Drive into the industrial precincts of the estate**

#### **Action 1 Provide link between Kingsbury Drive connecting with Bamfield**

Road at Orr Street for industrial traffic accessing the estate.

#### Impacts

- Reduce level of traffic accessing the industrial precincts through the residential precincts east of Bamfield Road along Northern Road from Waiora Road.
- Improve residential amenity in precincts east of Bamfield Road.
- Spread the load of traffic accessing the industrial precincts from Waterdale and Waiora Roads and ease pressure on Waterdale Road/Kingsbury Drive and Waiora Road/Kingsbury Drive intersections.

#### Implications

- Liaison required with City of Darebin to clarify status of the precinct north of Orr Street
- Remedial treatment to intersection of Bamfield Road and Dougharty Road to prevent through traffic using Bamfield Road.
- Construction would be undertaken over a water works pipe track between Orr Street and Kingsbury Drive, requiring Melbourne Water approval
- Signals at Kingsbury Drive/ Bamfield Road would need to be linked with Kingsbury Drive/Waiora Road intersection to minimise delay
- Provides opportunity to close Northern Road and Orr Street between Bamfield Road and Porter Road to separate the industrial and residential areas.

#### Comments

This action would involve relatively little in terms of land acquisition providing approval could be obtained from the City of Darebin for the construction of the link. The Bamfield Road link would certainly alleviate many of the concerns of the residents in the precincts abutting the estate about industrial traffic accessing industrial precincts through residential roads.

*Action 2      Link between Kylta Road and the interchange at LaTrobe University with Kylta Road between Dougharty Road and Crissane Road reverting back to two way operation*

#### Impacts

- Spread the load of traffic accessing the industrial precincts from Waterdale Road and ease pressure at intersection of Waterdale Road and Kingsbury Drive.
- Will attract regional traffic into LaTrobe University.
- Increased pressure on Kylta Road/Dougharty Road/Oriel Road intersection due to increase in through traffic
- Encourage regional traffic into residential precincts south of Dougharty Road
- Encourage regional traffic into industrial precincts north of Dougharty Road.

#### Implications

- Construction would require land acquisition from LaTrobe University
- Current northbound only operation of Kylta Road between Crissane Road and

- Dougharty Road would have to be changed to two-way
- Intersection of Kylta Road/ Dougharty Road /Oriel Road would have to be remodelled to increase its capacity particularly for through traffic.
- Exacerbate already existing problems with a deficiency of on-street parking at the northern end of Kylta Road.

#### Comments

Discussions with LaTrobe University indicate that they are not in favour of the Kylta Road link because it will attract regional traffic onto the campus.

The provision of this link would not provide short term relief as the time frame for its implementation would involve negotiation of property acquisition. However it involves negotiations with fewer parties than the Waterdale Road widening proposal.

The intersection at Dougharty Road/ Kylta Road and Oriel Road would require reconstruction.

Regional traffic should not be encouraged onto the local roads in the estate or into the residential area south of Dougharty Road.

*Action 3 Provide link between Kylta Road and the interchange at LaTrobe University forming part of a one-way couplet with Waterdale Road. Kylta Road (northbound) and Waterdale Road (southbound.)*

#### Impacts

- Spread the load of traffic accessing the industrial precincts from Waterdale Road and ease pressure at the intersection of Waterdale Road and Kingsbury Drive.
- Will attract regional traffic into LaTrobe University.
- Increased pressure on Kylta Road/Dougharty Road/Oriel Road intersection due to increase in through traffic
- Will increase regional traffic through local sector of industrial estate
- Will increase traffic circulating within the estate due to the one-way couplet
- Waterdale Road could accommodate southbound traffic demand without widening
- Loss of on-street parking in Kylta Road to accommodate additional traffic
- Reduces extent of regional traffic within the residential area to the south compared to Action 2.

#### Implications

- Construction would require land acquisition from LaTrobe University.
- Intersection of Kylta Road/ Dougharty Road /Oriel Road would have to be remodelled to increase its capacity for northbound traffic.
- Exacerbate existing problems with a deficiency of on-street parking at the northern end of Kylta Road.

#### Comments

This action would fundamentally alter the traffic circulation around the estate and whilst easing the pressure on Waterdale Road it would involve Kylta Road being upgraded to

cope with higher traffic flows. At the same time the intersection at Dougharty Road would have to be remodelled to increase its capacity for through traffic.

It is considered that regional traffic should not be encouraged onto the local roads in the estate or into the residential area south of Dougharty Road and in view of these principals the Kylta Road link would not be a recommended part of the strategy as it encourages the use of Oriel Road as a regional route.

This action also does not support the objectives of VicRoads' Principal Traffic Route programme.

**Action 4**      *Provide link across Darebin Creek accessing the industrial estate from the west*

#### Impacts

- Loss of residential amenity to residents in precincts west of Darebin Creek
- Improved access for traffic approaching the estate from the west
- Would provide some improvement for the Kingsbury Drive/Waterdale Road intersection but not improve the level of service at Kingsbury Drive/ Waioira Road.

#### Implications

- Liaison required with Darebin City Council regarding construction of the link
- Council would be required to purchase property west of Sheehan Road in order to provide link into local road network

#### Comments

The loss of residential amenity in the abutting municipality to the west of the estate and the use of local roads to address a regional traffic issue means that this is not really a viable action at this time. Darebin City Council would not be interested in constructing this link. This east-west link would not address the principal traffic issue of north-south traffic flows.

### **5.3 To reduce delays for traffic turning from the industrial estate into Waterdale Road and Waioira Road**

**Action 1**      *Flare approaches of Northern Road at the intersection with Waterdale Road to provide two stand up lanes.*

#### Impacts

- Reduce delays for traffic accessing Waterdale Road from Northern Road
- Safety will improve as drivers will not have to take risks when turning out of Northern Road
- Have width on eastern approach to provide necessary lanes
- Loss of nature strip on western approach.

#### Implications

- Cheaper solution than signals in the short term
- Flaring and widening on Northern Road approaches will be required with signalisation
- Will need to redo treatment with signalisation and/or widening

#### Comments

This action would improve the level of service and safety at this particular intersection in the short term.

#### *Action 2 Signalise intersection at Northern Road /Waterdale Road*

##### Impacts

- Reduce delays for turning and through traffic on the Northern Road approaches
- Safety at the intersection will improve as drivers will not be taking risks when accessing Waterdale Road from Northern Road
- Some delay for north-south traffic on Waterdale Road
- 

##### Implications

- Widening on both east and west approaches to the intersection required
- Preferable to have four lane treatment on Waterdale Road
- Require linking of traffic signals at Northern Road /Waterdale Road with Waterdale Road/ Kingsbury Drive
- Liaison with VicRoads for their agreement to install traffic signals
- Would improve access in/out of other side roads

#### Comments

While flaring of the Northern Road approaches would improve the capacity problem at this intersection in the short term, signalisation as originally put forward in the 1986 Strategy Plan would provide a long term solution to the problem of accessing Waterdale Road from Northern Road.

A major emphasis is on safety. This intersection has a higher accident rate than typically occurs for an arterial/collector road intersection.

#### *Action 3 Modify intersections of other local roads with Waterdale Road by flaring to allow two stand-up lanes*

##### Impacts

- Reduce delays for traffic turning onto Waterdale Road from local roads (Lillimur Avenue, Orthla Avenue and Vernon Avenue.)
- Improve safety of intersections due to reduced delays for traffic waiting to access Waterdale Road
- Scope to widen into nature strip.

##### Implications

- Scope to provide flaring
- Widening of approaches may be affected by services - needs to be investigated
- Widening of Vernon is achievable with development of site, but is also influenced by widening
- Will work well with signalisation at Northern Road/Waterdale Road

#### Comments

The flaring of the side street approaches to Waterdale Road would improve the level of service of the intersections by reducing delays to turning traffic without causing delays to north-south through traffic on Waterdale Road.

It is not proposed to flare the intersection of Crissane Road/Waterdale Road. If the flaring was constructed, there would be an attraction to use Crissane Road to bypass the signals at Northern Road/Waterdale Road. It is proposed that Crissane Road/Waterdale Road remain as is to provide one lane for exiting traffic principally serving properties along Crissane Road. Other traffic should be encouraged to use the signals at Northern Road/Waterdale Road.

#### 5.4 To reduce industrial traffic through the residential precinct abutting Waiora Road

*Action 1 Block Northern Road and Orr Street between Porter Road and Bamfield Road to provide barrier between residential and industrial land uses in the estate.*

##### Impacts

- Improve residential amenity in the precincts east of Bamfield Road
- Prevent traffic from accessing the industrial precincts from Waiora Road via Northern Road and Orr Street
- Increases pressure on Kingsbury Drive/Waterdale Road
- Increases traffic using Dougharty Road/Waiora Road intersection

##### Implications

- Increases need for another access point into the industrial sector of the estate

##### Comments

This action would improve the amenity of the residential areas east of Bamfield Road but would reduce accessibility to the industrial estate. It would require creation of a replacement access to the eastern sector of the estate.

*Action 2 Provide link between Kingsbury Drive connecting with Bamfield Road at Orr Street.*

##### Impacts

- Reduce level of traffic accessing the industrial precincts through the residential precincts east of Bamfield Road.
- Improve residential amenity in precincts east of Bamfield Road.

- Provides direct link to east-west regional arterial road.
- Would increase turning traffic volumes at Waiora Road/Dougharty Road intersection.
- Bamfield Road/Kingsbury Drive intersection would need to be signalised.

#### Implications

- Liaison required with City of Darebin to clarify status of the precinct north of Orr Street and agreement to link.
- Treatment required at the intersection of Bamfield Road and Dougharty Road to prevent through traffic using Bamfield Road.
- Construction would be over a Melbourne Water pipe track between Orr Street and Kingsbury Drive and therefore need their approval.
- Bamfield Road/Kingsbury Drive intersection would need to be signalised and linked to Waiora Road/Kingsbury Drive intersection.
- Widening of Kingsbury Drive required to provide two lanes on the eastern and western approaches of the intersection.

#### Comments

This action would involve relatively little in terms of land acquisition providing approval could be obtained from the City of Darebin and Melbourne Water for the construction of the link. The Bamfield Road link would alleviate many of the concerns of the residents in the precincts abutting the estate about industrial traffic and improve safety along this section of Waiora Road.

Closure of Northern Road and Orr Street (Action 1 above) could be implemented in conjunction with this action.

The treatment at Bamfield Road/Dougharty Road needs to restrict the crossing of Dougharty Road. A Seagull treatment that permits turning movements in/out of Bamfield Road (north of Dougharty Road) but does not permit right turns in/out of Bamfield Road (south of Dougharty Road) would provide a suitable treatment. This would change the direct accessibility of residents in Bamfield Road south of Dougharty Road, but opportunities exist for residents to use Lloyd Street as the alternative access.

#### *Action 3      Widen Waterdale Road*

This is discussed in Section 5.1 above. Widening of Waterdale Road and signalisation of Northern Road/Waterdale Road would make access via Waterdale Road more attractive than current treatment.

### **5.5 To provide additional parking within the precincts immediately west of Waterdale Road bounded by Kylta Road, Northern Road and Dougharty Road and in Precincts 19 and 20 east of Waterdale Road.**

Precincts 2, 5, 7, 12, 13, 16, 17, 19, 20 have been identified as having the greatest deficiency in available car parking.

The deficiency in car parking is best reflected by the level of usage or availability of on-street car parking spaces. Precincts where on-street parking is fully used or almost fully

used (90%) indicates that there is likely to be a deficiency in on-site parking. This needs to be compared to the usage and availability of on-site parking within the various precincts. The graphs of the car parking surveys presented in Appendix C have been used to establish the precincts with deficiencies.

This approach provides the best indication of the relative level of deficiency and need for additional car parking. It is not practical nor appropriate to consider each site through the estate and assess its individual needs. The situation needs to be considered based on a larger area which is the reason for dividing the estate into precincts, and basing the precincts on a street frontage basis. Where a site or sites have deficiencies, the next best or preferred location of employees to park is on the street. Therefore the cumulative effects of car parking deficiency within a precinct will be reflected by very high usage of the on-street car parking spaces.

A review of the on-street car parking also incorporates the demand generated by visitors. It is therefore considered that the review of on-street usage is the best indicator of the level of car parking deficiency. It does not provide the absolute number of spaces that the precinct is deficient. Actions to provide additional car parking or reduce the demand within the particular precinct should be undertaken to maximise the availability of spaces and then monitor the change.

The precincts were reviewed to identify those where:

- on-street car parking usage is **near** capacity, some off-street is **still available**
- on-street is **at** capacity, off-street is **almost at** capacity
- both on-street and off-street are **at capacity**.

The precincts are highlighted in Figure 2.12, with the precinct car parking availability and usage profiles through the day in Appendix C.

Monitoring of car parking would indicate whether the other precincts noted from Table 2.1 have a real deficiency.

*Action 1      Provide kerbside indented car parking in Korong Road (between Lillimur Avenue and Crissane Avenue), Mologa Road (between Dougharty Road and Lillimur Avenue), Orthla Avenue (between Kolara Road and Mologa Road) and Lillimur Avenue (between Kolara Road and Mologa Road).*

#### Impacts

- Elimination of need for maintenance of nature strips as they are removed
- Increase in provision of on-street parking in areas where there is an identified deficiency
- Provides opportunity to incorporate a number of objectives of improving streetscape, rationalisation of kerbs, appropriate landscaping, replacement of broken kerbs, replacement of signs
- Increase in usable road widths due to kerbside parking being indented.

#### Implications

- Street tree planting programmes need to be introduced to offset the loss of greenery



- Layout schemes must be prepared for the two streets

#### Comments

Kerbside indented parking treatments have already been successfully implemented in parts of the estate.

A sketch of the treatment for one-way streets such as Mologa Road and Korong Road is presented in Figure 5.2.

The use of indented kerb parking builds upon the existing publicly available land. It means treatments can be implemented sooner than if properties need to be acquired. The treatments also provide parking in the areas closest to the properties and in locations immediately accessible to the greatest number of properties within the identified deficient precincts.

The treatments could be extended along the full length of Mologa Road and Korong Road to provide consistent treatments along the full length of the streets, and provide supplementary parking in the future.

Opportunities also exist to implement indented treatments in Orthla and Lillimur Avenues. The low density of crossovers on these streets means they provide a greater number of spaces and scope for supplementary parking if more spaces are required in the future. The treatment for these roads is shown in Figure 5.3. This treatment provides a footpath on only one side of the road. This is consistent with Orthla Avenue between Waterdale Road and Mologa Road which does not have a footpath.

Estimates of the possible number of on-street car parking spaces that could be achieved from these actions are:

• Korong Road	67 spaces (currently 49)	+18 spaces
• Mologa Road	43 spaces (currently 26)	+17 spaces
• Orthla Avenue	29 spaces (currently 15)	+14 spaces
• Lillimur Avenue	31 spaces (currently 21)	+10 spaces

A detailed layout was prepared for Mologa Road between Northern Road and Orthla Avenue. This is shown in Figure 5.4. The layout provided 43 spaces compared to the current 26 spaces along this section of the street.

Indicative costs for these works are:

• Korong Road (Dougharty Road to Northern Road)	\$230,000
• Mologa Road (Dougharty Road to Northern Road)	\$230,000
• Orthla Avenue (Korong Road to Kolora Road)	\$35,000
• Lillimur Avenue (Korong Road to Kolora Road)	\$35,000
• Orthla Avenue (Korong Road to Mologa Road)	\$35,000

The indicative cost for Layout 1 (Korong Road, Mologa Road) as shown in Figure 5.2 is in the order of \$500 per metre, whilst the cost for Layout 2 (Orthla Avenue, Lillimur Avenue) is in the order of \$400 per metre.

It appears that due to the number and spacing of crossovers, trees, poles etc a similar

treatment in Beatrice Avenue would not produce a sufficient increase in car parking spaces. Therefore to provide additional car parking in this area a property would need to be purchased to provide land for this.

*Action 2 Provide parallel parking on both sides of Kylta Road between Lillimur Avenue and Northern Road.*

#### Impacts

- Provides additional parking within this precinct.
- Reduces effective width of road.

#### Implications

- May restrict access in/out of some properties by large commercial vehicles.

#### Comments

This precinct has a significant deficiency in car parking. The one-way traffic flow reduces the effective width required for the road. However traffic flows on Kylta Road are in the order of 750 vehicles per day.

Cross over locations will restrict the capability to maximise the number of spaces provided.

*Action 3 Provide indented angle parking along the northern section of Crissane Road between Waterdale Road and Kylta Road.*

#### Impacts

- Provides additional on-street parking within the immediate area of a significantly deficient precinct.
- Angle parking maintains the effective width of the carriageway.
- Involves land that is currently not used.

#### Implications

- Requires negotiations to purchase strip of land.

#### Comments

Provides parking in a significantly deficient precinct. Could be implemented quickly with appropriate negotiation with owner. Currently unused land, and only require a 5.5 metre strip along the road. The cost to construct a car parking area along a strip of 350 metres would be in the order of \$100,000. Due to the extensive length of road, the spaces could be constructed incrementally in sections over a few years. Initially, the section between Korong Road and Waterdale Road should be constructed. (The cost does not include the cost of purchasing the land.)

*Action 4 Purchase of Site for Car Parking*

A deficiency is noted in Precincts 19 and 20. Investigation indicates on-street parking

treatments would not provide sufficient spaces to justify the cost of the treatments. Therefore it is proposed that Council consider purchase of a property within these precincts to provide additional car parking for the area. A property that links between Northern Road and Beatrice Avenue would be desirable. This would provide benefit and access to both precincts.

## **5.6 To reduce the demand for car parking by improvements in public transport services and facilities**

### *Action 1 Promote public transport services within the area.*

As noted in Section 2.2.3 public transport usage was used on average by 6% of workers. The lowest usage was in the area east of Waterdale Road. As highlighted in Section 2.7 services operate along Waterdale Road which is effectively through the middle of the estate.

Greater awareness and promotion of public transport services is needed. This involves highlighting the service routes and timetables. Initiatives such as distribution of public transport maps and timetables to all businesses within the estate, as well as including service maps on newsletters and other promotional material distributed to employees should be undertaken. Maps and timetables should be left in lunch rooms, reception areas and notice boards.

This would assist increase awareness and present the image of public transport as a real mode of travel for some employees.

### *Action 2 Construction of partially indented bus bays on Waterdale Road and provision of bus shelters.*

#### **Impacts**

- Provide protection against the elements for bus patrons.
- Improve the visual awareness of bus services.
- Improve traffic operation of Waterdale Road.

#### **Implications**

- Immediate implementation would be replaced by later widening of Waterdale Road.
- Locate stops close to proposed future locations.

#### **Comments**

The provision of bus shelters would increase the awareness of bus services and improve the operation on Waterdale Road by allowing cars to pass buses whilst they are picking up/dropping off passengers. Combined with other actions addressing bus service provision this could lead to increased bus patronage as people increasingly see the bus as an alternative to private transport.

*Action 3      Bus service linking the Industrial Estate with the trams on Plenty Road and adjacent railway lines.*

The principal option is to run a service between Macleod railway station and Plenty Road tram via Northern Road.

Impacts

- Improves catchment for public transport services by including the higher profile tram and train services.
- Reduce pressure on existing car parking supply in the estate.

Implications

- Liaison required with Ivanhoe and National bus companies to determine how such a service could be implemented and liaison with Department of Infrastructure - Office of Transport.
- Require reduced delays at Northern Road/Waterdale Road intersection.

Comments

At the present time there are no bus services directly serving and linking the estate with the tram and train infrastructure to the north. The introduction of a service linking the Plenty Road tram and the adjacent train station at Macleod would serve to raise the profile of public transport as an alternative to private transport. This would reduce some of the demand for car parking in the estate.

*Action 3      Increase penetration of public transport into estate.*

This would be achieved through Action 2 above, as well as routing north-south services via either McEwan Street or Bamfield Road.

Impacts

- Brings services within close walking distance of services and therefore increasing attractiveness of services and potential usage of public transport.
- Reduced car parking demand in the eastern precincts.

Implications

- Need to provide additional bus stop facilities.
- Need link to Kingsbury Drive and/or reduce delays at Northern Road/Waterdale Road to efficiently run north-south service.

Comments

Increasing the penetration of public transport into the estate by expanding the network of bus routes would make the precincts away from Waterdale Road more accessible by public transport. This would reduce some of the demand for car parking in the eastern precincts, and assist address the deficiency identified in precincts 19 and 20.

Would need to implement services in conjunction with alternative access to Kingsbury

Drive and improved operation of the Northern Road/Waterdale Road intersection.

## 5.7 To encourage shared use of car parking infrastructure.

*Action 1 Encourage firms with large amounts of on-site parking to lease/share it with other companies.*

### Impacts

- Reduces demand for on-street car parking spaces.
- Potentially provides access to immediately available car parking areas.
- Utilises a currently under-utilised resource.
- Concerns raised regarding insurance, responsibility and liability for the car parking areas.

### Implications

- Reliance on individual companies to assist others.
- Issues regarding insurance, responsibility and liability for the car parking areas need to be resolved.
- Car parking short-fall returns when area is reclaimed by company for its own use.

### Comments

This objective may prove difficult to achieve due to concerns raised by businesses regarding the management, responsibility and liability of such shared car parking areas. It has also been noted that the sites with large areas of on-site car parking that are under-utilised are found in the precincts that don't have a major deficiency.

*Action 2 Council to purchase sites to provide shared car parking facilities*

### Impacts

- Car parking facilities can be provided in precincts where deficiency occurs.
- Reduce demands on existing car parking supply by workers on the estate.
- Loss of a business from the estate
- Could provide open space area in conjunction with part of the site.

### Implications

- Council can only consider purchasing land as and when it becomes available.
- Cost of maintenance needs to be included.

### Comments

In principal this would enable on-site parking to be provided in areas where it is judged to be desirable rather than the co-operation of businesses in certain areas of the estate where the necessity may not be very high.

This action is proposed for Precincts 19 and 20 where it is difficult to increase on-street

parking.

*Action 3      Review on-site car parking compared to development permits.*

Impacts

- Highlights sites where proposed car parking areas have been used for other uses
- Businesses may need to find alternative areas for storage
- Potentially reduce unsightly storage areas

Implications

- May require businesses to find alternative arrangements or areas to return permit designated areas to car parking
- Businesses may need to find a larger site/possibly relocate

Comments

The lack of on-site parking may be as a result of using designated car parking areas for storage or other uses. Businesses should be encouraged and supported to reorganise their car park layouts to maximise provision of on-site spaces. This is likely to be at the expense of using standard bay dimensions and access arrangements. Tandem parking is an appropriate means to increase parking. The inconvenience is principally with the employees, but would be manageable on sites with small employment numbers. These would typically be small sites which are the most likely to have insufficient car parking due to the constraints of the site size.

Business owners/operators need to undertake initiatives themselves, rather than rely on Council to provide all the additional car parking.

## **5.8 To facilitate movement of commercial vehicles from the local roads in/out of industrial premises**

*Action 1      Provide kerbside indented parking*

Impacts

- Provision of indented parking will increase the width of road that is available to commercial vehicles.
- Removes nature strips

Implications

- Street planting to offset loss of greenery

Comments

The indented parking retains the current road width for manoeuvring in/out of the sites. This may not contribute greatly in improving site access, but it maintains current accessibility.

**Action 2**      *Consolidation of kerbside accesses***Impacts**

- Increase in on-street car parking provision due to fewer accesses

**Implications**

- Liaison required with the site owners to co-ordinate consolidation policy

**Comments**

Most of the large sites and new developments abutting Sheehan and Bamfield Roads already have good access for commercial vehicles and so kerbside access consolidation would not be necessary in these precincts.

In other precincts where a policy of kerbside access consolidation would theoretically provide benefit and improve access for commercial vehicles it is generally not practicable due to the predominance of small lots whose access arrangements do not lend themselves to consolidation.

The treatments shown in Figures 5.1 to 5.3 provide the ability to consolidate accesses and improve turning into the sites. This can and should be refined in the preparation of layout plans for the car parking treatments.

Use of the street for loading/unloading should be an accepted practice, providing it is undertaken recognising safety and the need for trucks to be positioned so vehicles can pass.

**5.9 To ensure future developments provide appropriate levels of on-site car parking and satisfactorily facilitate access by commercial vehicles**

**Action**      *Develop guidelines for minimum provision of on-site parking and loading facilities for new developments in the estate*

**Impacts**

- Ensure that parking demands are catered for on-site.
- Reduce need for provision of on-street car parking in the future.
- Consolidate cross-over accesses.
- Reduce loading and unloading that is done on-street.

**Implications**

- Guidelines need to be developed.

**Comments**

The guidelines need to provide direction on new developments within the estate and redevelopment of current premises.

The guidelines would need to differentiate between precincts that have or expected to

have parking problems, as opposed to those that do not. The latter could utilise some on-street availability, but this would be limited. The guidelines should not require new developments to provide car parking in excess of acceptable levels to provide for the short-fall of others, nor should they allow for notional existing use credit.

On-site parking should be oriented to employee parking, particularly if tandem parking is permitted. The emphasis for visitor parking is on the street.

Expansion of site facilities needs to consider the actual car parking provided relative to demand generated and the expected increase in employment and associated additional demand for car parking.

Provision of loading facilities would be influenced by size of site and current activity within the respective precinct.

The guidelines should cover the issues of rates of car parking provision for new developments and extensions/redevelopments, standards/layout requirements, use of tandem spaces, cash-in-lieu contributions, loading bays, access, allowance/non-allowance for on-street car parking, reference to monitoring results.

#### **5.10 To develop low maintenance/ low water use street tree and landscape treatments**

##### *Action 1 Replace nature strips with pavement treatments*

###### Impacts

- Reduce maintenance requirements by eliminating nature strips
- Eliminate unsightliness caused by vehicles parking on and despoiling nature strips

###### Implications

- To eliminate nature strips, new pavements will need to be installed and street tree planting programmes need to be introduced to offset the loss of greenery.
- Such treatments will often need to be provided in association with indented parking where nature strips are currently used (illegally) for parking.

###### Comments

This action has been undertaken in some areas during recent years resulting in a significant improvement in the appearance of those areas.

##### *Action 2 Select street tree species for low maintenance and low water requirements*

###### Impacts

- Reduce time maintaining trees

###### Implications

- Selected street tree species should meet a number of criteria such as resistance



to disease, drought tolerance and be of suitable size that will not require future heavy pruning

#### Comments

Advanced trees only should be planted to be resistant to vandalism and theft. Table 5.1 is a list of possible tree species.

**Table 5.1: Possible Tree Species**

Botanical Name	Common Name	Comments (Size H x W)
Carpinus betulus 'Fastigiata'	Hornbeam Variety	Used in other areas of City of Banyule (7m x 4m)
Eucalyptus scoparia	Wallangarra White Gum	Used in other areas of City of Banyule (10m x 7m)
Pyrus calleryana 'Red Spine'	Ornamental Pear Variety	Good performance (10m x 6m)
Quercus palustris	Pin Oak	Not suitable for under power lines (15m x 8m)
Robinia pseudoacacia 'Frisia'	Robinia variety	Very Hardy. May sucker if roots disturbed. (8m x 4m)
Robinia pseudoacacia 'Umbraculifera'	Robinia variety	Very Hardy. May sucker if roots disturbed. (8m x 4m)

#### 5.11 To ensure that street tree and other landscape treatments are cognisant of safety requirements such as sightlines at intersections

*Action*      *Ensure street trees are planted to cater for sightlines at intersections and crossovers*

#### Impacts

- Increase visibility at crossovers and intersections to allow for safer vehicle movements at these points

#### Implications

- Advanced trees with a clear trunk should be planted to avoid problems in the short term

#### Comments

Existing street trees which block sightlines should be gradually removed as replacement trees are planted.

**5.12 To develop landscape treatments which are both visually attractive and robust enough to withstand the wear and tear of heavy traffic**

*Action            Install pavement treatments to co-ordinate with recent treatments.*

**Impacts**

- Provide a cohesive treatment for the Industrial Estate
- Eliminate broken-up kerbs and pavements

**Implications**

- Treatments will need to differ for varying road widths and for one-way as opposed to 2 way roads

**Comments**

These treatments would be installed in areas where nature strips are currently present. Materials used should include red/ brown asphalt and plain ruled concrete to co-ordinate with existing materials.

**5.13 To ensure that redevelopment, refurbishment and infill developments enhance the overall appearance of the estate**

*Action 1            Guidelines should be developed and issued to developers so that all proposed developments have a positive influence on the visual image of the estate.*

**Impacts**

- Provide a cohesive treatment for the Industrial Estate
- Incrementally reduce poor quality developments in the estate

**Implications**

- The guidelines will need to be reviewed and updated every few years.

**Comments**

The guidelines should cover the following topics:

***Built form***

- *Building envelopes and setbacks*
- *Scale*
- *Facade treatments*

***Materials***

- *Colour and finish*

- *Maintenance requirements*

#### *Signage*

- *Number of signs per site -promotion of consolidated signage for two or more businesses*
- *Size*
- *Colour*
- *Relation of signs to facades*
- *Signage Envelopes*

#### *Planting*

- *Suggested species list*
- *Sample landscape plan*

#### *Street scape*

- *Sample street scape treatments for different areas within the Estate including construction details and costings.*

#### *Open Space*

- *Solar access, shade and privacy provisions.*

*Action 2      Major developments should include a street scape improvement component*

#### *Impacts*

- *Street scape improvements will be implemented as new developments occur*

#### *Implications*

- *Relying totally on this method of implementing street scape improvements could result in a piecemeal effect.*

#### *Comments*

*Council should consider extending street scape treatments generated by major developments so that complete streets or sections of streets can be completed at once.*

### **5.14 *The image of the Industrial Estate should be improved and promoted to passing traffic.***

*Action 1      Erect signs at major entry points to the West Heidelberg Industrial Estate*

#### *Impacts*

- *Readily identify the Estate*
- *Improve image of the entry into the City of Banyule as well as the Estate*

#### Implications

- A logo which is readily identifiable with the Industrial Estate should be developed to put on the sign.
- A sign design will need to be developed to the approval of the Council and businesses in the Estate. An example (without a logo) is shown in Figure 5.5.

#### Comments

Positions for entry signs would be at either end of Waterdale Road and at the future intersection of Bamfield Road and Kingsbury Drive. Supplementary pointer signs could be placed on the intersection of Waterdale Road and Kingsbury drive.

#### *Action 2      Improve the image of Waterdale Road*

#### Impacts

- Readily identify the Estate
- Improve the image of the entry into the City of Banyule as well as the Estate

#### Implications

- The large number of crossovers into properties need to be accounted for in the design.

#### Comments

The design should be in keeping with the proposals for other streets in the Estate but reflect the fact that this is the major access route through the Estate. An indicative plan is presented in Figure 5.1.

### **5.15 Open space should be set aside for workers**

#### *Option 1      Purchase lots in areas where open space is required.*

#### Impacts

- Provide space for eating and relaxing at lunch times or rest breaks.

#### Implications

- Purchase of land will be expensive.
- Maintenance of these areas will need to be borne by Council.

#### Comments

This option will provide the best quality open space, but will be the most costly both in terms of initial capital investment and ongoing maintenance costs.

*Option 2 Set aside part of land purchased for car parking as open space.*

#### Impacts

- Provide open space without the need to buy land specifically for the purpose

#### Implications

- This action is still dependent on the purchase of lots which may not proceed.
- The areas which require car parking may not correlate with those that need open space.
- Maintenance of these areas will need to be borne by Council.

#### Comments

As car parking areas would require a landscape buffer where they adjoin streets, it would be a relatively minor addition to provide a small area of paving and some seating.

*Option 3 Set aside open space area for workers within new developments and encourage provision in existing sites.*

#### Impacts

- Provide open space without the need to buy land specifically for the purpose
- Open Space will be close to the work place where it is most needed.

#### Implications

- Some sites may be too tight to accommodate effective open space.

#### Comments

Open space areas may only need to be a small area of paving with seating. The size of the area should be directly related to the size of the workforce. Consideration of location of such a space would need to be carefully considered in terms of such factors as solar access, shade and privacy.

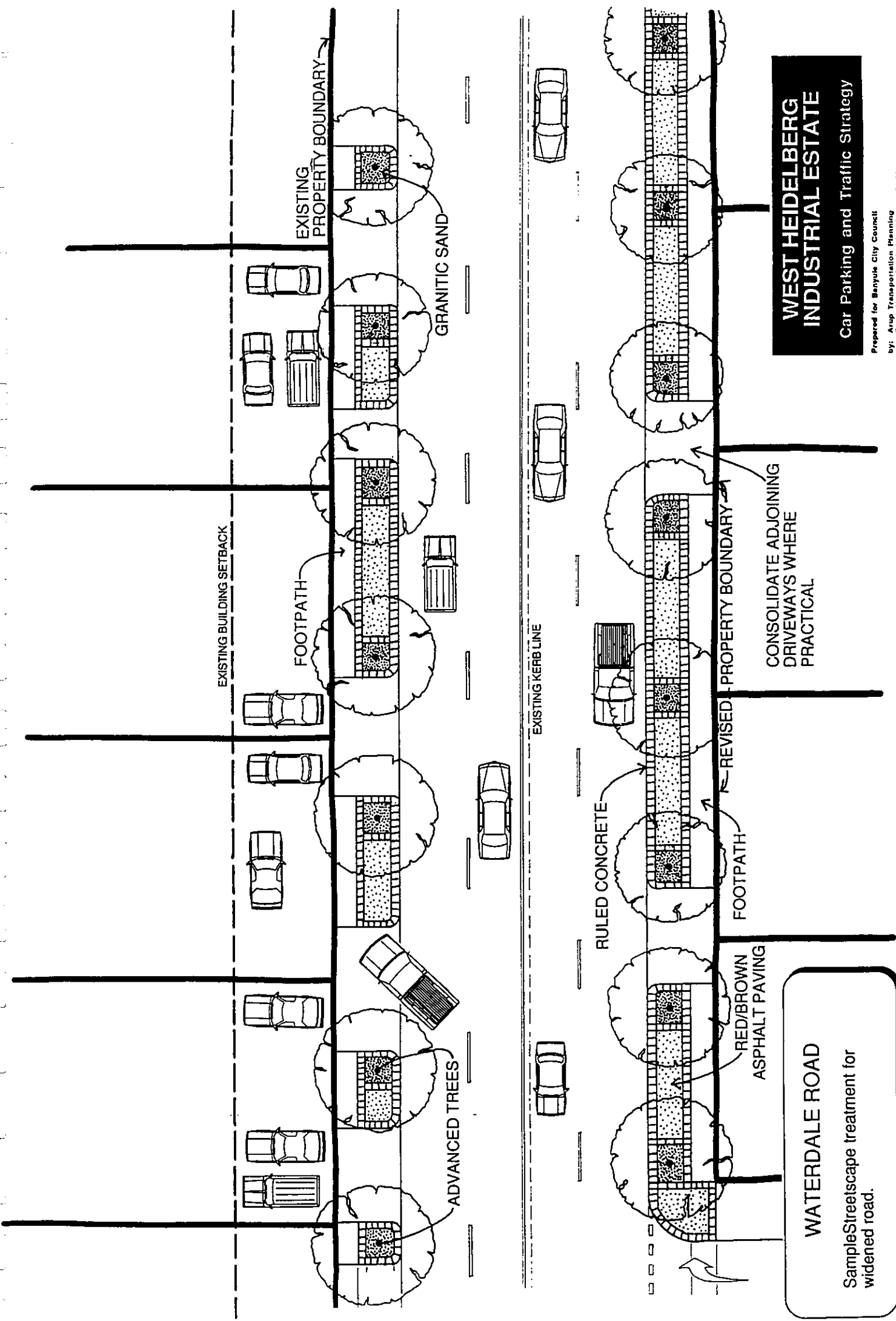
## 5.16 To reduce accidents in the area

Figure 2.13 and the results presented in Table 2.6 indicate that the predominant location of accidents is along Waterdale Road. The principal cause of accidents is considered to be the long delays experienced by traffic turning out of the side streets.

To addresss this issue delays need to be reduced. The means to achieve this are:

- provide additional width in the side streets to allow two vehicles to wait
- creat traffic platoons
- improve the traffic flow along Waterdale Road.

All these actions have been raised and discussed in Section 5.1 Action 1, and Section 5.3 Actions 1, 2, and 3.



**WEST HEIDELBERG INDUSTRIAL ESTATE**  
 Car Parking and Traffic Strategy

Prepared for Banyule City Council  
 by: Arup Transportation Planning  
 Frank Hanson Pty Ltd Landscaps Architects  
 August 1999

Figure 5.1

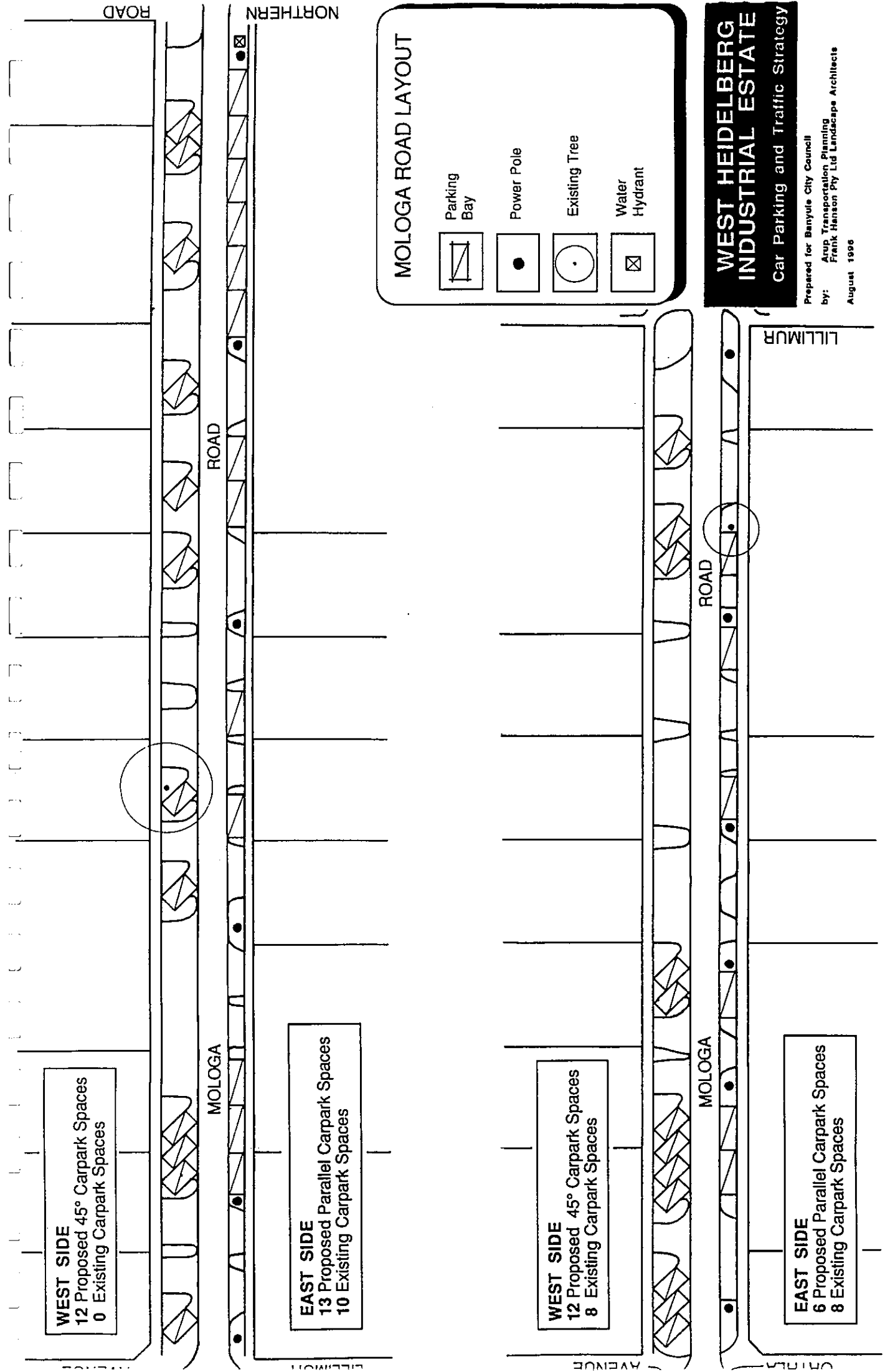
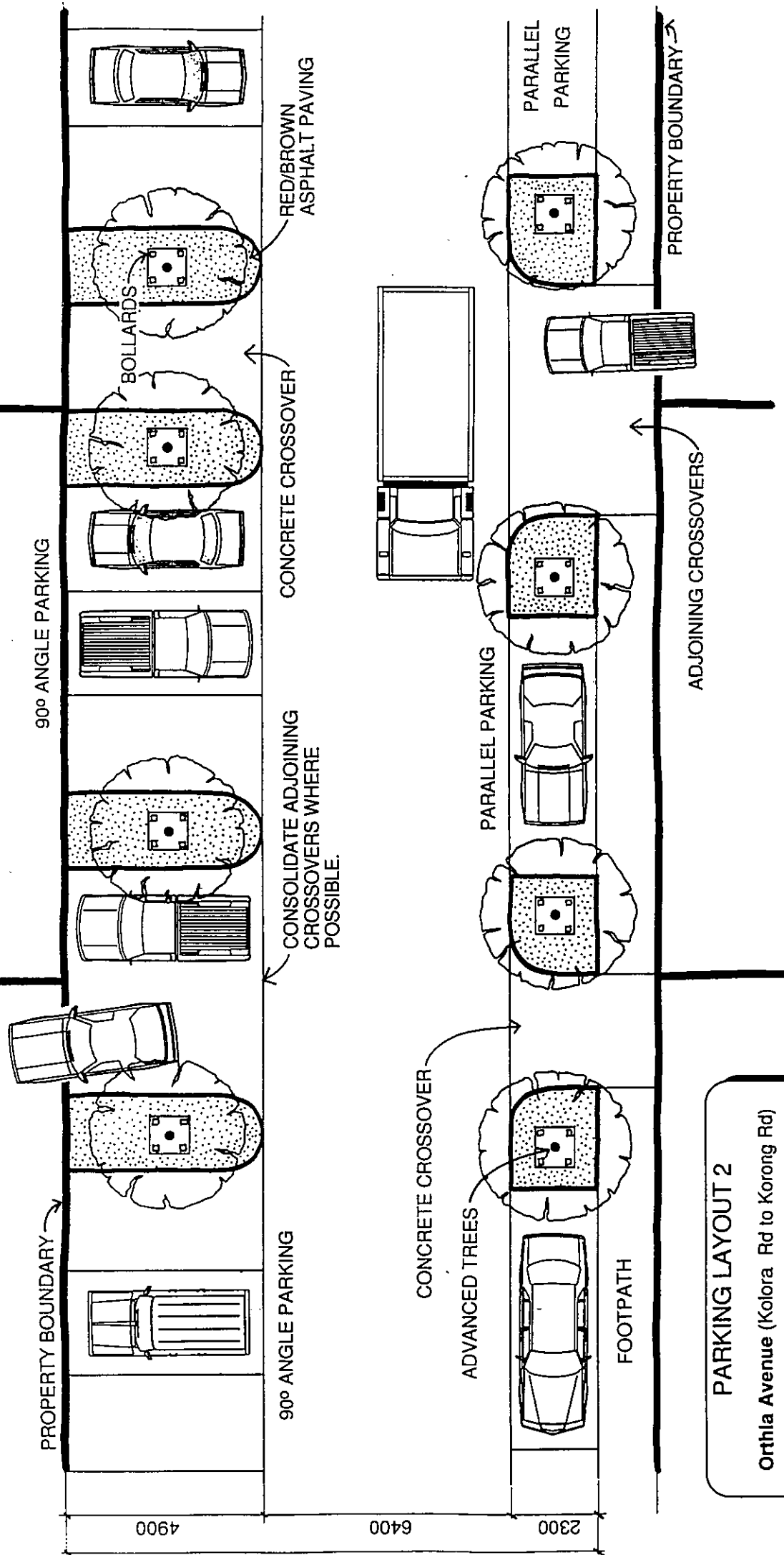


Figure 5.2



## PARKING LAYOUT 2

Orthia Avenue (Kolora Rd to Korong Rd)

-90° angle parking on north side

-parallel indented parking not included

Orthia Road (Korong Rd to Mologa Rd)

-90° angle parking on south side

-parallel indented parking on north side

Lilimur Road (Kolora Rd to Korong Rd)

-90° angle parking on north side

-parallel indented parking on south side

Lilimur Road (Korong Rd to Mologa Rd)

-90° angle parking on north side

-parallel indented parking not included

## WEST HEIDELBERG INDUSTRIAL ESTATE

Car Parking and Traffic Strategy

Prepared for Banyule City Council

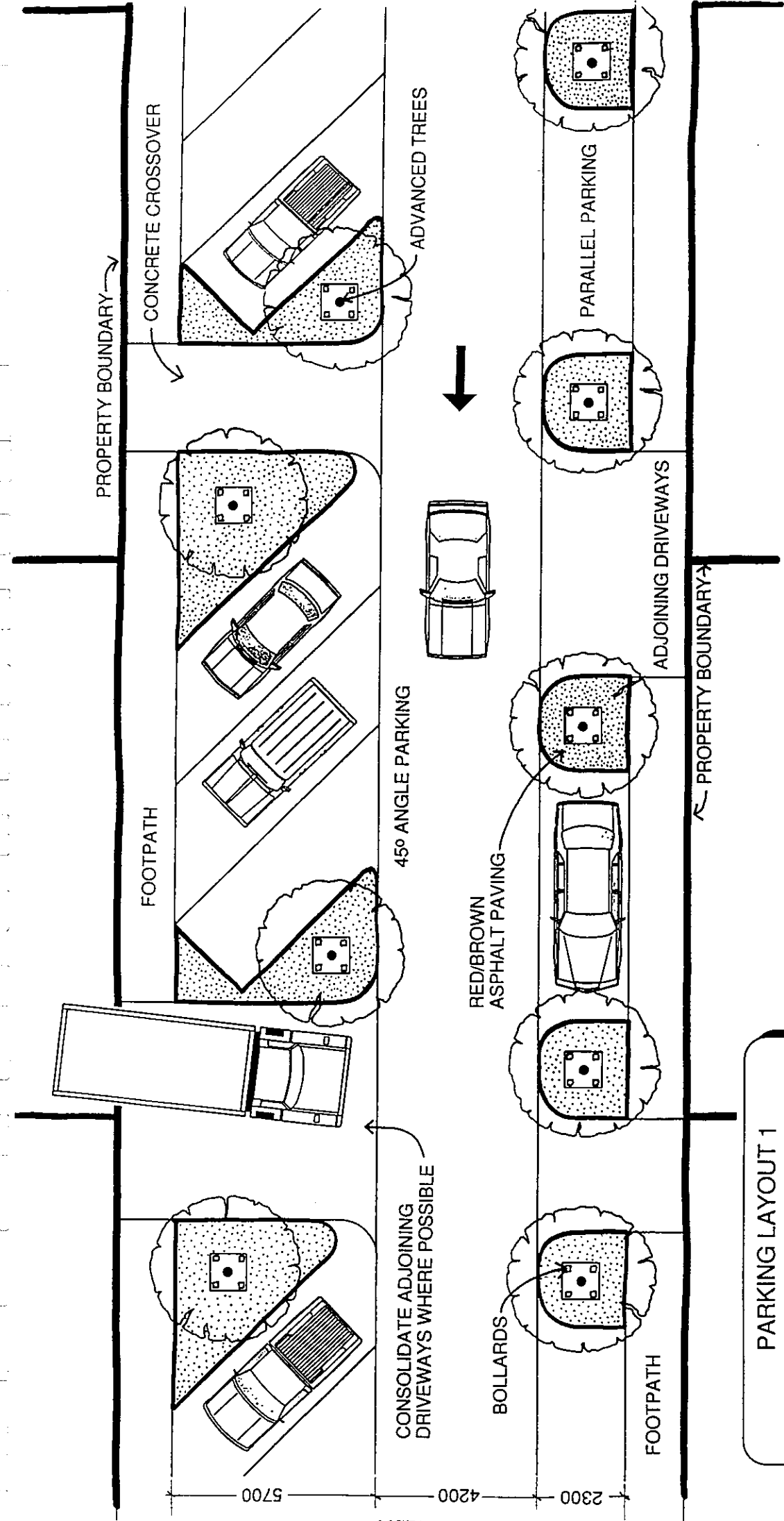
by: Arup Transportation Planning

Frank Hansen Pty Ltd Landscape Architects

August 1996

Figure 5.3





### PARKING LAYOUT 1

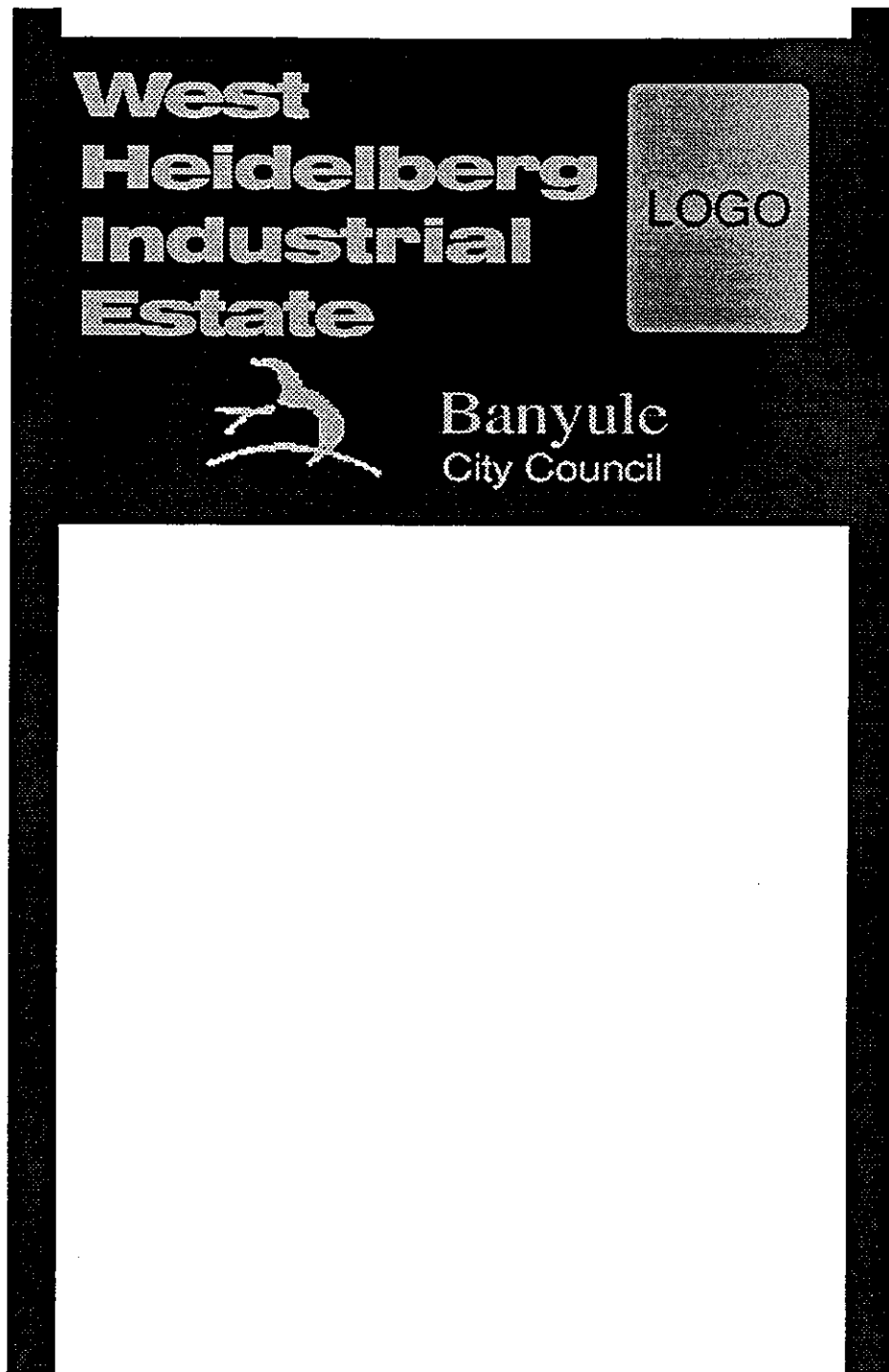
- Mologa Road (Northern Rd to Dougharty Rd)
- Korong Road (Northern Rd to Dougharty Rd)
- Korong Road (Northern Rd to Crisanne Rd)
- parallel indented parking not included

## WEST HEIDELBERG INDUSTRIAL ESTATE

### Car Parking and Traffic Strategy

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 August 1996

Figure 5.4



**PROPOSED ENTRANCE SIGNS -  
NOTIONAL LAYOUT**

## 6. STRATEGY PLAN

Based on the aspects raised and discussion in Section 5, the following are the recommended actions to implement the overall strategy for the Estate.

### 6.1 Strategy Actions

The Strategy Plan requires actions under the following broad initiatives. No one initiative will address or provide the solutions to the range of issues raised. The principle initiatives are:


- traffic actions
- promotion of public transport services
- parking provision
- urban design actions.

Figure 6.1 indicates the recommended actions. The specific actions and reasons are presented in the following section. The development times and budget constraints will require that actions are taken over a period of time. Time frames for the respective actions have been indicated. These are:

- short term - 1 to 3 years
- medium term - 3 to 5 years
- long term - 5+ years

#### Traffic

1. *Flare eastern and western approaches on Northern Road/Waterdale Road to provide two stand up lanes. (short term action)*
  - action is required to reduce delays at this intersection for traffic exiting the estate onto Waterdale Road
  - will improve safety at the intersection
  - immediate action to improve access and safety
  - precursor to late signalisation of intersection
2. *Flare Lillimur Avenue, Orthla Avenue and Vernon Avenue at Waterdale Road to provide for two cars (short term action)*
  - reduce delays for traffic exiting from the estate onto Waterdale Road
  - will improve safety at the intersections
3. *Upgrade line marking and traffic control/parking signs throughout estate (short term action)*
  - lines are faded and signs missing
  - reinforces priority, particularly at cross intersections where priority is uncertain
  - splitter islands and roundabout treatments are inappropriate due to need to facilitate truck access and turning vehicles
  - an ongoing maintenance task.

4. *Signalise the intersection of Waterdale Road/Northern Road (medium term action)* 
  - needs to be undertaken in conjunction with providing 2 lanes in each direction on Waterdale Road
  - would be undertaken after resolving and negotiating widening of Waterdale Road
  - provides supplementary access improvement into/from other side streets along Waterdale Road
  - desirable to implement as soon as possible
5. *Link Bamfield Road to Kingsbury Drive (medium term action)*
  - provides a supplementary access from the east-west primary arterial route of Kingsbury Drive.
  - the intersection of Kingsbury Drive/Bamfield Road will need to be signalised and linked to Kingsbury Drive/Waiora Road operation
  - will need liaison and agreement with Darebin City Council and Melbourne Water
6. *Closure of Orr Street and Northern Road between Bamfield Road and Porter Street (medium term action)*
  - would be undertaken only in conjunction with Action 5
  - improves amenity for residents in Northern Road, Orr Street and Porter Road
  - provides physical separation of industrial estate and residential area
  - will divert industrial estate traffic from Northern Road/Waiora Road into Bamfield Road and to access area at Dougharty Road/Waiora Road intersection.
7. *Treatment at Bamfield Road/Dougharty Road (medium term action)*
  - this is required in conjunction with Action 5
  - required to deter traffic using Bamfield Road particularly south of Dougharty Road as an alternative north-south route
  - provide a Seagull treatment that permits turning movements in/out of Bamfield Road (north of Dougharty Road) but does not permit right turns in/out of Bamfield Road (south of Dougharty Road).
8. *Widen Waterdale Road on the east side between Dougharty Road and Crissane Avenue to provide a 4 lane undivided road (long term action)*
  - the treatment is to provide footpaths on both sides, a landscaped nature strip of at least 1.5 metres, kerbside traffic lines of 4.2 metres and centre lanes of 3.3 metres
  - this will require purchase of properties on the east side of Waterdale Road to obtain a strip of around 5.5 metres
  - opportunities exist to consolidate purchased sites after excising the required reservation and resubdivide and develop the properties
  - this action provides the opportunity to provide additional car parking and open space areas to serve the precincts with redevelopment of the

- consolidated land
- 4.2 metre kerb lanes provide appropriate width for a bicycle lane and to facilitate left turns by commercial vehicles into abutting properties and side streets
- Council and VicRoads should jointly investigate opportunities to minimise the disruption to existing businesses affected by the widening. This could involve actions such as facilitating relocation to new premises on the Ministry of Education site, staged widening of Waterdale Road, purchase and lease back arrangements until construction, providing advice on status of programmed works, purchases, etc to keep owners advised of actions

### Public Transport

9. *Promote knowledge of public transport services in the area (short term action)*
  - the objective is to increase the awareness of employees to the possibility of using public transport services to/from work
  - actions include distribution of transport maps and timetables to companies within the estate, highlight services in newsletters and estate promotional literature
10. *Develop a service through the area east of Waterdale Road (short/medium term action)*
  - bring services closer to work location, increasing awareness of public transport service and reducing walking distance.
  - develop service in consultation with National Bus Company and Ivanhoe Buses
  - until Bamfield Road-Kingsbury Drive link is created, service could operate along McEwan Road-Northern Road-Waterdale Road
  - after Bamfield Road-Kingsbury Drive link is created service could then operate along McEwan Road-Northern Road-Bamfield Road-Kingsbury Drive or simply Bamfield Road-Kingsbury Drive
11. *Provide a bus service between the Plenty Road tram service and Macleod railway station via Northern Road (short term action)*
  - develop service in consultation with Ivanhoe Bus Company and National Bus Company
  - brings services within the immediate catchment of the industrial estate
  - would reduce some of the demand for employee car parking, particularly in precincts 19 and 20
12. *Provide indented bus bays on Waterdale Road (medium term action)*
  - indented bays would reduce traffic delays along Waterdale Road due to buses stopping to pick up/drop off passengers
  - increases awareness of bus services to the estate
  - shelters, timetables, etc. provide better facilities and information for passengers

## Car Parking

13. *Provide kerbside indented car parking in Korong Road between Lillimur Avenue and Crissane Avenue, and in Mologa Road between Dougharty Road and Lillimur Avenue (short term action)*
  - provides additional parking in areas identified to have a deficiency
  - use of indented kerb parking enables early implementation because land does not have to be purchased
  - eliminates the need to maintain nature strips
  - parking is provided in areas closest to the most properties within the identified deficient precincts
  - provides parking that can be used by all employees in the precinct, as well as visitors
14. *Continue indented treatments on remaining sections to provide consistent appearance (medium to long term action)*
  - extend treatments along Korong Road and Mologa Road to provide consistent appearance
  - provides supplementary parking
  - priority of this action is influenced by budget allocations and extent of deficiency after implementation of Action 13
15. *Provide angled indented car parking on north side of Crissane Avenue between Waterdale Road and Kylta Road (short term action)*
  - provides additional on-street parking within a precinct with a significant deficiency
  - angle parking maintains the effective width of the carriageway
  - requires negotiation for purchase of land
  - requires a relatively narrow strip of land along street
16. *Allow parking on both sides of Kylta Road between Lillimur Avenue and Northern Road (short term action)*
  - provides additional parking within a deficient precinct
  - can be implemented immediately
  - may restrict traffic movements along this section, however it is locally generated traffic which will have improved access to/from other streets with implementation of Actions 1, 2 and 4.
17. *Council purchase a site within precincts 19/20 (south of Northern Road and linking through to Beatrice Avenue) (medium/long term action)*
  - this is an identified deficient precinct but there is no scope to provide effectively additional parking along Northern Road and Beatrice Avenue
  - improved public transport services will assist in this area, but not likely to address the level of demand required to improve this precinct
  - this area will need to be monitored
  - a site should be purchased that links between Northern Road and Beatrice Avenue to maximise benefit to both precincts 19 and 20 and provide direct

access to both precincts

18. *Council monitor car parking usage throughout the estate (on-going)*
  - surveys be undertaken on an annual basis of usage of car parking spaces within the estate
  - particularly important this is undertaken after implementing Actions 13-16 and prior to Action 17
19. *Council purchase sites after on-street treatments are implemented and monitoring indicates deficiencies still exist within precincts (long term action)*
  - if the additional on-street parking and bus service improvements do not reduce the deficiency in car parking within the precincts, more substantial action will be necessary
  - this should only be undertaken when all opportunities for on-street parking is provided and the annual monitoring indicates there has been an on-going deficiency recorded in the respective precincts

#### Other Car Parking

20. *Check compliance of site car parking provision and availability to permit (short term action)*
  - ascertain whether deficiency is due to non-conformance of permit and use of expected car parking areas for other uses (eg storage)
  - enforce permit parking requirements
  - provides additional on-site car parking
21. *Support non-standard car park layouts and standards on small sites and encourage operators to arrange car parking in a revised but orderly layout to maximise on-site car parking (short term on-going action)*
  - small sites with smaller numbers of employees have greater scope to shift cars
  - these sites are likely to be deficient in car parking due to amount of land available to provide spaces
22. *Prepare guidelines on car parking provision for development within the estate (short term action)*
  - guidelines need to establish policy on provision of car parking for new developments and redevelopment/extensions to existing premises
  - guidelines should cover the issues of rates for new developments and extensions to existing premises, standards/layout, provision of tandem spaces, cash-in-lieu, special rates, access to site/driveways, loading bay facilities, visitor parking on-street, allowance for on-street usage, reference to monitored survey results and precincts designated as deficient/surplus

#### **Urban Design**

23. *Replace nature strips with pavement treatments (short to medium term)*
- reduces maintenance requirements by eliminating nature strips
  - eliminates unsightliness caused by vehicles parking on and despoiling nature strips
  - street tree planting to be incorporated to offset loss of greenery
24. *Select street tree species for low maintenance and water requirements (short term action)*
- need to select tree species that are resistant to disease, drought tolerance and be of suitable size that will not require future heavy pruning (see Table 5.1 for possible species)
  - advanced trees only should be planted to be resistant to vandalism and theft
25. *Ensure street trees are planted to cater for sightlines at intersections and crossovers (short term on-going action)*
- advanced trees with a clear trunk should be planted to avoid problems in the short term
  - existing street trees which block sightlines should be gradually removed as replacement trees are planted
26. *Install pavement treatments to co-ordinate with recent treatments (short term action)*
- provide a cohesive treatment for the Industrial Estate
  - eliminate broken-up kerbs and pavements
  - treatments will need to differ for varying road widths and for one-way as opposed to 2 way roads and are shown in Figures 5.2 and 5.3.
  - these treatments should be installed in areas where nature strips are currently present
  - materials used should include red/brown asphalt and plain ruled concrete to co-ordinate with existing materials
27. *Guidelines should be developed to issue to developers to ensure that all proposed developments have a positive influence on the visual image of the estate (short term action)*
- provide a cohesive treatment for the Industrial Estate
  - the guidelines should cover the following topics:
    - Built form
      - building envelopes and setbacks
      - scale
      - facade treatments
    - Materials
      - colour and finish
      - maintenance requirements



- open space areas only need to be a small area of paving with seating.

## 6.2 Time Frame & Interdependence

The overall time frame and interdependence of the actions are shown in Figure 6.2. Most of the actions for the Strategy Plan are independent initiatives, and most could be implemented in the short term (1-3 years).

The principle traffic initiative is the widening of Waterdale Road. This will be a long term action but provides significant benefits. The long term time frame of this project reflects the complexity of land acquisition, high cost and need for agreement and negotiation. In the short term, intersection flaring can be implemented, whilst the Bamfield Road-Kingsbury Drive link is a medium term action. This action results in follow-on initiatives relating to closure of Northern Road and treatments at Dougharty Road/Bamfield Road.

Several car parking initiatives can be implemented in the short term. This is the benefit of using the road reserve to provide the car parking. A major emphasis is for ongoing monitoring of the use of car parking spaces in the area, with purchase of properties for car parking a long term action after implementation of the respective short and medium term initiatives. The purchase of properties for car parking will be dependent upon when owners place their properties on the market within the precincts in which provision of additional car parking is required.

The urban design initiatives are principally ongoing actions relating to actions as the estate continues to develop/redevelop. A number of the actions (replacement of nature strips, tree planting, pavement treatments) relate to the proposed kerbside rationalisation and proposed car parking treatments.

## 6.3 Indicative Costs

Table 6.1 provides indicative costs for the various treatments and physical works. Actions such as preparation of guidelines, bus services, promotions and monitoring surveys have not been costed as these could be undertaken either in-house or use other resources. A number of the urban design actions are in association with recommended physical traffic/parking actions and therefore do not have a specific cost.

The figures in Table 6.1 are only indicative for initial budgetary/programming purposes. They do not include land acquisition costs, service relocation, plan preparation, preliminary investigations and surveys.

Table 6.2 provides an indication of the costs for the three periods. It should be noted that some tasks have been indicated to spread over periods, however the costs have been allocated to the initial period indicated.

**Table 6.2: Indicative Cost for Each Period**

<b>Short Term (1 - 3 years)</b>		<b>Medium Term (3 - 5 years)</b>		<b>Long Term (5+ years)</b>	
Project 1	\$25,000	Project 4	\$100,000	Project 8	\$950,000
Project 2	\$25,000	Project 5	\$180,000		
Project 3	\$10,000	Project 6	\$20,000		
Projects 13&14a	\$490,000	Project 7	\$20,000		
Project 15	\$100,000	Project 12	\$40,000		
Project 22	\$5,000	Project 14b	\$105,000		
Project 27	\$5,000				
Project 29	\$10,000				
<b>Total</b>	<b>\$670,000</b>	<b>Total</b>	<b>\$465,000</b>	<b>Total</b>	<b>\$950,000</b>

(Projects which would be ongoing actions by council or associated with other projects are 18, 20, 21, 24, 25, 26, 28, 30 and 31. No specific cost has been estimated.

Projects which would be investigations and actions by others are 10, 11 and 16.

Projects which have unknown costs depending upon actual works are 9, 17, 19 and 23.)

## TRAFFIC

- 1 Flare eastern and western approaches on Northern Road/Waterdale Road to provide width for two cars. (Short Term)
- 2 Provide width on Lillimur Avenue, Orthia Avenue and Vernon Avenue for two cars at the intersections with Waterdale Road. (Short Term)
- 3 Upgrade line markings and traffic control and parking signs. (Short Term)
- 4 Signalise the intersection of Waterdale Road/Northern Road. (Medium Term)
- 5 Link Bamfield Road to Kingsbury Road. (Medium Term)
- 6 Close Northern Road and Orr Street between Bamfield Road and Porter Road. Linked to action 5. (Medium Term)
- 7 Install treatment at the intersection of Bamfield Road/Dougharty Road to restrict use by through traffic south of Dougharty Road. Linked to action 5. (Medium Term)
- 8 Widen Waterdale Road on the east side to provide footpaths on both sides, nature strips of 1.5 metres, kerb lanes of 4.2 metres and centre lanes of 3.3 metres.

A widening of 5.5 metres will be required into properties. Properties will need to be purchased and remaining area consolidated and resubdivided/developed. (Long Term)

## PUBLIC TRANSPORT

- 9 Promote knowledge of public transport services within the area. (Short Term)
- 10 Bus service run through the area east of Waterdale Road. Route options are via either Bamfield Road or McEwan Road. (Short - Medium Term)
- 11 Investigate providing services between railway stations/Plenty Road tram into estate. (Short Term)
- 12 Indented bus bays in Waterdale Road. Linked with action 8. (Medium Term)

## PARKING (Continued)

- 20 Review compliance of site car parking provision and permits (Short Term)
- 21 Support non-standard car park layouts and standards to maximise on-site provision (On-going)
- 22 Prepare guidelines on car parking provisions for developments within the estate (Short Term)

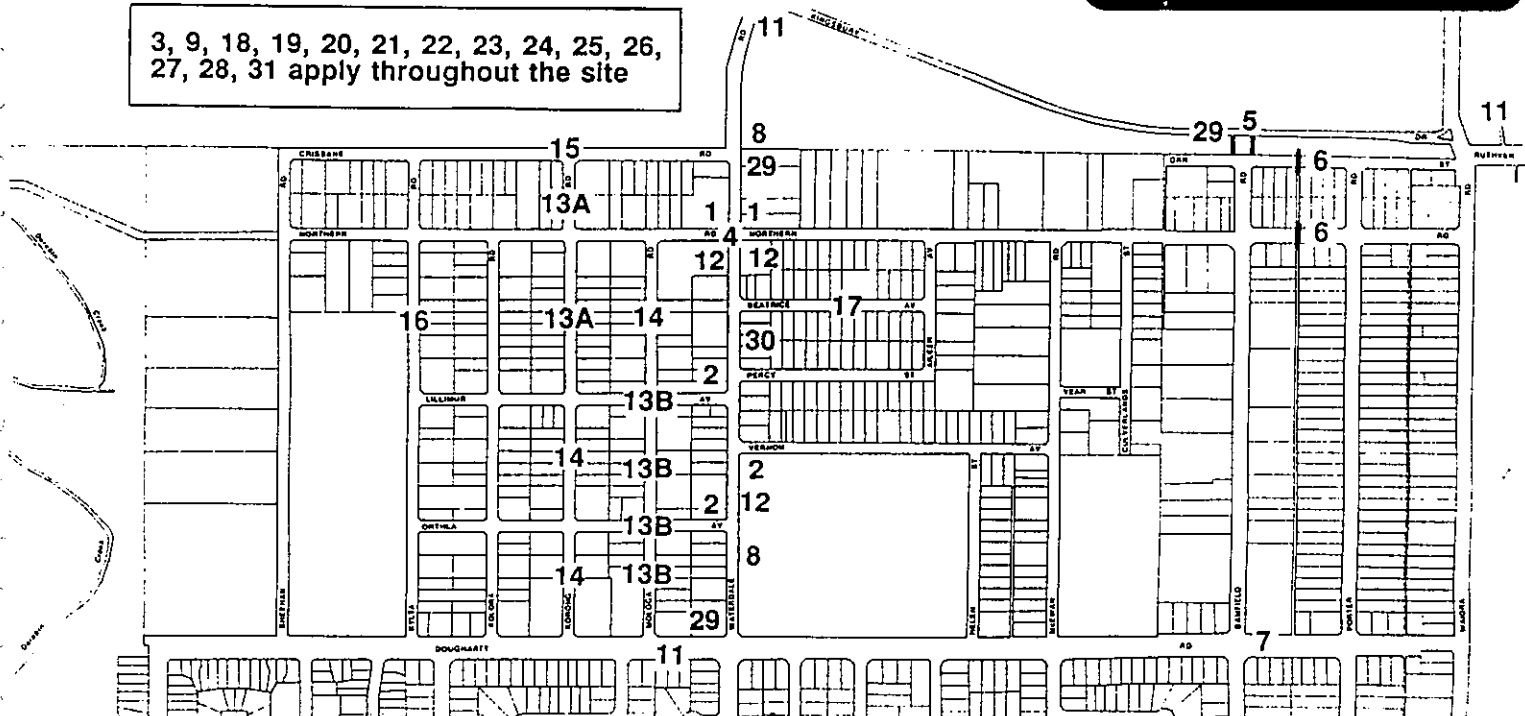
## PARKING

- 13 Provide indented on-street parking treatments. Includes review and consolidation of property accesses. (Short Term)
- 14 Continue indented on-street treatments on remaining sections to provide consistent appearance. (Medium - Long Term)
- 15 Indented angle parking on north side of Crissane Road (Short Term)
- 16 Parking permitted both sides (Short Term)
- 17 Council purchase site within precincts 19/20 (Medium - Long Term)
- 18 Council monitor car parking demand and usage throughout the estate. (On-going)
- 19 Council purchase sites after on-street treatments installed if monitoring indicates deficiency within precinct. (Long Term)

## URBAN DESIGN

- 23 Replace nature strips with pavement treatments. (Short - Medium Term)
- 24 Select street tree species for low maintenance and water requirements. (Short Term)
- 25 Street trees are planted to cater for sightlines at intersections and crossovers. (Short Term On-going)
- 26 Install pavement treatments to co-ordinate with recent treatments. (Short Term)
- 27 Guidelines should be developed so that all proposed developments have a positive influence on the visual image of the estate. (Short Term)
- 28 Major developments should include a streetscape improvement component. (On-going)
- 29 Erect signs at major entry points to the West Heidelberg Industrial Estate. (Short Term)
- 30 Improve the image of Waterdale Road. (Medium Term)
- 31 Set aside open space area for workers within new developments and encourage space in existing sites. (On-going)

3, 9, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31 apply throughout the site



## STRATEGY PLAN

## WEST HEIDELBERG INDUSTRIAL ESTATE

### Car Parking and Traffic Strategy

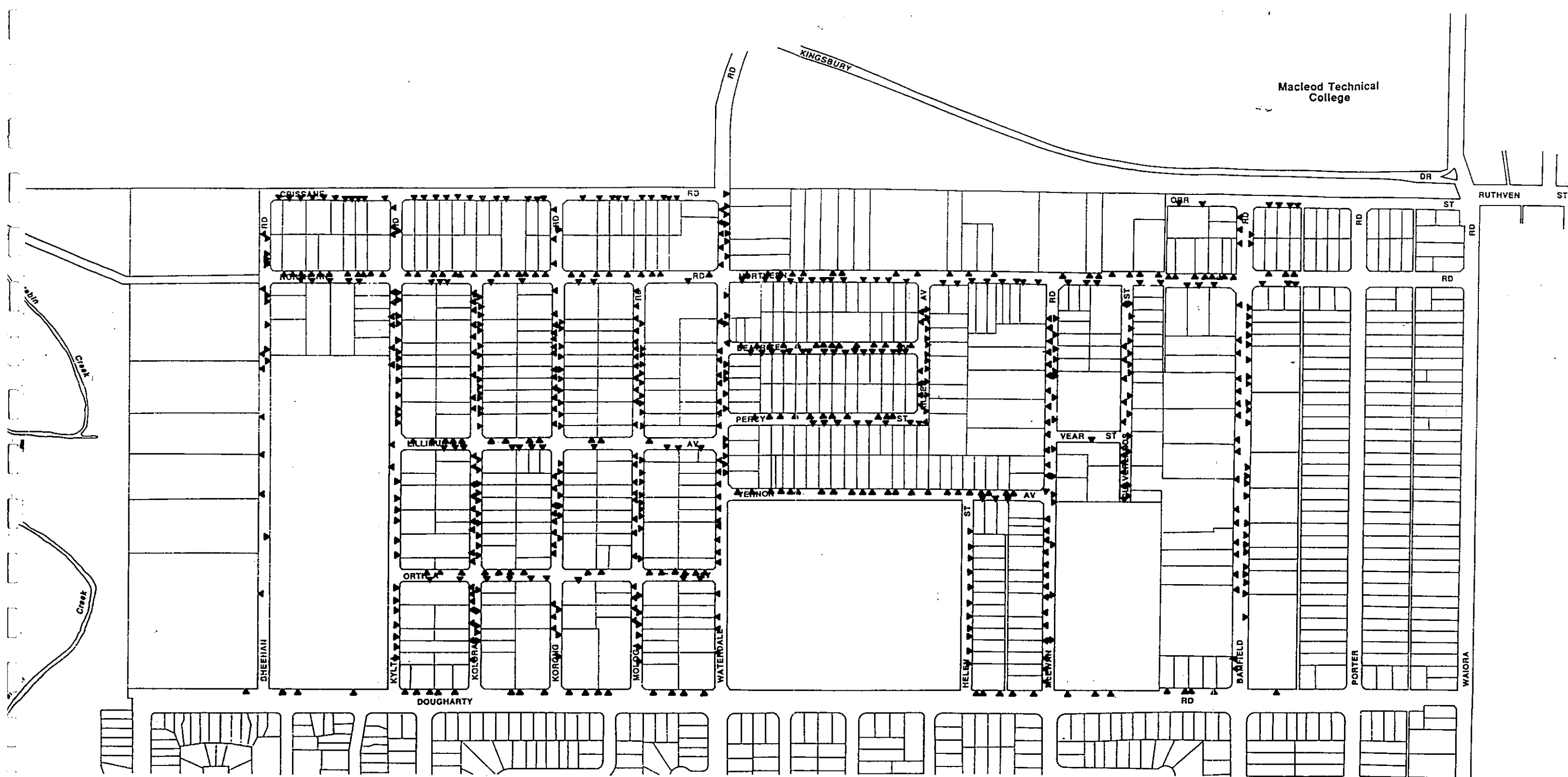
Prepared for Benyule City Council

by: Arup Transportation Planning  
Frank Hanson Pty Ltd Landscape Architects

September 1995



Figure 6.1



**LEGEND**

▲ CROSSOVER LOCATIONS

**CROSSOVER LOCATIONS**

**WEST HEIDELBERG  
INDUSTRIAL ESTATE**

**Car Parking and Traffic Strategy**

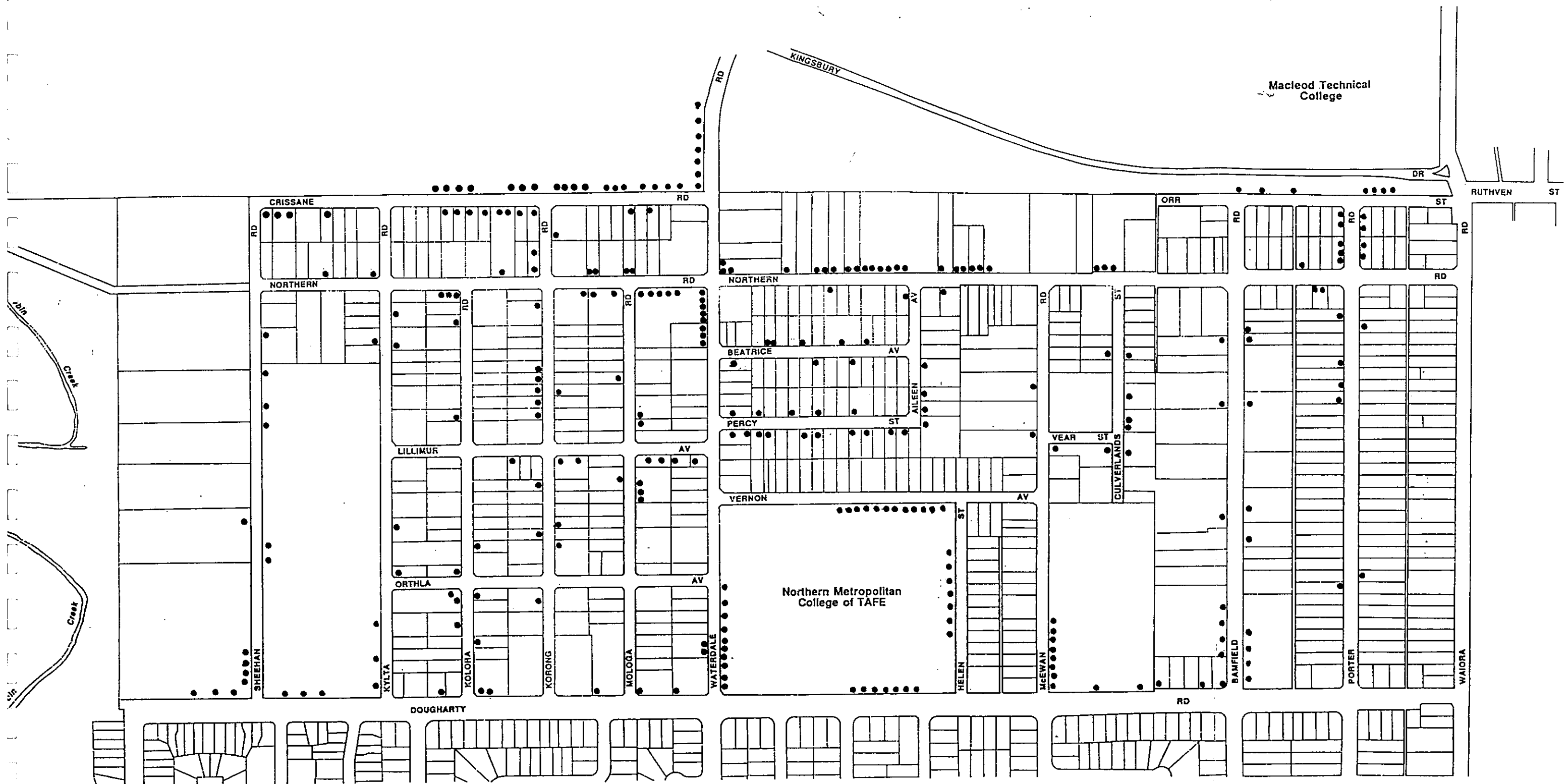
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Frank Hanson Pty Ltd Landscape Architects

March 1996



**Figure 2.7**



# LEGEND

- TREE LOCATIONS

## TREE LOCATIONS

## WEST HEIDELBERG INDUSTRIAL ESTATE

### Car Parking and Traffic Strategy

Prepared for Banyule City Council

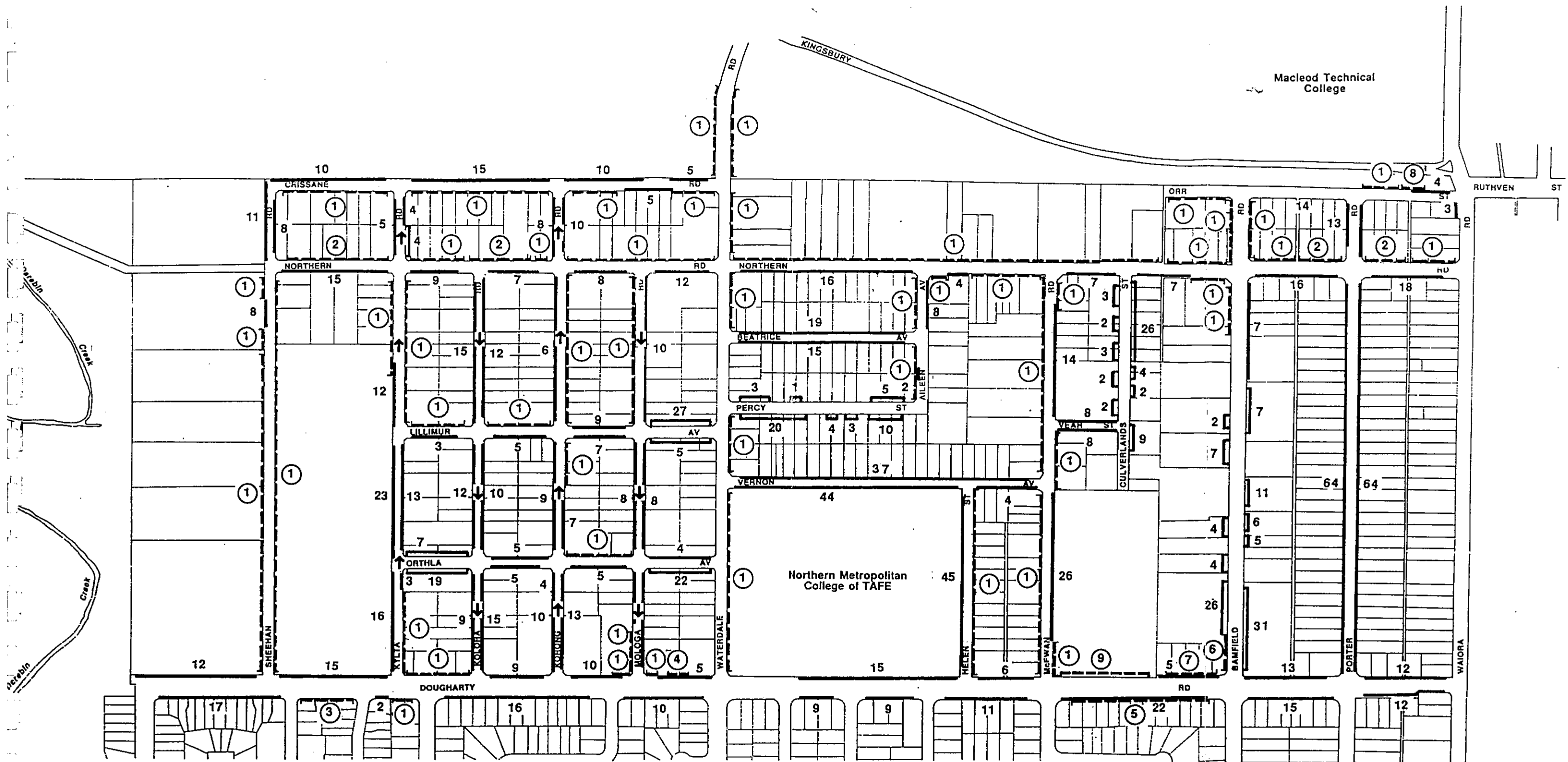
by: Arup Transportation Planning  
Frank Hanson Pty Ltd Landscape Architects

March 1996

0 50 100 250 metres



Figure 2.8



## LEGEND

- ① No Standing
- ② No Standing M-F 7-6  
Sat 7-Noon
- ③ No Standing M-F 8-4
- ④ 2hr Parking M-F 8-5  
Sat 8-Noon
- ⑤ 1/2hr Parking M-F 8-5
- ⑥ 1/2 hr Parking M-F 6-6
- ⑦ 1/4 hr Parking M-F 8-5  
Sat 8-Noon
- ⑧ 1hr Parking
- ⑨ Loading Zone

- On Street Parking
- 8 Number of Spaces
- Parking Restriction
- ① Indented Car Parking
- 2 Number of Spaces

## PARKING RESTRICTIONS AND ON - STREET PARKING

# WEST HEIDELBERG INDUSTRIAL ESTATE

## Car Parking and Traffic Strategy

Prepared for Banyule City Council

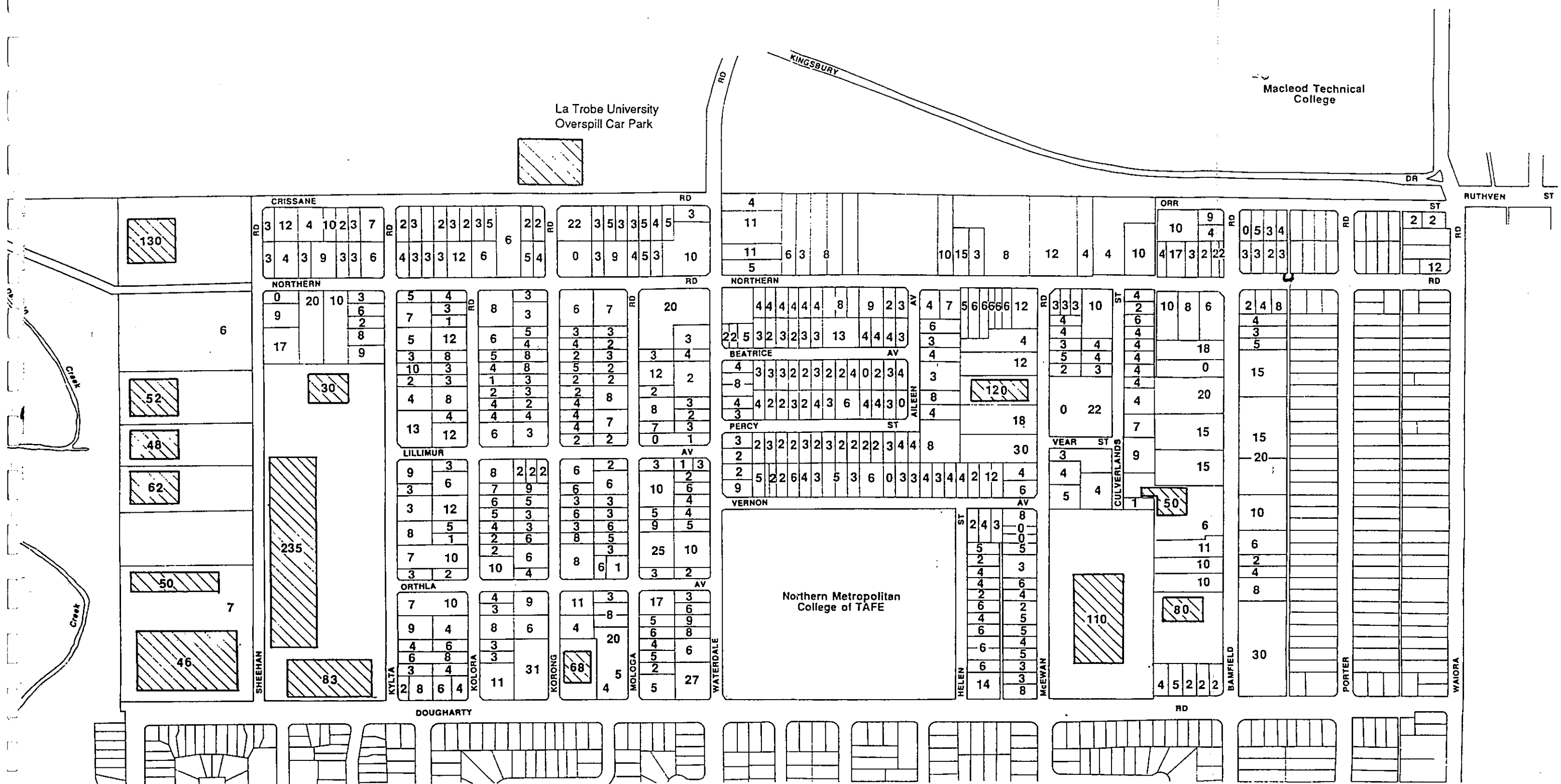
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March 1986


0 50 100 250 metres



Figure 2.9



**LEGEND**

 Large Scale Car Park

2 Number of on-site Parking Spaces

**ON - SITE  
CAR PARKING**

**WEST HEIDELBERG  
INDUSTRIAL ESTATE**

**Car Parking and Traffic Strategy**

Prepared for Banyule City Council  
by: Arup Transportation Planning  
Frank Hanson Pty Ltd Landscape Architects  
March 1996



**Figure 2.10**

## REPORT ISSUE AUTHORISATION

**PROJECT:** WEST HEIDELBERG INDUSTRIAL ESTATE CAR PARKING AND  
TRAFFIC STRATEGY

**Project No:** 9225

Rev	Date	Purpose of Issue/Nature of Revision	Prepared by	Issue Authorised by
	10.9.96 20.11.96	Draft Study Report for Comment Issue of Final Study Report	AKD/TEC TEC	TEC TEC

This report takes into account the particular instructions and requirements of Banyule City Council. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Appendix A Tree Planting in Streets

Appendix B Public Transport Usage for Each Precinct

Appendix C Car Parking Profiles for Each Precinct

## EXECUTIVE SUMMARY

Arup Transportation Planning (Arup) was commissioned by Banyule City Council to undertake a study to identify car parking and traffic issues in the West Heidelberg Industrial Estate and the abutting residential area, and develop a car parking and traffic strategy plan for the area.

The study area is located in the northern environs of Banyule at the municipal boundary with the City of Darebin. The primary study area is formed by the boundaries of Waiora Road to the east, Dougharty Road to the south, Darebin Creek in the west and Crissane Road-Orr Street to the north. Immediately to the north of the area are institutional facilities. The adjacent areas to the east and south are residential.

In the initial phase of the study consultation was carried out with the various interest groups in the area to identify problems perceived by those groups. The groups included residents, property owners, business owners/operators, and the bus companies.

Specific surveys were undertaken of traffic flows and usage of car parking areas in the estate. These surveys along with other information relating to parking restrictions, street widths, car parking space inventory, driveway and tree locations that were collected during on-site inspections, are presented in Section 2.

A review was also undertaken of the Council's Industrial Estate Profile survey which provided information on employment, parking availability, travel mode and loading docks for a proportion of the Estate's industrial premises. The information was aggregated into 28 precincts.

### Identified Issues

From the information collected and discussions, the main points identified were:

#### *Traffic Access*

The Estate is bounded by arterial roads and is a contained area, but is divided by Waterdale Road.

The main access roads to/from the Estate are Waterdale Road and Waiora Road. There is no direct access to the Estate from the only east-west arterial road in the area (Kingsbury Drive).

Waterdale Road is a Principal Traffic Route within VicRoads' traffic and road use programme. An emphasis should be to develop and maintain a good level of service on this road.

The unsignalised intersections of Waterdale Road/Northern Road and Waterdale Road/Crissane Road have very bad levels of service with long delays experienced on the minor streets.

Improvements are required along Waterdale Road to improve the level of service of this principal traffic route. This road is an important regional north-south route as

reflected by its designation as a Principal Traffic Route. The current carriageway is inappropriate for its current operation and the expected increase in traffic flows in the future

The one-way operation of the north-south streets west of Waterdale Road is considered appropriate recognising the ability to provide one-way couplets, the provision of intermediate east-west roads to reduce the length of circulation, the width of the streets, the need to provide on-street parking, the low level of traffic using the streets and the access requirements for commercial vehicles.

### *Characteristics*

The estate predominantly consists of:

- small lots with restricted capability to provide car parking
- a significant number of automotive premises which generate cars from both employees and cars associated with the business.

The key urban design issues in the West Heidelberg Industrial Estate are:

- unattractive buildings or yards
- poorly maintained nature strips (pot-holed and muddied by parking or turning vehicles)
- poorly maintained kerbs and pavements
- a general lack of trees for shade and screening
- cluttered advertising signage.

### *Travel*

The main mode of travel to the estate is by car, with on average over the estate 84% of workers driving to work and only 6% using public transport.

Workers are predominantly from the south of the estate.

### *Car Parking*

Based on the surveys of spaces used both on-site and on-street within each precinct it is considered that the principal precincts requiring additional parking in the short term are precincts 2, 5, 7, 12, 13, 16, 17, 19, 20. Other precincts have been noted, however these listed precincts have been identified from observations of high usage/available spaces on-street.

### *Accidents*

Waterdale Road has an accident rate 20% higher than the mean casualty accident rate for an undivided arterial road (Middleton & Strickland, 1983). This is probably due to the narrow road width, level of turning traffic from Waterdale Road, and the level of delay for traffic trying to access Waterdale Road from the minor streets. The northern section of Waterdale Road (between Crissane Road and Northern Road) has a rate around double the mean rate. The intersection accident rate on Waterdale Road at Northern Road, Crissane Road and Lillimur Avenue are two to three times

the mean intersection rates for comparable intersections, whilst the rate at Beatrice Avenue is about four times.

Actions are required to reduce the delays at the intersections and improve traffic flow along Waterdale Road.

#### *Public Transport*

Although the bus services along Waterdale Road travel to the Latrobe University bus interchange, the three aspects that are noted are:

- the lack of coverage/penetration into the estate
- the lack of linkages and connections with other railway lines
- the need to promote the link between Plenty Road trams via the buses.

### **Aims, Objectives and Principles of the Strategy**

Based on the review of information collected and comments from the consultation phase a set of aims and objectives for the strategy were developed. These are presented in Section 4.

In developing actions to achieve the indicated aims and objectives, a number of principles have been adopted. These principles are listed in Section 4.3 and include aspects such as:

- not to encourage regional traffic onto residential streets south of Dougharty Road
- not encourage regional traffic onto roads within the primary study area which have an emphasis for local access
- visitor car parking is predominantly on-street
- to use existing public road reserves for car parking where possible
- to have consistency in parking restrictions in the estate
- not to install road treatments such as roundabouts and splitter islands that restrict manoeuvring of commercial vehicles on roads within the estate
- all street scapes and urban design treatments must be cost effective and low maintenance while being of high quality
- the area is an industrial estate and therefore on-street loading/unloading and circulating traffic movements are reasonable expectations
- the area is an established estate and major changes involving significant infrastructure within the local precincts is not proposed
- all actions cannot be expected to be funded or undertaken by Council and VicRoads, actions need to be undertaken by business owners/operators.

### **Initiatives**

A range of actions and options within some of the actions were investigated. These actions related to arterial road improvements, intersection improvements, additional car parking areas, improvements to and promotion of public transport, and urban design initiatives. The impacts, options, implications and comments on the respective actions are presented in Section 5.

### Recommended Strategy

The recommended strategy contains actions relating to:

- traffic improvements
- public transport initiatives
- parking initiatives
- urban design initiatives.

Actions must be undertaken within all these areas in order to achieve the aims and objectives of the strategy. The actions have been presented over a period of time.

Due to changes that will occur within the area as premises expand, relocate or change activity, as well as the impacts of the recommended actions, it is important that Council monitors and reviews the car parking, traffic and general activity/appearance of the estate. This will provide scope to either reconsider actions if initial actions achieve better than expected results, or alternatively bring forward actions to provide improvements in areas that have deteriorated.

The strategy actions and time frames are presented in Figure 1.

Table 1 presents indicative costs for the projects within the nominated periods of short term (1 - 3 years), medium term (3 - 5 years) and long term (5+ years).

**Table 1: Indicative Costs for Each Period**

Short Term (1 - 3 years)		Medium Term (3 - 5 years)		Long Term (5+ years)	
Project 1	\$25,000	Project 4	\$100,000	Project 8	\$950,000
Project 2	\$25,000	Project 5	\$180,000		
Project 3	\$10,000	Project 6	\$20,000		
Project 13&14a	\$490,000	Project 7	\$20,000		
Project 15	\$100,000	Project 12	\$40,000		
Project 22	\$5,000	Project 14b	105,000		
Project 27	\$5,000				
Project 29	\$10,000				
<b>Total</b>	<b>\$670,000</b>	<b>Total</b>	<b>\$465,000</b>	<b>Total</b>	<b>\$950,000</b>

*(Projects which would be ongoing actions by council or associated with other projects are 18, 20, 21, 24, 25, 26, 28, 30 and 31. No specific cost has been estimated.*

*Projects which would be investigations and actions by others are 10, 11 and 16.*

*Projects which have unknown costs depending upon actual works are 9, 17, 19 and 23.)*

## TRAFFIC

- 1 Flare eastern and western approaches on Northern Road/Waterdale Road to provide width for two cars. (Short Term)
- 2 Provide width on Lillimur Avenue, Orthia Avenue and Vernon Avenue for two cars at the intersections with Waterdale Road. (Short Term)
- 3 Upgrade line markings and traffic control and parking signs. (Short Term)
- 4 Signalise the intersection of Waterdale Road/Northern Road. (Medium Term)
- 5 Link Bamfield Road to Kingsbury Road. (Medium Term)
- 6 Close Northern Road and Orr Street between Bamfield Road and Porter Road. Linked to action 5. (Medium Term)
- 7 Install treatment at the intersection of Bamfield Road/Dougharty Road to restrict use by through traffic south of Dougharty Road. Linked to action 5. (Medium Term)
- 8 Widen Waterdale Road on the east side to provide footpaths on both sides, nature strips of 1.5 metres, kerb lanes of 4.2 metres and centre lanes of 3.3 metres.  
  
A widening of 5.5 metres will be required into properties. Properties will need to be purchased and remaining area consolidated and resubdivided/developed. (Long Term)

## PUBLIC TRANSPORT

- 9 Promote knowledge of public transport services within the area. (Short Term)
- 10 Bus service run through the area east of Waterdale Road. Route options are via either Bamfield Road or McEwan Road. (Short - Medium Term)
- 11 Investigate providing services between railway stations/Plenty Road tram into estate. (Short Term)
- 12 Indented bus bays in Waterdale Road. Linked with action 8. (Medium Term)

## PARKING (Continued)

- 20 Review compliance of site car parking provision and permits (Short Term)
- 21 Support non-standard car park layouts and standards to maximise on-site provision (On-going)
- 22 Prepare guidelines on car parking provisions for developments within the estate (Short Term)

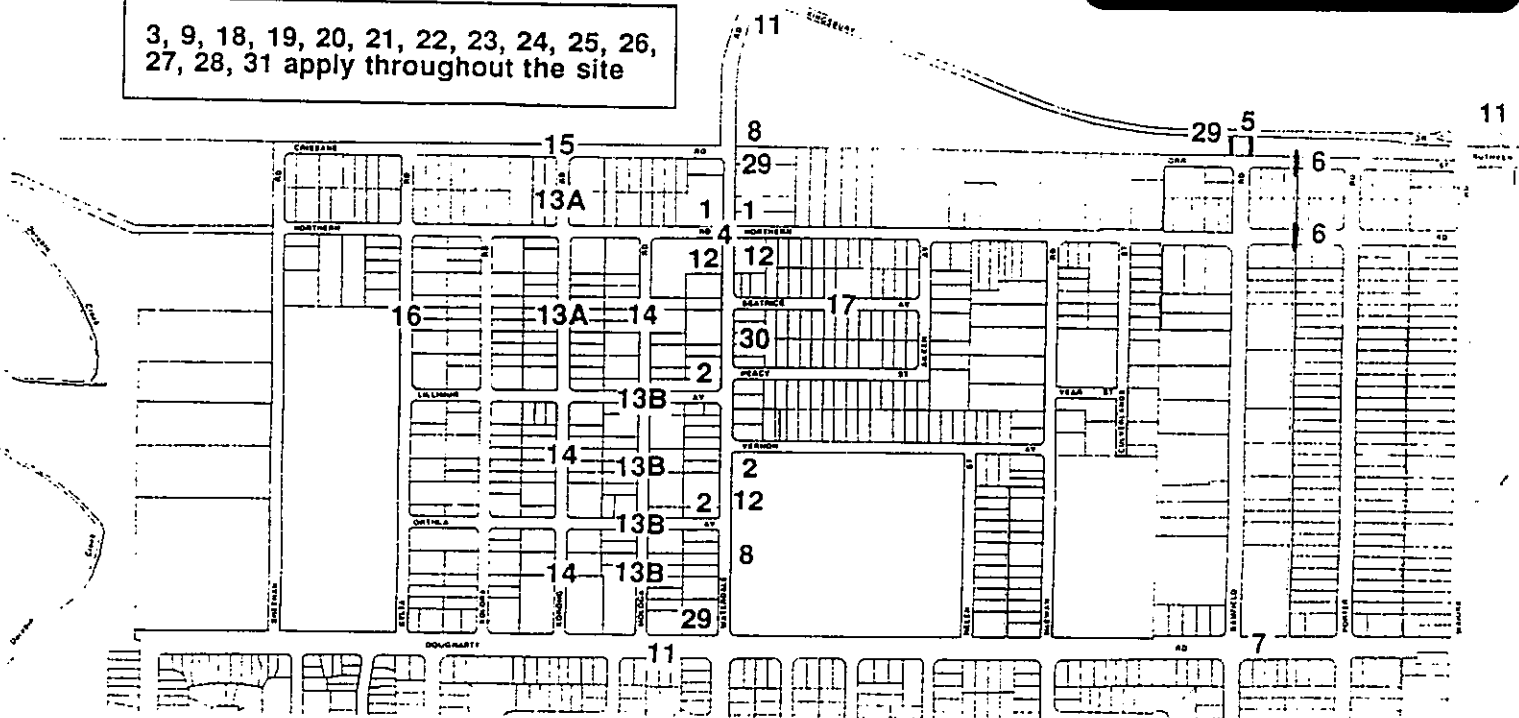
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## URBAN DESIGN

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- 24 Select street tree species for low maintenance and water requirements. (Short Term)
- 25 Street trees are planted to cater for sightlines at intersections and crossovers. (Short Term On-going)
- 26 Install pavement treatments to co-ordinate with recent treatments. (Short Term)
- 27 Guidelines should be developed so that all proposed developments have a positive influence on the visual image of the estate. (Short Term)
- 28 Major developments should include a streetscape improvement component. (On-going)
- 29 Erect signs at major entry points to the West Heidelberg Industrial Estate. (Short Term)
- 30 Improve the image of Waterdale Road. (Medium Term)
- 31 Set aside open space area for workers within new developments and encourage space in existing sites. (On-going)

3, 9, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31 apply throughout the site



## STRATEGY PLAN

## WEST HEIDELBERG INDUSTRIAL ESTATE

### Car Parking and Traffic Strategy

Prepared for Banyule City Council

by: Arup Transportation Planning  
Frank Hanson Pty Ltd Landscape Architects

September 1996



Figure 1

## 1. INTRODUCTION

Arup Transportation Planning (Arup) was commissioned by Banyule City Council to undertake a study to identify car parking and traffic issues in the West Heidelberg Industrial Estate and the abutting residential area, and develop a car parking and traffic strategy plan for the area.

The study area is located in the northern environs of Banyule at the municipal boundary with the City of Darebin. The primary study area is formed by the boundaries of Waiora Road to the east, Dougharty Road to the south, Darebin Creek in the west and Crissane Road-Orr Street to the north. Immediately to the north of the area are institutional facilities. The adjacent areas to the east and south are residential.

### 1.1 Background

The West Heidelberg Industrial Estate is an important area in terms of both the municipality and on a wider metropolitan scale. In addition to the estate being one of the municipality's major industrial areas it was also identified as an area of significant industrial activity in the Department of Planning and Development's policy document "Living Suburbs" published in 1995.

Concern has been raised about the ability of the Industrial Estate to grow, mainly due to infra structural constraints restricting the activities of the sites. The West Heidelberg Estate was previously a residential subdivision which meant that the initial industrial subdivision was based on small plots and residential type roads. This has consequently caused problems for site development, access and provision of site facilities.

This is one of the broad issues relating to the estate however other more specific issues prompted this study. Particular issues related to car parking in the area have been noted, including an overflow of car parking from some premises and on-street parking being restricted by the large number of crossovers and various parking restrictions. The size of the site area restricts the scope for on-site parking. Other traffic issues identified were delays in accessing from side streets onto Waterdale Road and general access problems for larger commercial vehicles.

A LATM study was undertaken for the area south of Dougharty Road in 1994. The only study to specifically look at the industrial estate was the West Heidelberg Industrial Estate Strategy (August 1986) which recommended several actions, of which only a few have been implemented.

### 1.2 Scope of report

The objective of the study is to review the existing traffic and car parking situation within the West Heidelberg Industrial Estate and its abutting residential environs and recommend actions to address the parking and traffic concerns in the area. These actions would be provided for implementation within short, medium and long term time frames.

In the initial phase of the study consultation was carried out with the various interest groups in the area to identify problems perceived by those groups and possible solutions. The businesses of the Industrial Estate, through a meeting of a Working Group



consisting of business representatives of the Estate, were consulted. The residents from the eastern precincts and those who live on Dougharty Road were contacted and invited to a public meeting and the bus companies who run services through the study area were also consulted for their views.

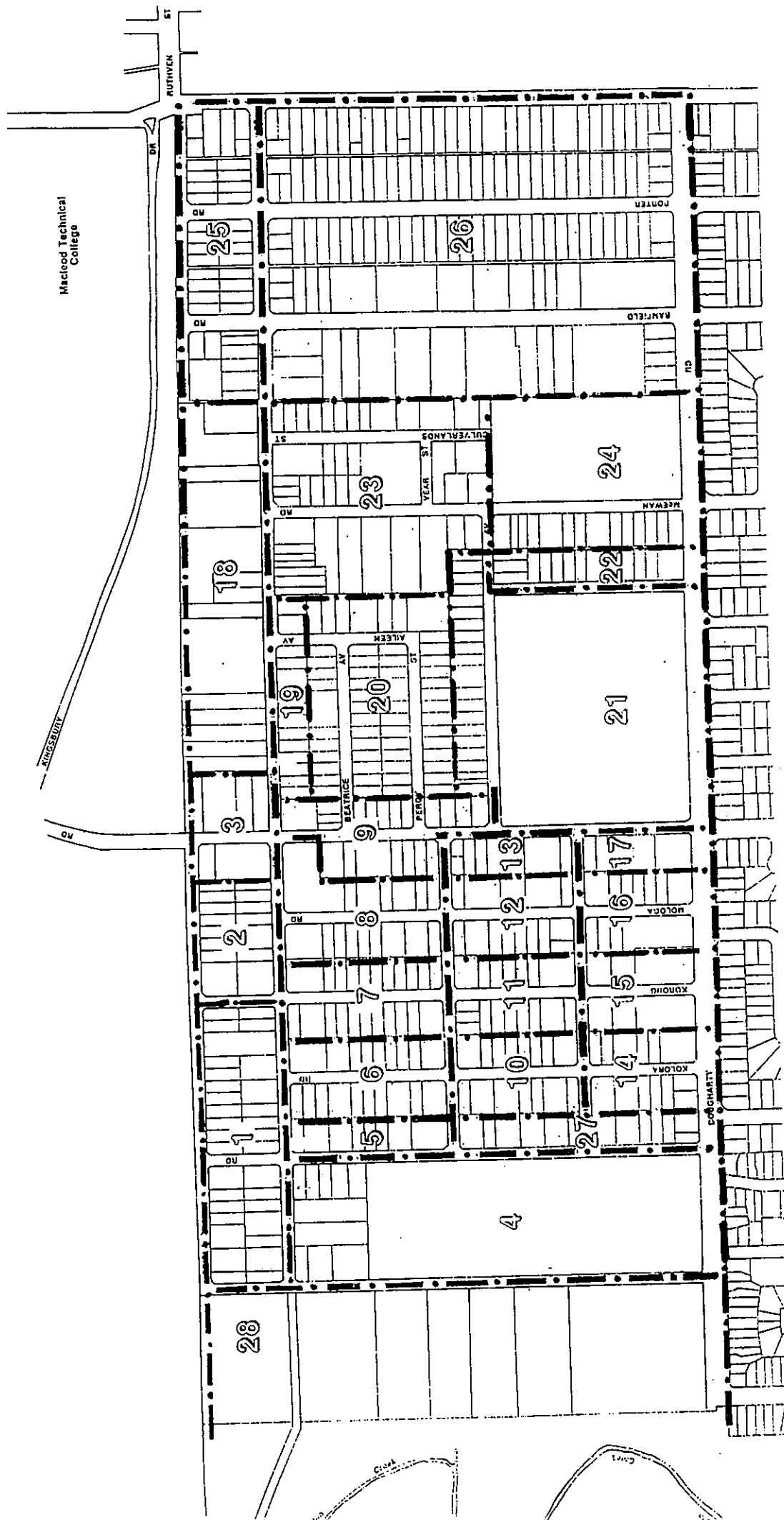
Data was collected to analyse the issues raised as part of the discussion sessions. Traffic counts were undertaken on Wednesday 27th March at fourteen intersections in the primary study area. These included vehicle classification counts which identified the level of commercial vehicle activity in and out of the area. On Thursday 28th March car parking surveys were undertaken to collect data identifying the levels of on-street and on-site parking in the study area through the day.

The results of these surveys along with other information relating to parking restrictions, driveway and tree locations that were collected during on-site inspections, are presented in this report.

A review was also undertaken of the Council's Industrial Estate Profile survey which provided information on employment, parking availability, travel mode and loading docks for a proportion of the Estate's industrial premises. The information was aggregated into 28 precincts as shown in Figure 1.1. These precincts to a large extent try to use property lines as boundaries, thereby maintaining sections of road within one precinct.

The issues have been summarised and objectives of a strategy for the area prepared. Actions were developed relating to the respective objectives.

Recommended actions are presented with time frames and indicative costs.



PRECINCT PLAN

# **WEST HEIDELBERG INDUSTRIAL ESTATE**

**Car Parking and Traffic Strategy**

Prepared for Banyule City Council  
by: Arup Transportation Planning  
Frank Hansen Pty Ltd (endorsement) 10/10/10  
March 1996



Figure 1.1

## 2. EXISTING CONDITIONS

### 2.1 Precinct Access

The principal access roads to the area are Waterdale Road, which runs north-south through the middle of the industrial area, and Waiora Road which also runs north-south and forms the eastern boundary of the study area. To the north of the area both these roads have intersections with a third principal access route, Kingsbury Drive which is an east-west arterial. Dougharty Road is also an east-west road and forms the southern boundary of the primary study area.

Regional access to the site is constrained by several physical features including Darebin Creek which restricts access to and from the west as there are no crossings of the creek between Plenty Road and Southern Road. A barrier is formed by the Hurstbridge railway line which restricts access from the east, no crossings exist between Ruthven Street and Lower Plenty Road. The location of LaTrobe University campus and several hospitals to the north mean there is no direct access to the north.

Waterdale Road, Kingsbury Drive and Waiora Road are all VicRoads declared main roads. Council's road hierarchy classifies these roads as primary arterial roads while the other main road in the study area, Dougharty Road is a secondary arterial road. The road network within the study area forms a grid with a series of north-south one-way streets west of Waterdale Road and two-way streets on the eastern side.

Waterdale Road is a Principal Traffic Route within VicRoads' traffic and road use management programme. These roads are selected based on:

- forming a connective network of primary arterial roads
- connecting centres of major business activity, manufacturing areas, warehousing/distribution centres, and high value goods production and distribution
- breaching travel barriers such as rivers, creeks, railways, freeways and major arterial roads.

Waterdale Road fulfills these characteristics.

The National Bus Company and Ivanhoe Bus Company run buses along Waterdale Road and Waiora Road through the study area. The latter has a depot on the corner of Waterdale Road and Dougharty Road. The majority of these routes terminate at LaTrobe University. The Ivanhoe services originate in areas south of the municipality such as Heidelberg and Northland Shopping Centre, whilst the National services are from the City. There are no other modes of public transport that directly service the study area.

#### **Main Points**

*The Estate is bounded by arterial roads and is a contained area, but is divided by Waterdale Road.*

*The main access roads to/from the Estate are Waterdale Road and Waiora Road. There is no direct access to the Estate from the only east-west arterial road in the area (Kingsbury Drive).*

*Waterdale Road is a Principal Traffic Route within VicRoads' traffic and road use programme. An emphasis should be to develop and maintain a good level of service on this road.*

## **2.2 Characteristics of the Area**

### **2.2.1 General**

Although the area was previously residential, it now consists primarily of industrial uses. The area to the east of Bamfield Road encompassing Porter Road, the western side of Waiora Road and the eastern sections of Orr Street and Northern Road being consolidated residential development.

The industrial estate is almost fully developed except for the Ministry of Education site at the Dougharty Road and Waterdale Road intersection for which some planning permits have been issued to allow office/warehouse type development. Another large unoccupied site exists abutting the west side of Sheehan Road. The ICI site on Northern Road near Aileen Avenue is another lot where some additional development could be undertaken in the future.

A majority of the activity is light industrial and although the emphasis is on small lot development there are several large premises. The latter are primarily located towards the western sector abutting Sheehan Road and to a lesser extent along Bamfield Road. Based on data from the Industrial Profile Survey the average site area of lots abutting Sheehan Road was 37,500 m<sup>2</sup> whilst for the rest of the industrial area it was 5,180m<sup>2</sup>.

A significant number of the small lot businesses are automotive repair. Across the estate 19% of the businesses profiled were directly involved in repairs and a number of other businesses were involved in other related industries like machine tool manufacture and metalwork.

Across the estate the average number of people per business employed between 9am and 3pm was approximately 10. The precincts incorporating the larger sites exhibited higher employee numbers, with the precincts abutting Sheehan Road employed an average of 35 people per business between 9am and 3pm and those on Bamfield Road 23 people per business. In the middle of the western area, the precincts along Mologa, Kolara and Korong Roads are smaller businesses with an average number of employees per business of 10.

It was perceived by 61% of the businesses surveyed in the industrial profile surveys that the businesses were growing. It was also indicated by 34% of respondents that their current floor space was inadequate.

From the WHIE Industrial Survey, 53% of businesses surveyed had their own loading bay on-site, whilst 12% accept and 18% deliver goods from on the street. The trend across the estate was that large sites generally had loading bays. These tended to be sites of 15,000m<sup>2</sup> or more. All the surveyed businesses abutting Sheehan Road and Bamfield Road had internal loading dock facilities.

#### **Main Points**

*The estate predominantly consists of:*

- *small lots with restricted capability to provide car parking*
- *a significant number of automotive premises which generate cars from both employees and cars associated with the business.*

*The Estate is extensively developed, with the principal site that will generate additional traffic and car parking demands being the Ministry of Education site on the north-east corner of Dougharty Road/Waterdale Road.*

### 2.2.2 Image/Urban Design

The key urban design issues in the West Heidelberg Industrial Estate are:

- unattractive buildings or yards
- poorly maintained nature strips (pot-holed and muddied by parking or turning vehicles)
- poorly maintained kerbs and pavements
- a general lack of trees for shade and screening
- cluttered advertising signage.

#### Buildings

In general, the appearance of built form within the estate is second rate. The combination of poor design, cheap construction and the multitude of businesses/factories on small allotments often give a cluttered unattractive presentation to the street. In addition, yards, loading bays and car parks associated with the premises are often poorly screened or not screened at all and are often in an unsightly condition.

#### Nature Strips and Kerbs

One of the most unattractive aspects of the estate is the presence of muddied and pot-holed nature strips surrounded by crumbling kerbs due to illegal parking. In addition the grass on these nature strips is often poorly maintained. Contributing to these problems is the poor access to car parking areas on sites which requires vehicles to mount kerbs and cross nature strips/footpaths with resulting damage to these surfaces.

#### Vegetation

The original street tree planting, probably dating back to the 1970's, consists almost entirely of Australian native species. This planting is especially prevalent in the western side of the estate. A large number of species have been used, often in the same street, which give a disjointed effect. Some of these plantings are now past maturity and will require replacement. In addition, the dense low habit of many of these species impedes sightlines for traffic within the estate exiting or entering properties.

In the last decade a number of advanced deciduous trees have been planted including the following species:

- *Pyrus callaryana 'Red Spire' (Ornamental Pear variety)*

- Quercus robur fastigiata (Cypress Oak)
- Quercus palustris (Pin Oak)
- Liquidamber styraciflua

A full listing of street trees by species and by street is contained in the tables in Appendix A.

The planning requirement for a 3 metre garden buffer strip for all industrial land within the former City of Heidelberg has resulted in poorly maintained and ineffectual strip planting. Greater flexibility in such controls may contribute to more imaginative design solutions in the future.

### Signage

The number, placement and design of existing signs contributes to a cluttered look. This is especially noticeable in Waterdale Road where the signage contributes to an image that is in sharp contrast to the other leafy residential stretches of the road.

### Recent Streetscape Treatments

In the last decade (after the West Heidelberg Industrial Estate Strategy 1986) a series of streetscape treatments have been implemented. These relate to provision of:

- asphalt-paved 90 degree angle parking bays.
- parallel parking bays paved in unit pavers
- coloured (red brown) asphalt sometimes in conjunction with plain ruled concrete in pedestrian areas
- advanced street trees in newly paved areas
- protective bollards to trees
- seating.

These treatments have, in general, had a positive effect on the amenity and appearance of the estate. The provision of clearly defined parking bays has overcome some problems of haphazard parking in the areas where they occur.

The seating that has been provided does not appear to be used. There is a tendency for workers to cluster on the footpaths outside their work places against walls or fences at lunchtimes.

### **Main Points**

*The key urban design issues in the West Heidelberg Industrial Estate are:*

- *unattractive buildings or yards*
- *poorly maintained nature strips (pot-holed and muddied by parking or turning vehicles)*
- *poorly maintained kerbs and pavements*
- *a general lack of trees for shade and screening*
- *cluttered advertising signage.*

### 2.2.3 Travel Characteristics

The WHIE Industrial survey data indicated that 84% of employees who worked between 9 am and 3 pm drove a car to work. Across the estate this number of cars cannot be absorbed by the level of on-site parking spaces designated for staff. An analysis on a precinct basis highlights that it is not a problem throughout the estate.

Across the estate 6% of employees indicated that they utilised public transport in travelling to work, with buses providing the only direct public transport mode. The highest proportion of public transport users on a precinct basis were found in the area west of Waterdale Road, where there is a deficiency of on-site parking. Precinct 11 (Korong Road between Orthla and Lillimur Avenues) had the highest proportion of public transport users, 19%. The precincts east of Waterdale Road showed much lower utilisation rates with a maximum of 6%. Appendix B shows the utilisation of public transport by employees on a precinct basis.

The primary catchment area of people working in the estate is in the municipality of Banyule and other areas north of Melbourne. Around 45% of the workers in the Estate are from within the municipality which orientates traffic to/from the south. A further 25% are resident in other parts north of Melbourne.

Table 2.1 indicates the relative demand/supply of car parking based on the industrial profile survey. This indicates a greater level of deficiency in precincts within the central core west of Waterdale Road, and the precincts immediately to the east of Waterdale Road.

#### **Main Points**

*The main mode of travel to the estate is by car, with on average over the estate 84% driving to work and only 6% using public transport.*

*Workers are predominantly from the south of the estate.*

### 2.3 Existing Traffic Flows

Traffic flows were collated for the area based on surveys undertaken at the intersections indicated on Figure 2.1 over the period 7am - 6pm. Full counts were conducted at the major signalised intersections to identify the levels of through traffic and local road turning counts were conducted at the smaller intersections to gauge the levels of traffic accessing the industrial estate. Figure 2.2 shows the 11 hour volumes and also the proportion of commercial vehicles.

**Table 2.1 Relative Demand and Available Spaces On-site Based on Profile Survey**

	No. staff drive to work	No. On-site parking spaces	Deficiency(-)/Surplus(+)	
				Percentage
1	51	80	+29	+57
2	39	27	-12	-30.8
3	32	7	-25	-78.1
4	56	64	+8	14.3
5	31	29	-2	-6.5
6	21	28	+7	33.3
7	22	12	-10	-45.5
8	43	55	+12	+27.9
9	20	22	+2	+10
10	12	10	-2	-16.7
11	32	31	-1	-3.1
12	27	8	-19	-70.4
13	56	70	+14	+25.0
14	4	4	0	0
15	53	27	-26	-49.1
16	5	12	7	+140
18	7	7	0	0
19	19	12	-7	-36.8
20	115	98	-17	-14.8
21	23	14	-9	-39.1
22	16	11	-5	-31.3
23	48	43	-5	-10.4
24	17	20	+3	+17.6
25	3	8	+5	+166.7
26	117	78	-39	-33.3
27	26	32	+6	+23.1
28	25	38	+13	+52
Estate	920	847	-73	-7.9

\* No responses recorded for Precinct 17



The peak periods for the morning and afternoon were identified. These are shown in Figures 2.3 - 2.5. In the afternoon there are two peaks: regionally related traffic peaks in the period 4.30 - 5.30 pm, whilst local activity peaks in the period 3.30 - 4.30 pm. Table 2.2 below indicates the level of traffic in these two peak periods. The earlier peak has higher volumes of traffic turning onto the arterials with a lower volume of through traffic on the arterial, whilst the later peak has higher volumes of arterial traffic but lower turning volumes.

**Table 2.2 Traffic Flows in Afternoon Peak Periods**

	Intersection	Total turning vehicles	
		3.30 - 4.30PM	4.30 - 5.30PM
Local Intersections	Waterdale-Crissane	221	174
	Waterdale-Northern	335	280
	Waterdale-Lillimur	128	173
	Waterdale-Vernon	137	78
	Waterdale-Orthla	92	112
	Dougharty-Sheehan	293	211
	Dougharty-Kylta	87	53
	Dougharty-McEwan	196	185
	Dougharty-Bamfield	237	165
	Waiora-Northern	292	321
Strategic Intersections	Waterdale-Dougharty	2091	2667
	Waterdale-Kingsbury	3114	4318
	Waiora-Kingsbury	2624	3463
	Waiora-Dougharty	1876	2250

Although the peak hour for regional and commuter traffic is later in the afternoon there is an earlier peak for local turning movements which is consistent with factory hours. The exceptions are the intersections with Waterdale Road at Lillimur Avenue and Orthla Avenue which provide access for many of the smaller lot businesses to the west of Waterdale Road and Waiora Road/Northern Road.

These areas have less shift work, whilst many of the larger factories in the eastern and western precincts do. 75% of the surveyed firms' employees are employed on normal working hours in the central precincts immediately west of Waterdale Road area, compared to 65% in the eastern and western precincts. These variations in working hours may account for slight differences in flows, although this does not affect the general trend.

Commercial traffic represents around 5% of total traffic on the arterial roads, whilst on streets in the estate is 10% - 20%. The proportion of commercial traffic varies through

the day.

**Table 2.3 Proportion of Commercial Vehicles In Daily Traffic Flows**

	Northbound /Eastbound (%)	Southbound/ Westbound (%)	Total (%)
Waterdale Rd. (North of Dougharty Road)	6	4	5
Waioara Rd. (South of Kingsbury Dr.)	3	3	3
Waterdale Rd. (South of Kingsbury Dr.)	6	7	6
Northern Rd. (West of Waterdale Rd.)	17	16	16
Northern Road (East of Waterdale Rd.)	12	15	13
Lillimur Av. (West of Waterdale Rd.)	13	13	13
Vernon Av. (East of Waterdale Rd.)	-	12	12
Orthla Av. (West of Waterdale Rd.)	13	10	11
Sheehan Rd. (North of Dougharty Rd.)	17	14	14
Kylta Rd. (North of Dougharty Rd.)	15	NA	15
McEwan Rd. (North of Dougharty Rd.)	21	18	20
Bamfield Rd. (North of Dougharty Rd.)	21	18	19

The intersections were analysed using SIDRA to obtain an indication of their level of service. The degree of saturation reflects the level of congestion and delay on the road network during the peak periods.

Waterdale Road/Kingsbury Drive in the pm peak and Waioara Road/Kingsbury Drive in both peak periods exhibit very poor levels of service with a degree of saturation of around 1.0. The intersection of Waterdale Road /Dougharty Road operates well during both morning and afternoon peaks. Delays and congestion occur on Waterdale Road due to the high volume of traffic turning into the local streets and abutting properties with Waterdale Road only one lane in each direction.

A greater level of congestion is noted on the northern section of Waterdale Road at the intersections with Northern Road and Crissane Road. These problems relate mainly to traffic trying to turn into and from Waterdale Road and at Northern Road the through movement to the opposite section of Northern Road.

The intersections on Dougharty Road with Sheehan, Kylta, Oriel, Bamfield and McEwan Roads are operating at levels well within their capacities.

**Table 2.4 Peak Hour Analysis of Surveyed Intersections**

Intersection	AM Peak			PM Peak (4.30 - 5.30 pm)		
	Degree of Saturation	Delay (sec/veh)	Level of Service *	Degree of Saturation	Delay (sec/veh)	Level * of Service
Waterdale / Dougharty	0.53 (Waterdale NB T)	16	B	0.70 (Dougharty EB)	18	B
Waterdale / Kingsbury	0.89 (Kingsbury EB and WB RT's)	30	C	1.0 (Waterdale SB LT)	46	D
Waiora / Dougharty	0.91 (Waiora Rd. SB RT)	23	C	0.77 (Waiora NB LT,T)	19	B
Waiora / Kingsbury	1.0 (Kingsbury EB RT)	61	E	1.0 (Waiora NB, LT and T)	75	E
Waterdale / Crissane				1.0 (Crissane RT)	50	F
Waterdale / Northern				1.0 (Northern WB T,RT)	54	F
Waterdale / Lillimur				0.71 (Waterdale SB)	35	E
Waterdale / Orthla				0.71 (Orthla LT)	25	D
Waterdale / Vernon				0.69 (Vernon RT)	22	D
Dougharty /Bamfield				0.28 (Bamfield SB)	4	A
Dougharty / McEwan				0.42 (McEwan SB)	5	A
Dougharty / Oriel				0.35 (Dougharty EB)	12	A
Dougharty / Sheehan				0.31 (Sheehan SB)	6	A

\* Level of Service

- A Very good operation
- B Very good operation
- C Good operation
- D Acceptable operation
- E Poor operation
- F Bad operation

### **Main Points**

*There are two peak periods in the afternoon. One associated with traffic generated from the estate in the period 3.30 - 4.30 pm and the other associated with regional traffic in the period 4.30 - 5.30 pm.*

*Commercial vehicle traffic represents 10 - 20% of traffic using the roads within the Estate, with McEwan Road and Bamfield Road comprising 20% and 19% in the eastern precincts and Northern Road comprising 16% in the western precinct.*

*The arterial road intersections of Waterdale Road/Kingsbury Drive (pm peak) and Waiora Road/Kingsbury Drive are operating at capacity.*

*The unsignalised intersections of Waterdale Road/Northern Road and Waterdale Road/Crissane Road have very bad levels of service with long delays experienced on the minor streets.*

*Improvements are required along Waterdale Road to improve the level of service of this principal traffic route.*

## **2.4 Road Network Characteristics**

To the west of Waterdale Road there are a series of one-way streets running in a north-south direction for their entirety with Mologa and Kolora Roads running north to south and Korong and Kylta Roads south to north. Apart from Beatrice Avenue and Percy Street which are one-way west-east and east-west respectively the roads east of Waterdale Road facilitate traffic movements in both directions.

The roads in the study area can be classified in terms of three standards. The widest road in the study area is Dougharty Road which has a pavement width of 12 metres and between property lines is approximately 20 metres wide including a nature strip on both sides. Waterdale, Northern, Kylta, McEwan and Bamfield Roads all have pavements widths of approximately 8 metres. All the other roads in the area are between 7.3 and 7.7 metres wide. Apart from Bamfield Road where on-street parking has cut into its nature strip all the other roads have a nature strip between the footpath and the road pavement. To the west of Waterdale Road the nature strips tend to be wider on the north-south roads than the east-west roads. The widths of the roads in the study area are indicated in Figure 2.6.

The layout of the West Heidelberg Estate is characterised by numerous crossovers. Each individual site has at least one crossover with sometimes a second being shared with the adjacent site. What is also clear is that where lots have been amalgamated to form a larger site this has not necessarily been followed by a removal of the kerbside accesses. The location of the crossovers are illustrated in Figure 2.7.

The smaller streets running north-south between Orthla Avenue and Northern Road west of Waterdale Road and Beatrice and Vernon Avenues have accesses which are more than sufficient to service current conditions.

There appears to be potential to remove or consolidate some of the accesses. One option could be to reduce the number of kerbside accesses per site and introduce some shared accesses to provide more contiguous kerbside space to be designated for

parking. The location of trees in the estate is another aspect to be considered when considering on-street parking. Figure 2.8 shows the location of trees.

On-street parking is discussed in Section 2.5.

### **Main Points**

*The one-way operation of the north-south streets west of Waterdale Road is considered appropriate recognising the ability to provide one-way couplets, the provision of intermediate east-west roads to reduce the length of circulation, the width of the streets, the need to provide on-street parking, the level of traffic using the streets is low and the access requirements for commercial vehicles.*

*There are excessive numbers of cross overs to some sites which could be rationalised to provide scope for better access to the site and additional kerb space for on-street car parking.*

## **2.5 Car Parking**

The industrial profile survey indicated that, estate wide, there were approximately seven parking spaces on site for staff and a further two for visitors. The highest average number of spaces were found along Sheehan Road with an average 28 on-site parking spaces provided, while surveyed sites along Kolora and Korong Road had an average of 5 and 6 spaces respectively.

51% of respondent firms had some element of on-street staff parking.

### **On-street Parking**

The on-street parking restrictions are shown in Figure 2.9. No standing restrictions cover the north side of Northern Road, almost the entire length of Sheehan Road on both sides, the western side of McEwan Road and the southern edge of Crissane Road as well as sections of Helen Street, Orthla and Lillimur Avenues and Kylta Road. Limited no standing restrictions exist along parts of Dougharty and Northern Roads and restricted parking exists in some areas principally in the vicinity of the estate's milk bars.

On-street parking in the estate consists mainly of kerbside parallel spaces although several streets have parking bays. At the present time combinations of angled and parallel bays are located on Orthla Avenue, Lillimur Avenue, Percy Street, Culverlands Street, Bamfield Road and along a small part of Kylta Road. These bays are shown in Figure 2.9 and they contribute approximately 286 spaces which forms 19% of the estate's on-street parking supply.

Under the conditions of the planning permit for the Ministry of Education site there is a requirement to provide a 5.0 metre wide strip of land along the Vernon Avenue frontage of the site for indented parking treatments.

On-site parking (see Figure 2.10) through a large part of the estate is restricted to the immediate frontage of the sites. Some of the newer larger sites along Sheehan Road have their own large car parks such as Nilsens and Fraser-Jenkinson. VDO on Northern Road maintain a car park in McEwan Road as do Stanley's in Bayfield Road. It is clear from Figure 2.10 that the large areas of off-street parking are located in the peripheral

areas of the estate and that the smaller lot sizes in the middle precincts have capacity for only small numbers of car parking spaces.

### Surveys of Car Parking Usage

Analysis of the survey results for on and off street parking over the day indicated a peak occupancy level in the morning between 10 and 11am and in the afternoon between 2 and 3 pm. Table 2.5 shows the overall occupancy for on-street and off-street parking during the peak periods.

**Table 2.5 Occupancy of Estate Car Parking Supply At Peak Times**

	Time Period	
	10-11am	2-3pm
On-Street	57%	56%
Off-Street	63%	62%
Overall	61%	60%

For the survey period the median level of off-street parking across the estate was 60% and for on-street parking 51%.

Figure 2.11 shows the relative areas of deficiency and surplus across the study area for the period of maximum occupancy 10-11am. The results should be considered in terms of relativity rather than absolute deficiency. It was noted during site inspections and on the day of the survey that cars were often, particularly on or near small sites, parked in difficult to access places (eg vehicles crammed onto site frontages).

The pattern that emerges is that the precincts with a surplus of car parking are those on the periphery of the estate. These are also the areas with large areas of off-street parking. The congested nature of the area immediately west of Waterdale Road is reflected in the small number of surplus spaces and in one incidence actual deficits. Precinct 15 stands out in this area as having a higher number of unoccupied spaces than its surrounding precincts, this is due to the large car park in the property on the corner of Dougharty and Korong Roads.

Appendix C shows for each precinct the fluctuations in the occupancy levels of its supply of parking over the day.

The deficiency in car parking is best reflected by the level of usage or availability of on-street car parking spaces. Precincts where on-street parking is fully used or almost fully used (90%) indicates that there is likely to be a deficiency in on-site parking. This needs to be compared to the usage and availability of on-site parking within the various precincts. The graphs of the car parking surveys presented in Appendix C have been used to establish the precincts with deficiencies.

This approach provides the best indication of the relative level of deficiency and need for additional car parking. It is not practical nor appropriate to consider each site through the estate and assess its individual needs. The situation needs to be considered based

on a larger area which is the reason for dividing the estate into precincts, and basing the precincts on a street frontage basis. Where a site or sites have deficiencies, the next best or preferred location of employees to park is on the street. Therefore the cumulative effects of car parking deficiency within a precinct will be reflected by very high usage of the on-street car parking spaces.

A review of the on-street car parking also incorporates the demand generated by visitors. It is therefore considered that the review of on-street usage is the best indicator of the level of car parking deficiency. It does not provide the absolute number of spaces that the precinct is deficient. Actions to provide additional car parking or reduce the demand within the particular precinct should be undertaken to maximise the availability of spaces and then monitor the change.

The precincts were reviewed to identify those where:

- on-street car parking usage is **near capacity**, some off-street is **still available**
- on-street is **at capacity**, off-street is **almost at capacity**
- both on-street and off-street are **at capacity**.

The precincts are highlighted in Figure 2.12.

### **Main Points**

*Based on the surveys of spaces used both on-site and on-street within each precinct it is considered that the principal precincts requiring additional parking in the short term are precincts 2, 5, 7, 12, 13, 16, 17, 19, 20. Other precincts have been noted as reflected in Table 2.1. However the latter were based on incomplete information from the Industrial Profile Survey, whilst the former are based on observations of high usage/available spaces on-street within the precincts.*

## **2.6 Accidents**

The incidence of accidents in the study over the period 1990-1994 were analysed. The results indicated that two fatal accidents had occurred in five years, one was at the intersection of Waterdale Road/Beatrice Avenue and the second was along Waiora Road between Northern Road and Dougharty Road. The distribution of accidents in the estate is shown in Figure 2.13.

Accident rates across the study area are shown in Table 2.6.

The highest intersection accident rate is Waiora Road/Dougharty Road. However, this intersection is now signalised, but the accident data includes the period it was not signalised.

Along Waterdale Road the accident rates are significantly higher in the northern section. The rate at the intersection with Crissane Road being 2.7 compared to the mean rate for a primary arterial/local road intersection of 0.8 casualty accidents/10 million vehicles entering, whilst at Beatrice Avenue the rate is around 3.2 casualty accidents/10 million vehicles entering. At Lillimur Avenue the rate is 1.6 casualty accidents/10 million vehicles entering. This trend is also illustrated by the overall mid-block and intersection rates which indicate that the section of Waterdale Road between Crissane Road and

Northern Road has a rate of 138 casualty accidents /100 million vehicle kilometres compared to a mean rate of 63 casualty accidents/100 million vehicle kilometres for undivided arterial roads. The overall rate for Waterdale Road between Dougharty Road and Crissane Road is 76 compared to the mean of 63, indicating there is an accident problem along this road.

Dougharty Road has an overall midblock and intersection accident rate similar to the mean for secondary arterials, although slightly higher than average in the section between Sheehan Road and Waterdale Road.

Waiora Road/Kingsbury Drive has an intersection accident rate of 2.9 casualty accidents/10 million vehicles entering which is slightly higher than the mean rate of 2.4.

**Table 2.6 Accident Rates in the Industrial Estate**

	Intersection Accident Rate (accidents/10 million vehicles entering)	Mid-block and Intersection Accident Rate (accidents/100 million vehicle kilometres)
Waterdale Rd / Dougharty Rd.	0.9	-
Waiora Rd. / Dougharty Rd.	3.8	-
Waiora Rd. / Kingsbury Drive	2.9	-
Dougharty Rd. / McEwan Road	2.9	-
Dougharty Rd. (Sheehan Rd. - Waterdale Road)	-	95
Dougharty Rd. (Waterdale Rd. - Waiora Rd.)	-	71
Waterdale Rd. / Crissane Rd.	2.7	-
Waterdale Rd. / Northern Rd.	2.4	-
Waterdale Rd. / Beatrice Av.	3.2	-
Waterdale Rd. / Lillimur Avenue	1.6	-
Waterdale Rd. (Crissane Rd. - Northern Rd.)	-	138
Waterdale Rd. (Northern Rd. - Dougharty Rd.)	-	76

### **Main Points**

*Waterdale Road has an accident rate 20% higher than the mean casualty accident rate for an undivided arterial road (Middleton & Strickland, 1983). This is probably due to the narrow road width, level of turning traffic from Waterdale Road, and the level of delay for traffic trying to access Waterdale Road from the minor streets. The northern section of Waterdale Road (between Crissane Road and Northern Road) has a rate around double the mean rate. The intersection accident rate on Waterdale Road at Northern Road, Crissane Road and Lillimur Avenue are two to three times the mean intersection rates*



*for comparable intersections, whilst the rate at Beatrice Avenue is about four times.*

## 2.7 Public Transport

Figure 2.14 indicates the public transport services into and through the area. The nearest railway station is Macleod, which is over a kilometre from the north-eastern corner of the estate.

The Plenty Road tram is around 1.5 kilometres from the northern boundary of the estate via Kingsbury Drive.

The principal bus services through the area via Waterdale Road are:

- 246/250 Elsternwick/Garden City to Latrobe University
- 350 City to Latrobe University
- 550 Northland Shopping Centre to Latrobe University
- 551 Heidelberg Railway Station to Latrobe University.

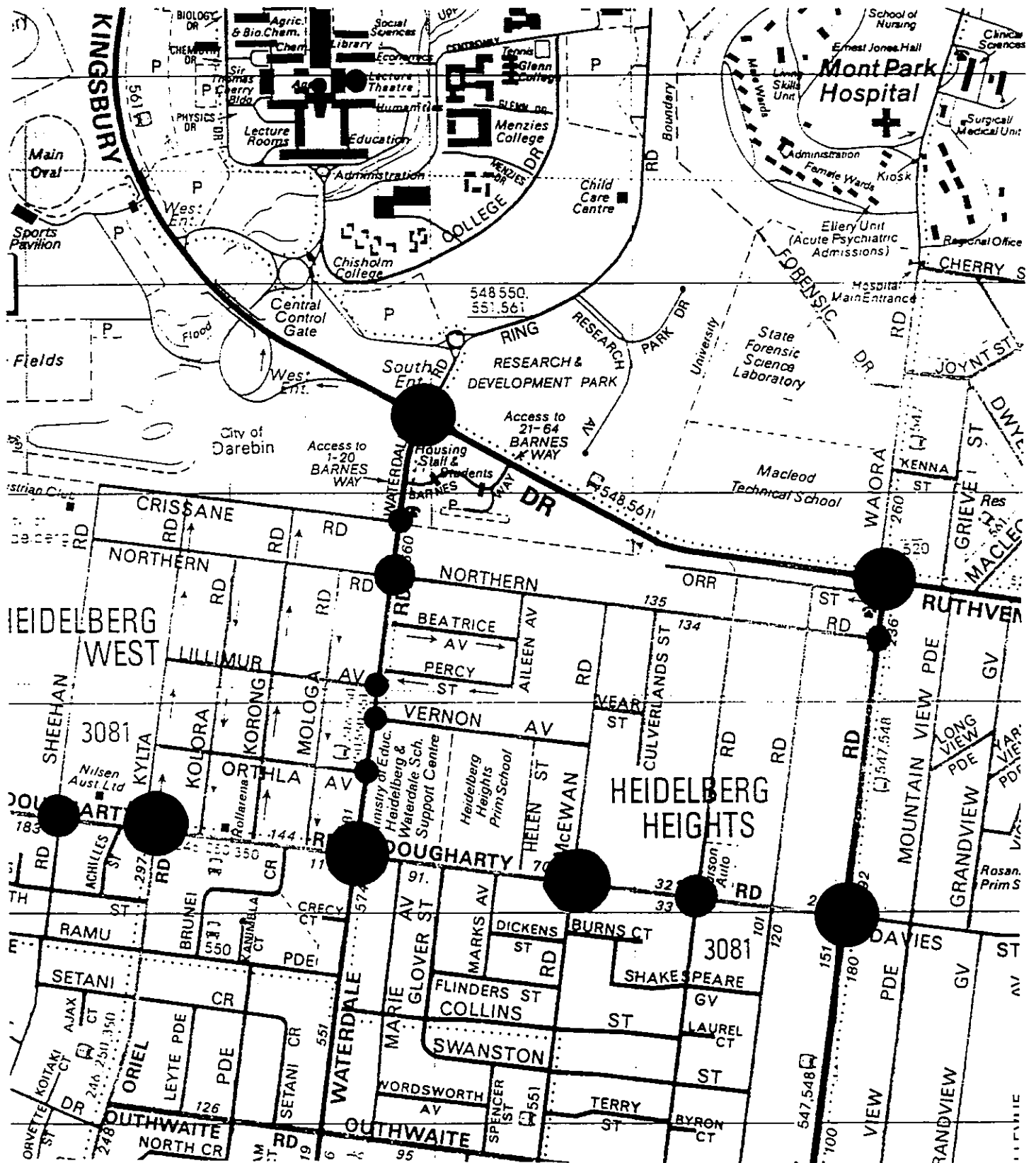
Services via Waioira Road are:

- 547 Kew to Mont Park
- 548 Kew to Latrobe University.

### **Main Points**

*Although the bus services along Waterdale Road travel to the Latrobe University bus interchange, the three aspects that are noted are:*

- *the lack of coverage/penetration into the estate*
- *the lack of linkages and connections with other railway lines*
- *the need to promote the link between Plenty Road trams via the buses.*



- Major Counts
- Full Turning Movements
- Local Street Turning Count

Figure 2.1

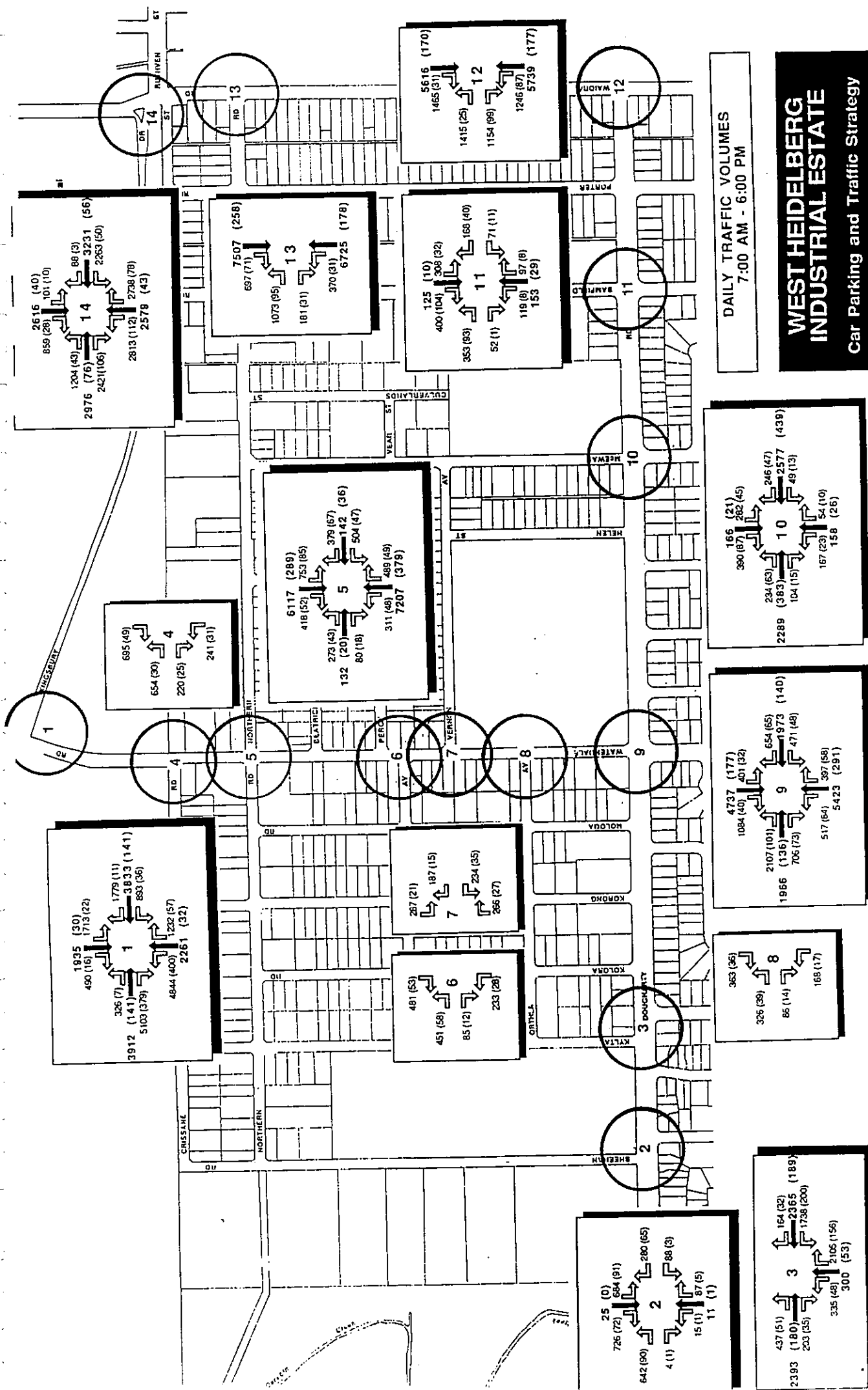
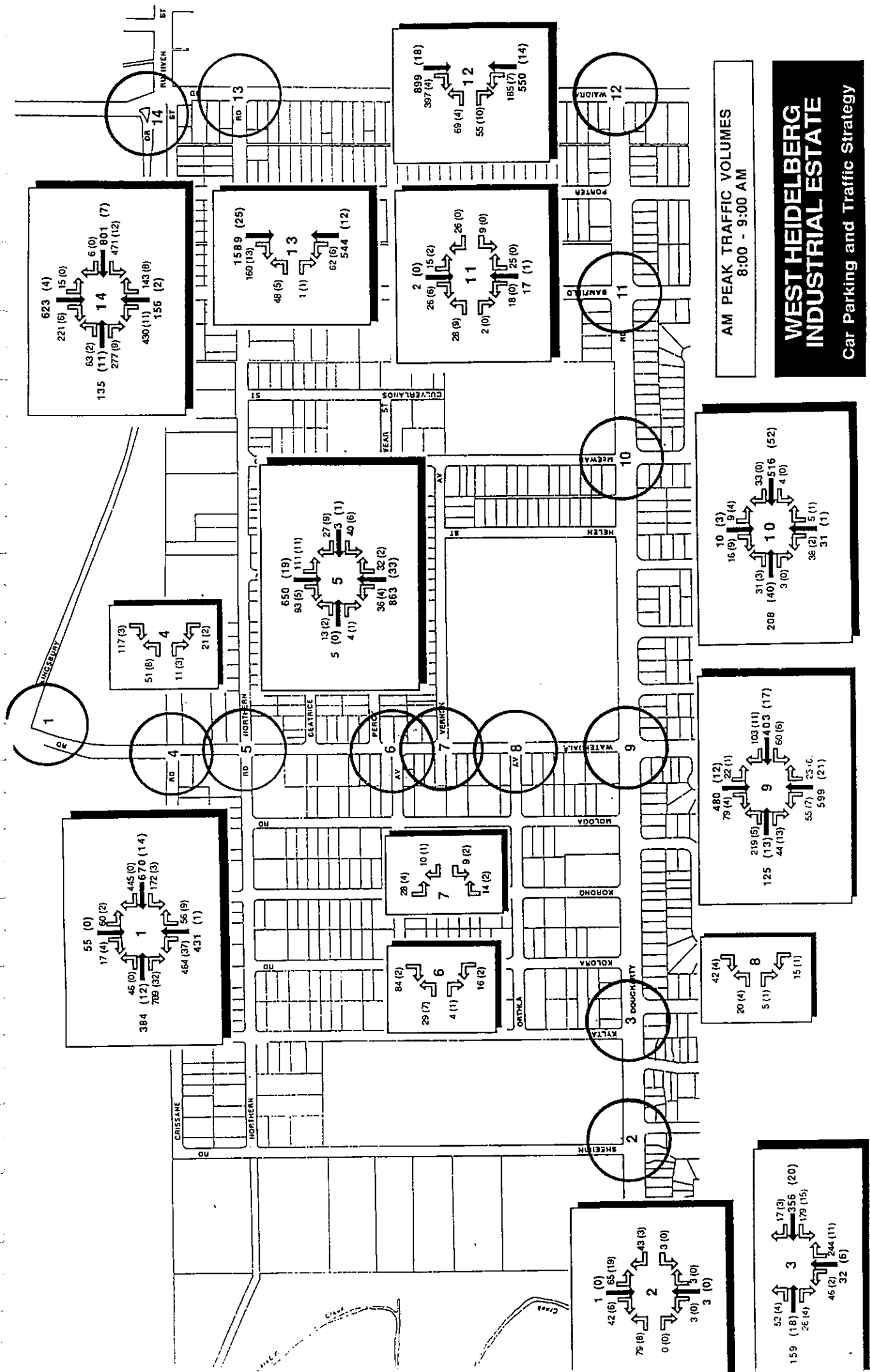


Figure 2.2



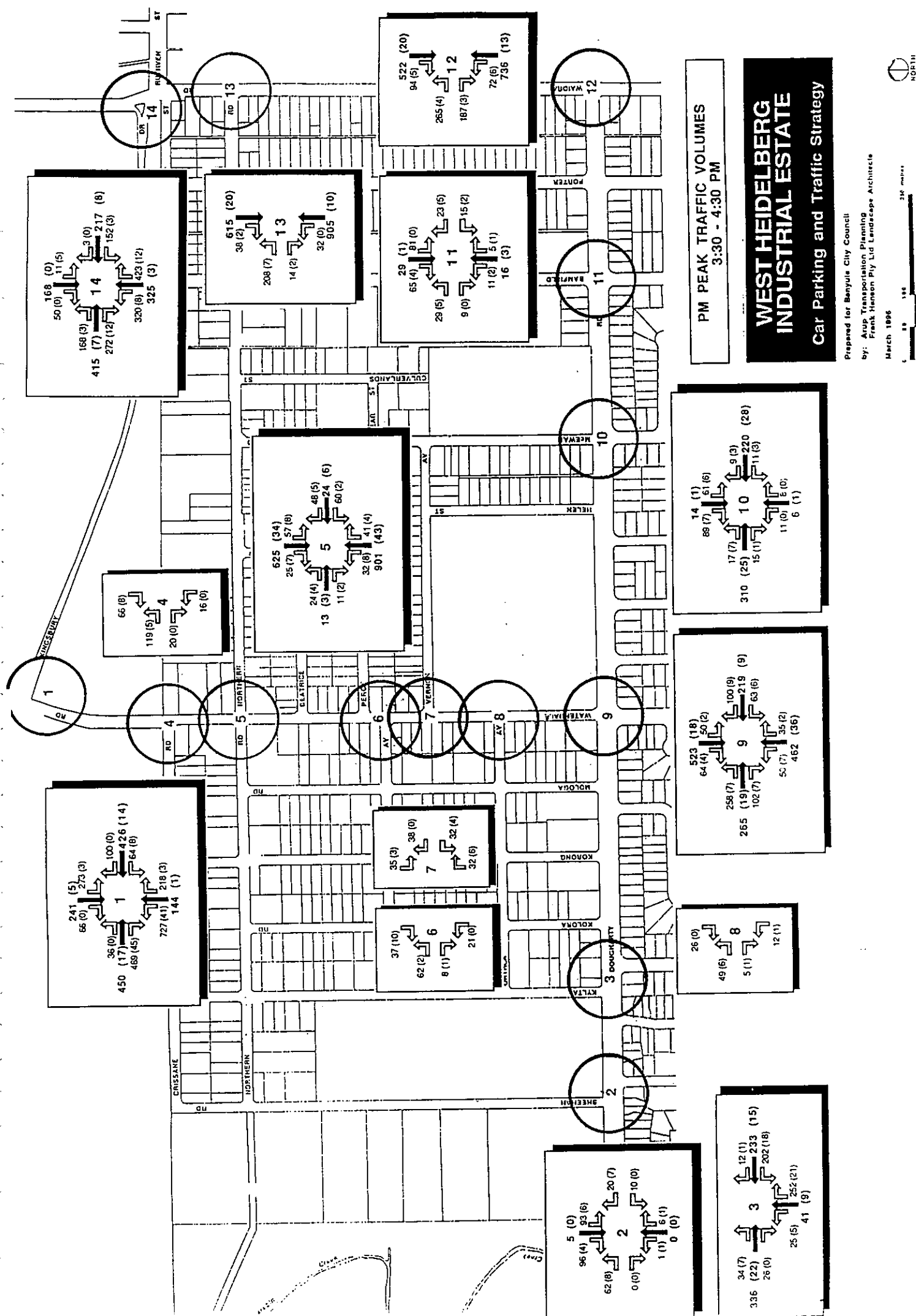
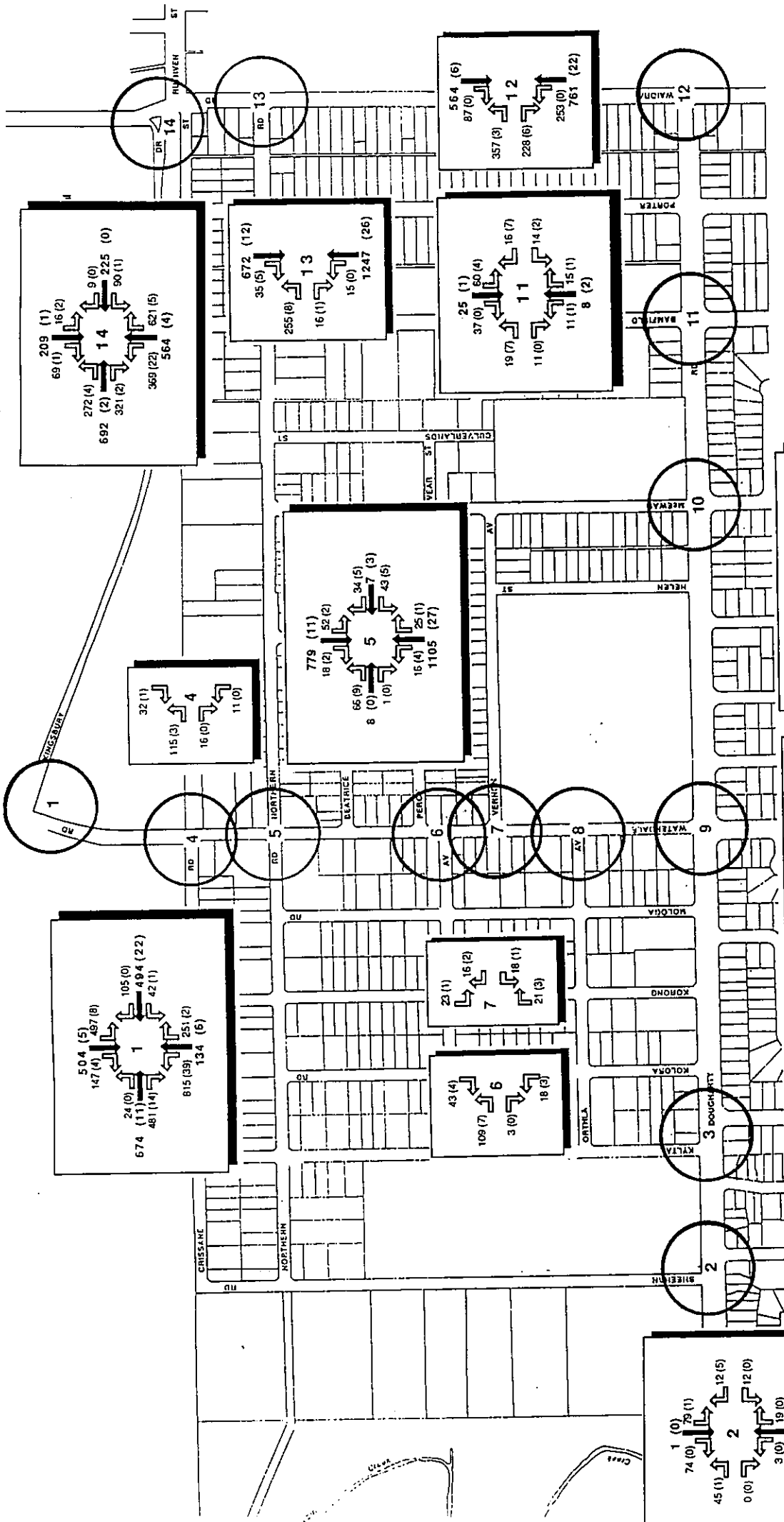


Figure 2.4



PM PEAK TRAFFIC VOLUMES  
4:30 - 5:30 PM

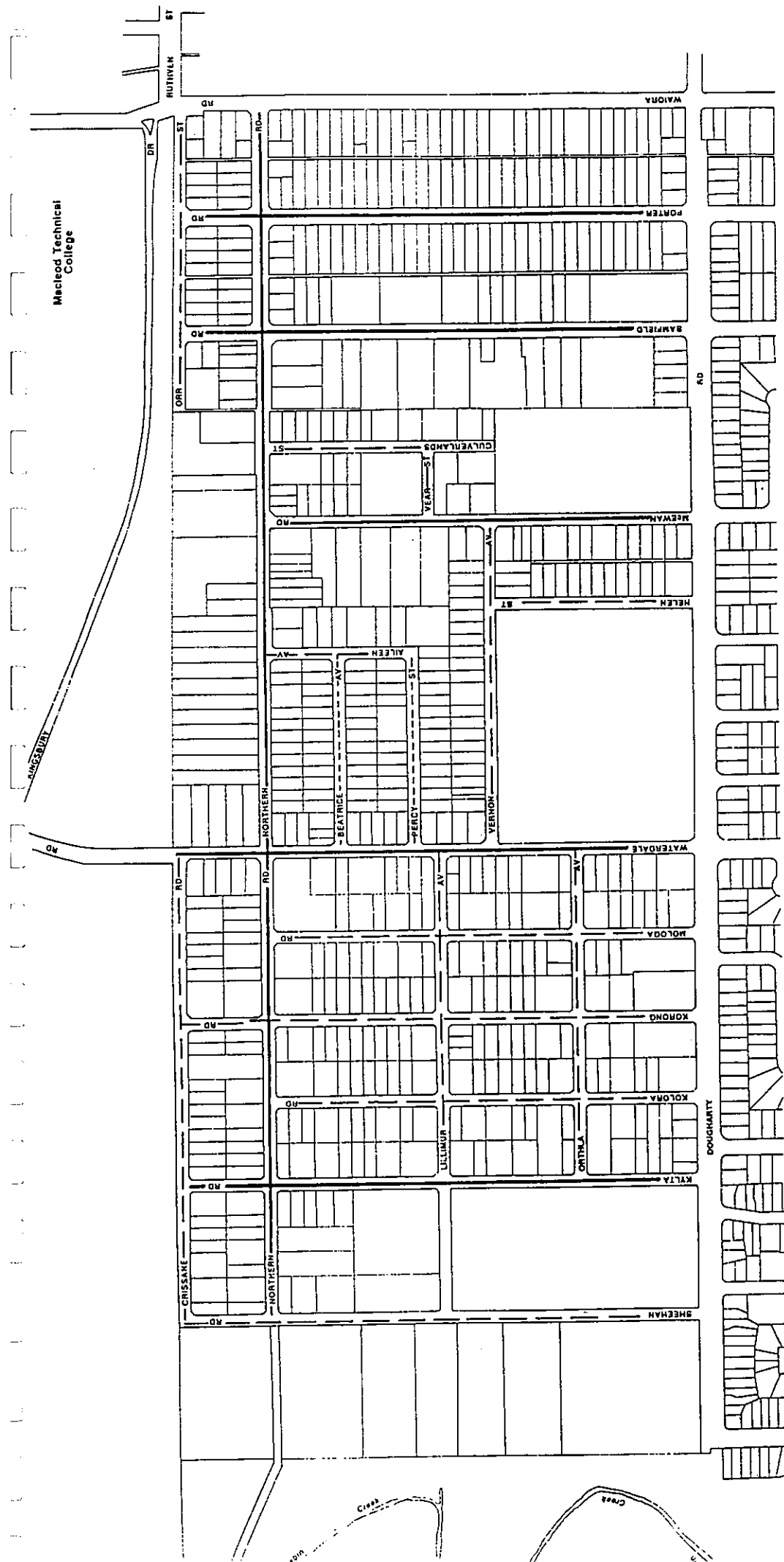
## WEST HEIDELBERG INDUSTRIAL ESTATE

Car Parking and Traffic Strategy

Prepared for Banyule City Council  
 by: Arup Transportation Planning  
 Frank Hansen Pty Ltd Landscape Architects  
 March 1986



Figure 2.5



**WIDTHS OF ROADS  
IN INDUSTRIAL ESTATE**

**WEST HEIDELBERG  
INDUSTRIAL ESTATE**  
Car Parking and Traffic Strategy

Prepared for Banyule City Council  
by: Arup Transportation Planning  
Frank Hanson Pty Ltd Landscape Architects  
March 1998



Figure 2.6