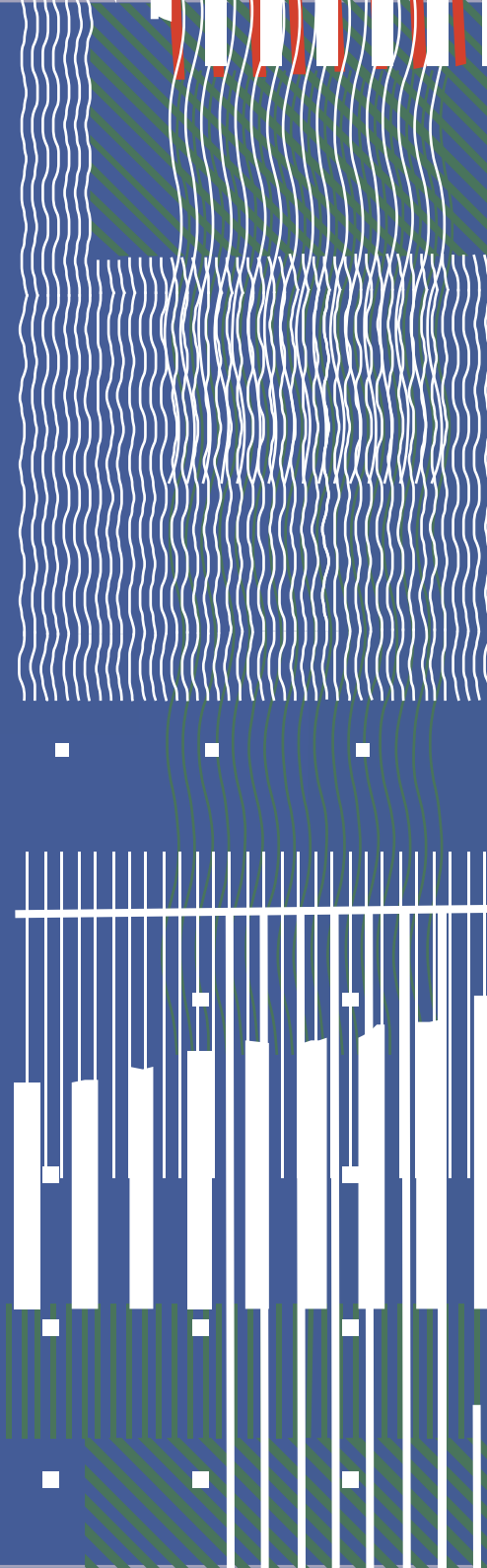




NEERABUP INDUSTRIAL AREA STRUCTURE PLAN NO. 17

prepared for: **LANDCORP**

prepared by: **TAYLOR BURRELL** Town planning and design
SINCLAIR KNIGHT MERZ



NEERABUP INDUSTRIAL AREA
AGREED STRUCTURE PLAN
(As Amended)

Structure Plan No. 17
Adopted: 11 January 2005

This Structure Plan was prepared under the provisions of Part 9 of City of Wanneroo District Planning Scheme No. 2

NEERABUP INDUSTRIAL AREA STRUCTURE PLAN NO. 17

OCTOBER 2011

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DOCUMENT HISTORY AND STATUS

Printed	17/11/2011 1:29:00 PM
Last Saved	17/11/2011 1:29:00 PM
Author	Karen Wright
Document Version	Rev 10

Revision	Date Issued	Reviewed by	Approved by	Date Approved
Rev 1	Jan 03			
Rev 2	17.09.04			
Rev 3	24.03.04			
Rev 4	12.10.04			
Rev 5	16.11.04			
Rev 6	22.11.04			
Rev 7	09.02.05	Karen Wright		
Rev 8	01.11.08	Kris Nolan	Karen Wright	01.11.08
Rev 9	15.02.11	Andrew Patterson	Andrew Patterson	15.02.11
Rev 10	15.07.11	Andrew Patterson	Andrew Patterson	15.07.11
Rev 11	02.11.11	Andrew Patterson	Andrew Patterson	02.11.11

**RECORD OF AMENDMENTS MADE TO THE NEERABUP INDUSTRIAL AREA
AGREED STRUCTURE PLAN NO. 17**

Amendment No.	Description of Amendment	Finally Endorsed by Council	Finally Endorsed by WAPC
2	Makes provisions for some design guidelines applicable to a portion of the Agreed Structure Plan known as Meridian Park and addition of Plan 6 to illustrate the Meridian Park area.	03.06.2008	18.08.2008
3	Realignment of 'Road B' and intersection with Pederick Road.	05.08.2011	12.10.2011

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Appendix 5	DEP Advice
Appendix 6	Flynn Drive Traffic Assessment
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Plan 3	Indicative Movement Network
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PART 1 - STATUTORY PLANNING SECTION

As provided for under the provisions of the scheme, this part of the Structure Plan has the same force and effect as if it were a provision, standard or requirements of the scheme.

1.0 STRUCTURE PLAN AREA

The Structure Plan applies to the land contained within the inner edge of the broken black line shown on the Structure Plan map.

Subject Area

The Structure Plan area comprises approximately 1,000 hectares.

2.0 STRUCTURE PLAN CONTENT

This Structure Plan comprises:

- Statutory Section (Part 1)
- Explanatory Section (Part 2)

3.0 INTERPRETATION

“LandCorp” means the Western Australian Land Authority.

“The City” means the City of Wanneroo.

“The Scheme” means the City of Wanneroo District Planning Scheme No. 2.

The words and expressions used in this Structure Plan shall have the same respective meaning given in the Scheme.

4.0 OPERATION DATE

In accordance with Part 9 of the Scheme, this Structure Plan shall come into operation on the later date when it is either certified by the Commission pursuant to subclause 9.6.3 or adopted, signed and sealed by the Council under subclause 9.6.5.

5.0 RELATIONSHIP WITH THE SCHEME

In accordance with clause 9.8 of the Scheme:

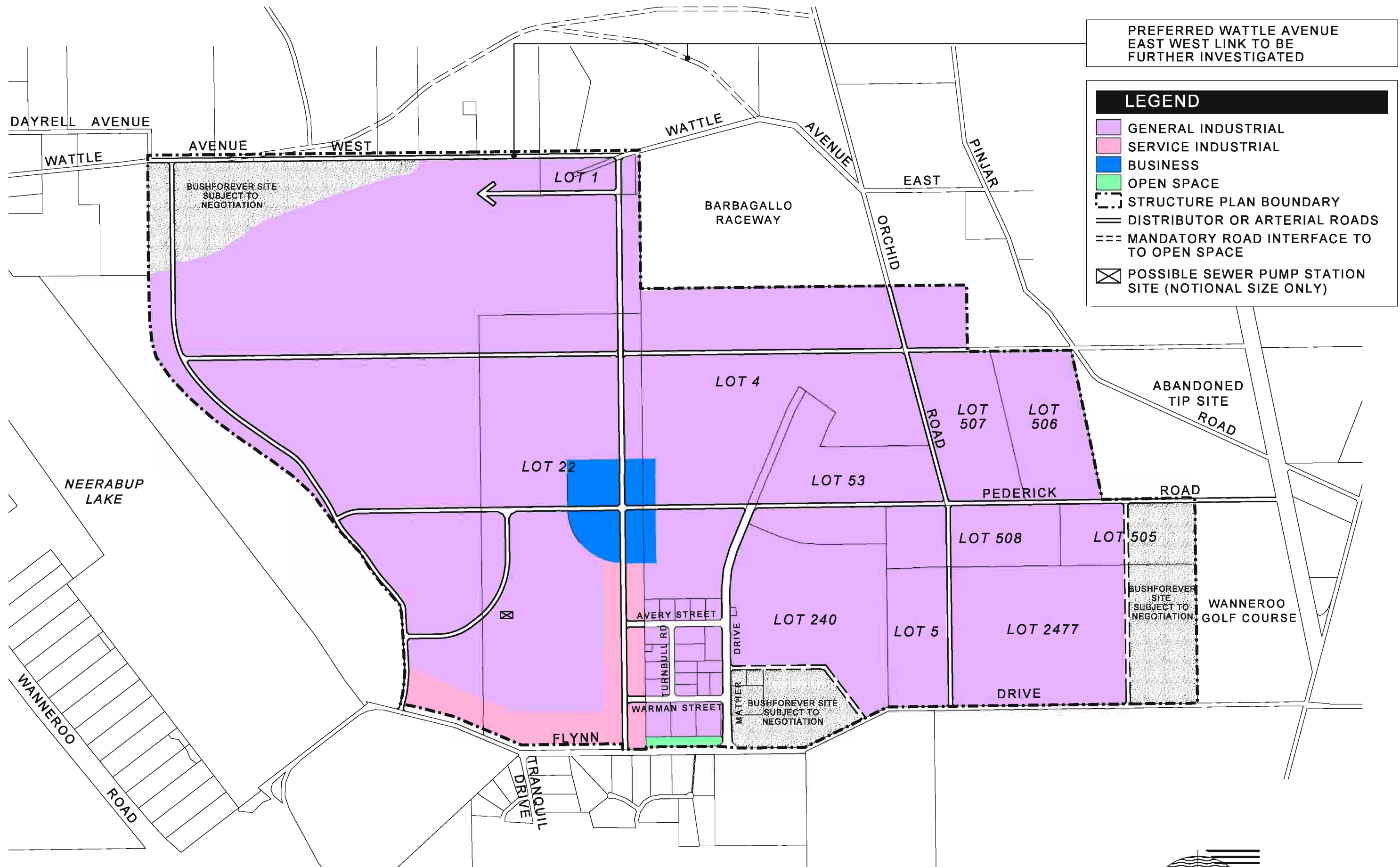
- a) The provisions, standards and requirements specified under Part 1 of this Structure Plan shall have the same force and effect as if it were a provision, standard or requirement of the Scheme. Part 2 of this Structure Plan is for explanatory purposes only, in order to provide a descriptive analysis of the Structure Plan.
- b) In the event of there being any inconsistencies or conflict between the provisions, standards or requirements of the Scheme and the provisions, standards or requirements of this Structure Plan, then the provisions, standards or requirements of the Scheme shall prevail.

6.0 LOCAL STRUCTURE PLAN MAP

Plan 1: The 'Structure Plan' illustrates the road structure and land use precincts proposed for the Structure Plan area. The map defines the following precincts:

1. General Industrial
2. Service Industrial
3. Business

In addition, an area of 5,000 m² of open space shall be located in or near the Business Park on either Lot 22 or Lot 4.

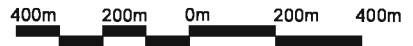


PREFERRED WATTLE AVENUE EAST WEST LINK TO BE FURTHER INVESTIGATED

LEGEND

- GENERAL INDUSTRIAL
- SERVICE INDUSTRIAL
- BUSINESS
- OPEN SPACE
- STRUCTURE PLAN BOUNDARY
- DISTRIBUTOR OR ARTERIAL ROADS
- MANDATORY ROAD INTERFACE TO TO OPEN SPACE
- POSSIBLE SEWER PUMP STATION SITE (NOTIONAL SIZE ONLY)

NEERABUP INDUSTRIAL AREA ZONING AND LOCAL STRUCTURE PLAN



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7.0 SURFACE CONTOUR LEVELS

Plan 2: The 'Final Surface Contour Plan' illustrates the final surface levels which must be achieved prior to subdivision and/or development on-site. Where any resource extraction is undertaken within the Structure Plan area, these levels must be complied with at the completion of extraction.

Council may approve a variation to the Final Surface Contour Plan, if it is satisfied that such a variation:

1. complies with the design criteria contained in section 6.5 of the Explanatory Report; and
2. will not adversely affect the ability of adjoining properties to conform to the Final Surface Contour Plan.

Council shall not approve any extraction where the proposed final surface level has a vertical separation distance of less than:

- 1.2 metres from Average Annual Maximum Groundwater Level; or
- 2.0 metres from groundwater contours shown in the Water and Rivers Commission Groundwater Atlas; or
- such other distance as approved or required by the Department of Environment Water and Rivers;

whichever is the greater distance.

8.0 MOVEMENT NETWORK MAP

Plan 3: 'Indicative Movement Network', illustrates the internal road structure proposed within the Structure Plan area. This map is indicative and provides a guide to the detail road design. The movement network may be varied subject to Council and Western Australian Planning Commission approval through either the Structure Plan or subdivision process where consistent with principles of **Plan 3**.

9.0 LAND CLEARING

Prior to the clearing of natural vegetation and habitat, Council may require flora and fauna surveys to be undertaken.

If priority or threatened species are identified, the proponent will be required to liaise with CALM to ensure that appropriate management strategies are developed.

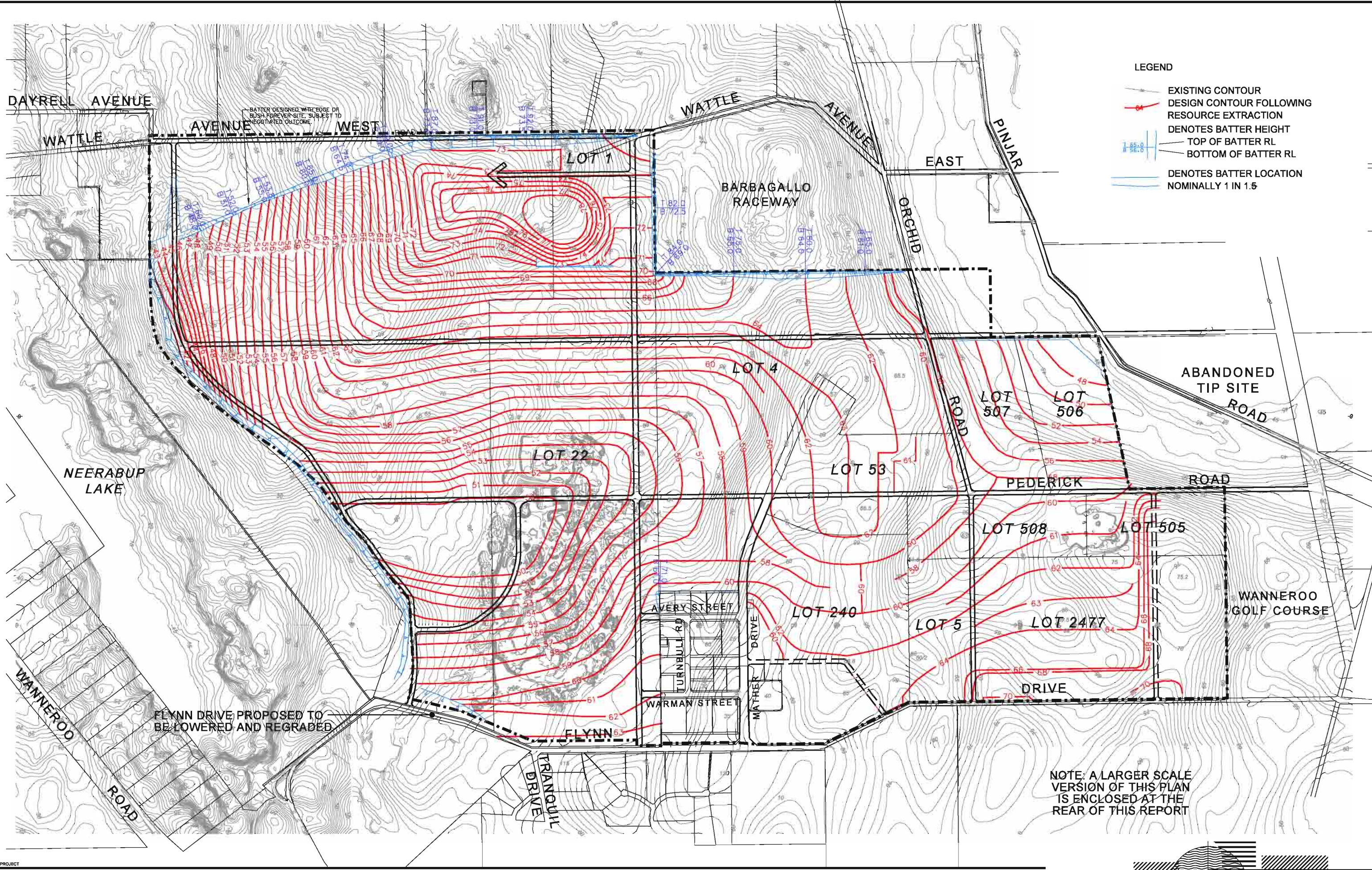
10.0 PINJAR TIP SITE LEACHATE PLUME

Within the land identified as being affected by the Pinjar Tip Site Leachate Plume in Figure 5.1 of the Explanatory Report, or by such other subsequent study as may be undertaken by Council, conditions will be imposed on any development approval, and recommended on any subdivision application, to ensure that prospective purchasers of land or development are appropriately informed of the potential impacts of the plume.

11.0 CELL WORKS

Each owner within the Structure Plan area shall be responsible for contributions towards shared infrastructure costs, referred to as Cell Works. The final details of those infrastructure items for the Cell Works, for example road upgrading and engineering standards and the actual costs shall be determined through a separate Scheme Amendment process, in consultation with the landowners, Council and the Western Australian Planning Commission. Generally however, the contributions shall be in accordance with the principles of this part of the Structure Plan, as outlined below.

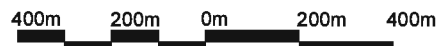
1. In accordance with the City of Wanneroo DPS the method of apportionment shall be on the basis of each owners proportion of the gross subdividable area.
2. The Cell Works shall generally include contributions to:
 - External and internal roads and upgrading as illustrated on **Plan 4**, including land, earthworks, construction costs and drainage.



- LEGEND**
- EXISTING CONTOUR
 - DESIGN CONTOUR FOLLOWING RESOURCE EXTRACTION
 - DENOTES BATTER HEIGHT
 - TOP OF BATTER RL
 - BOTTOM OF BATTER RL
 - DENOTES BATTER LOCATION NOMINALLY 1 IN 1.5

NOTE: A LARGER SCALE VERSION OF THIS PLAN IS ENCLOSED AT THE REAR OF THIS REPORT

**NEERABUP INDUSTRIAL AREA
FINAL SURFACE CONTOUR PLAN (SEPT 2004)**

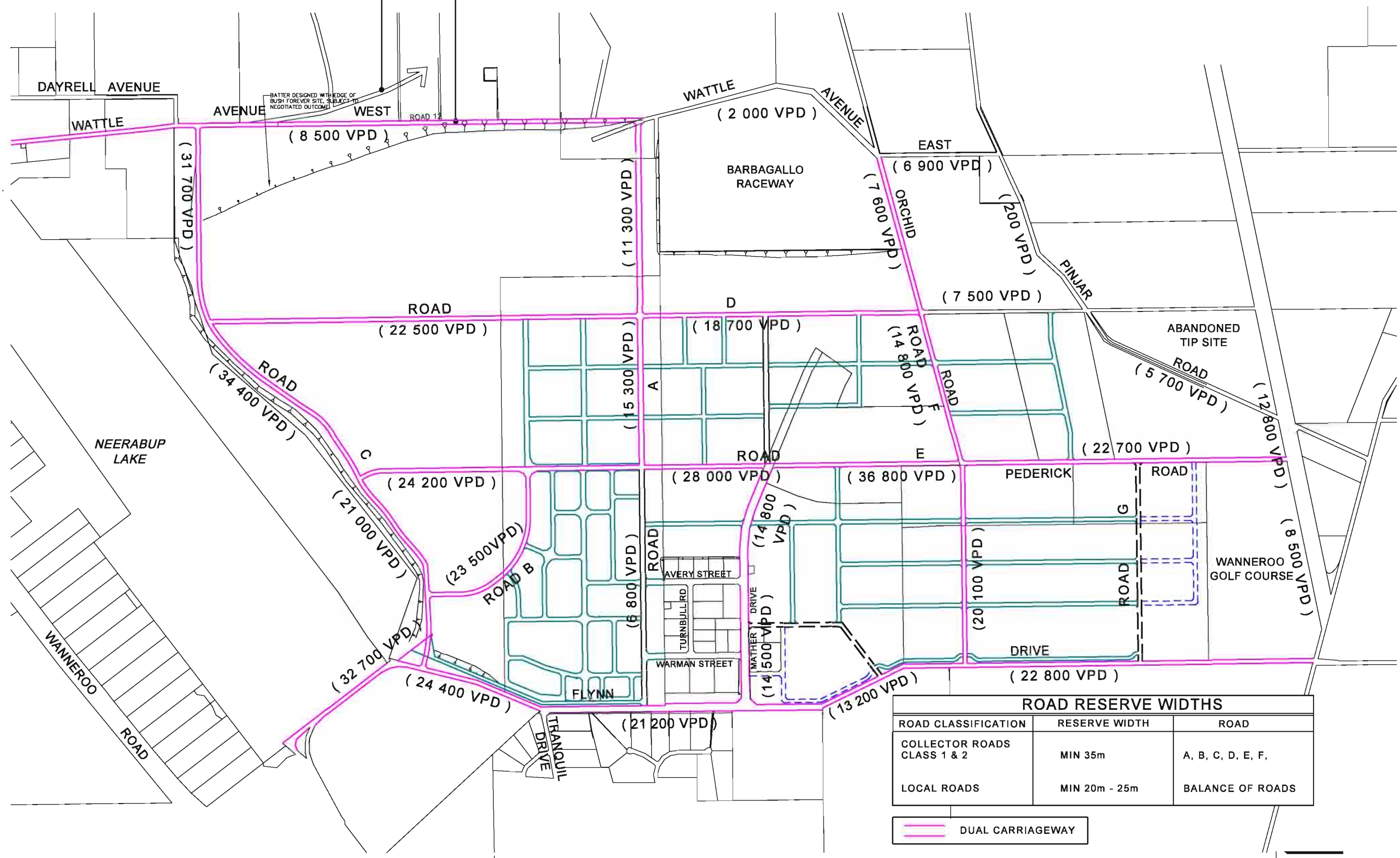


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PREFERRED WATTLE AVENUE EAST WEST LINK TO BE FURTHER INVESTIGATED



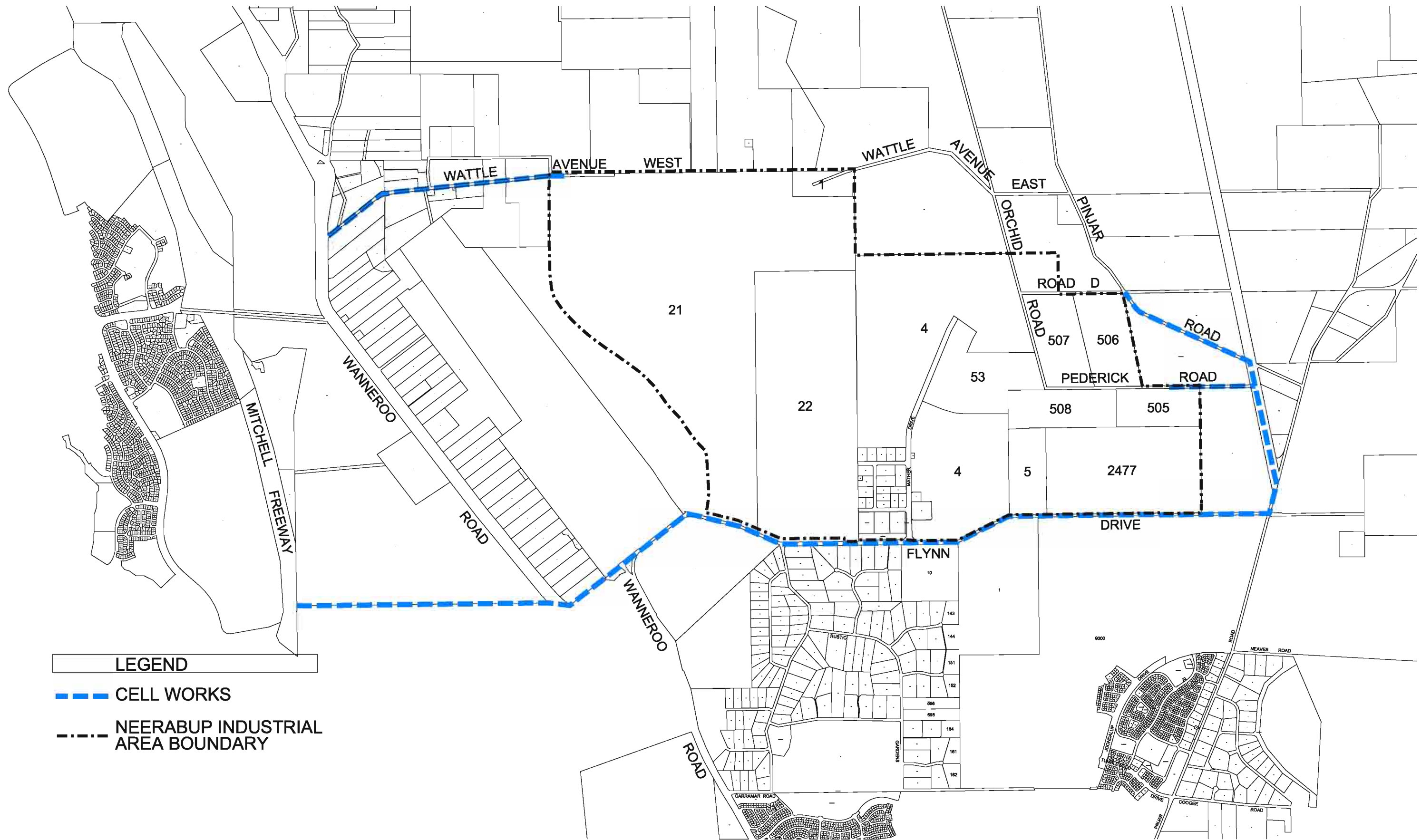
NEERABUP INDUSTRIAL AREA INDICATIVE MOVEMENT NETWORK





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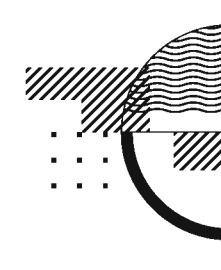


- LEGEND**
-  CELL WORKS
 -  NEERABUP INDUSTRIAL AREA BOUNDARY

NEERABUP INDUSTRIAL AREA CELL WORKS



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- Major road intersection treatment i.e. lights or roundabout.
- Public Open Space.
- Cost of Structure Plan preparation and associated studies and Scheme Amt including Design Guidelines and Landscape Master Plan, Service Concept Plan, Drainage and Nutrient Management Plan and Flora and Fauna Study for strategic roads.
- Administration costs.

In relation to the Flynn Drive extension to the Freeway, Council considers a one-third contribution to be appropriate. The detail of the percentage contribution will be determined in more detail through the Scheme Amendment process.

12.0 ADDITIONAL PLANS AND GUIDELINES

12.1 Design Guidelines and Landscape Master Plan

Prior to subdivision commencing within the Structure Plan Area, Design Guidelines and a Landscape Master Plan should be prepared, addressing the key elements of the Structure Plan, including, but not limited to:

- Main estate entries;
- The core business area;
- Areas adjacent to the Lake Neerabup Parks and Recreation reserve; and
- Service Industrial areas fronting Flynn Drive.

The cost of preparing the Design Guidelines and the Landscape Master Plan shall be included as a Cell Work under the developer contribution arrangement.

12.2 Service Concept Plans

Prior to subdivision or development commencing within the Structure Plan area service concept plans should be prepared for sewer, water, electric power, drainage, gas and communication services, and such plans should be endorsed by the appropriate government authorities. The concept plans should be based on a total development philosophy and provide a basis for integrating individual developments.

The cost of preparing the concept plans and achieving government endorsements shall be included as a Cell Work under the developer contribution arrangement.

12.3 Drainage, Nutrient and Water Management Plan

Prior to subdivision or development commencing within the Structure Plan area, a Drainage, Nutrient and Water Management Plan should be prepared, and such plan should, if considered necessary by Council, include a contingency plan to ensure the protection of Lake Neerabup.

The cost of preparing the Drainage and Nutrient Management Plan shall be included as a Cell Work under the developer contribution arrangement.

12.4 Dieback Hygiene Plan

Prior to subdivision or development commencing within the Structure Plan area, a Dieback Hygiene Plan should be prepared.

13.0 PROVISIONS

13.1 General Industrial

The permissibility of uses and development shall be in accordance with the provisions of the General Industrial Zone. Notwithstanding the uses permitted under the Scheme, Industry - Hazardous shall be an 'X' use in this precinct.

13.2 Service Industrial

The permissibility of uses and development shall be in accordance with the provisions of the Service Industrial Zone.

13.3 Business

The permissibility of uses and development shall be in accordance with the provisions of the Business Zone. In addition to the uses permitted under the Scheme, Shop shall be an 'A' use in this precinct. The maximum floorspace per shop use is 300m² NLA.

13.3.1 Barbagallo Raceway Noise

In relation to land situated within the Raceway Noise Influence Area, as identified in Figure 5.1 of the Explanatory Report, it is possible that some noise sensitive uses may be affected by excessive noise levels if they operate on Sundays.

In the event that Council considers that a proposal involves a use which might be so affected, Council may require the proponent to prepare a suitable noise management strategy, or demonstrate that the use will not be adversely affected by the Raceway activities.

14.0 ROAD SUBDIVISIONAL REQUIREMENTS

All owners shall be required to construct Collector Roads A, C, D, E and F as illustrated in **Plan 3**.

Each owner's proportional contribution shall be generally as outlined in **Table 1** below; this may be in the form of a 100% contribution where it is wholly located on an individual's holding, or 50% where it is shared or merely a road upgrade and there is an existing carriageway and road reservation.

Table 1: Landowners Contribution to Collector Roads

Lot No.	Road (refer Plan 5)	Road Width or Road Widening / Land Required	Comment No.
21	A2	35 m	1
	C	35 m	
	D1	35 m	
	E1	35 m	
22	A1	35 m	1
	D2	35 m	
	E2	35 m	
4	D3	35 m	1
	D4	7.5 m	2
	E3	35 m	1
	F1	15 m	2
	F2	7.5 m	
53	E4	35 m	1
	E5	17.5 m	2
	F3	7.5 m	
240	NIL		
5	F5	17.5 m	2
505	E8	7.5 m	2
	E9	15 m	1
506	E7	7.5 m	2
	E8	7.5 m	
	D5	15 m	1
507	D4	7.5 m	2
	E6	7.5 m	
	F1	7.5 m	
	F3	7.5 m	

Lot No.	Road (refer Plan 5)	Road Width or Road Widening / Land Required	Comment No.
	D5	15 m	1
508	E5	17.5 m	1
	E6	7.5 m	2
	E7	7.5 m	
	F4	17.5 m	1
2477	F5	35 m	2
1	A3	35 m	1

Comments:

- 1 Contribution to land in accordance with the width specified plus 100% contribution to full earthworks, one carriageway and drainage.
- 2 Contribution to land in accordance with the width specified plus 50% contribution to full earthworks, one carriageway and drainage.

Notes:

- a) Refer to **Plan 5** for road numbers.
- b) All other internal roads will be required as part of standard subdivisional requirements.
- c) This table must be updated where landowners create and sell superlots.

15.0 PROVISIONS RELATING TO MERIDIAN PARK

Notwithstanding the provisions of the Scheme the following sub-clauses apply to lots created within the area illustrated in **Plan 6** and known as 'Meridian Park'.

15.1 Landmark Sites

Landmark Site(s) shall be identified at the subdivision stage and be subject to a Detailed Area Plan as a condition of subdivision approval. Prior to the clearance of subdivision containing landmark site(s), Detailed Area Plans shall be submitted by the developer for the approval of the City. No development shall commence on a landmark site other than in conformity with an Agreed Detailed Area Plan.

15.2 Parking Provisions

On-street parking, where provided, can be offset against the City of Wanneroo District Planning Scheme No. 2 parking requirements for the adjacent development across the entire site and not for individual tenancies.

15.3 Rainwater Tanks

Rainwater tanks are to be located behind the setback area and integrated into the building or appropriately screened from view of the street or other public space.

15.4 Energy Efficiency

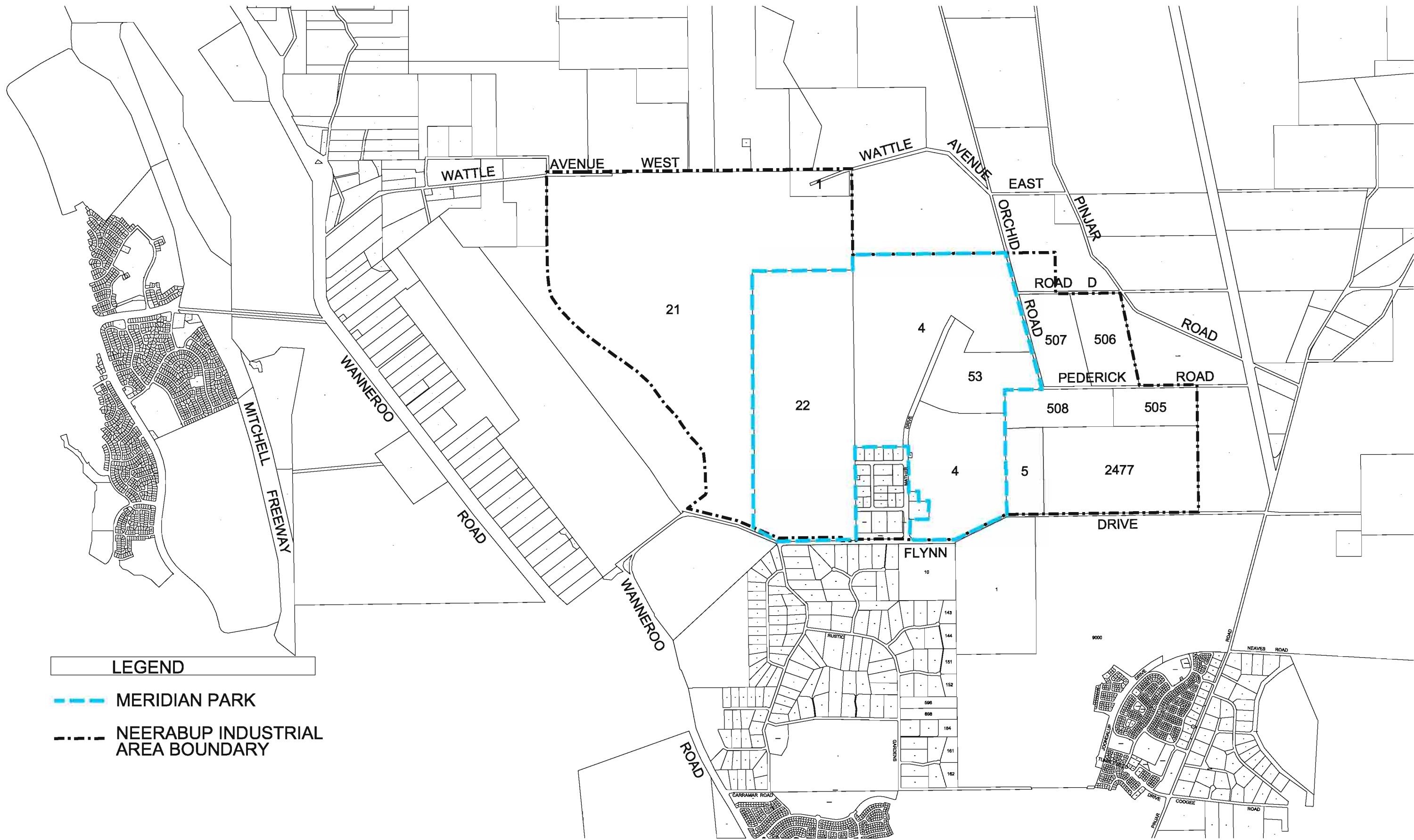
All buildings to comply with Section J (Energy Efficiency) of the Building Code of Australia.

15.5 Fencing

Front fencing shall be 'open style' and integrated with the building where possible.

15.6 Landscaping

Applications for Approval to Commence Development shall include a 'Landscaping Plan' which promotes the use of drought tolerant planting.



LEGEND

- MERIDIAN PARK
- NEERABUP INDUSTRIAL AREA BOUNDARY

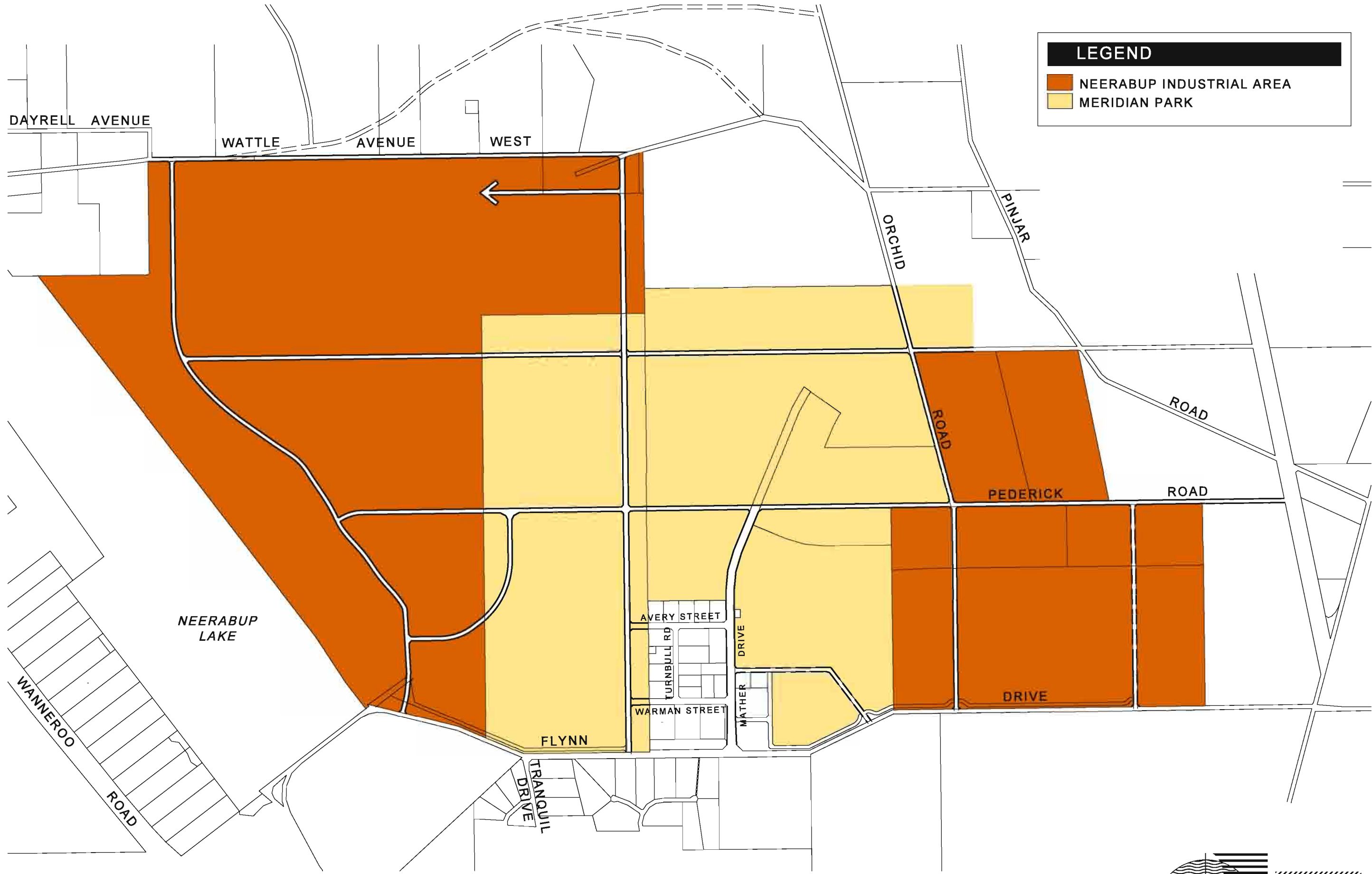
NEERABUP INDUSTRIAL AREA MERIDIAN PARK



PLAN 5

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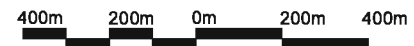
SINCLAIR KNIGHT MERZ



LEGEND

- NEERABUP INDUSTRIAL AREA
- MERIDIAN PARK

**NEERABUP INDUSTRIAL AREA
MERIDIAN PARK**



PLAN 6

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15.7 Glazing

The street elevation of the proposed building is to include a high percentage of glazing to contribute to and activate the façade and complying with the Energy Efficiency provisions of the Building Code of Australia.

15.8 Natural Lighting

Subject to compliance with the Energy Efficiency provisions of the Building Code of Australia, natural lighting should be provided to the uppermost floor area of all buildings by incorporating strategically placed windows and light shelves, light wells and/or awning reflectors to capture light.

- Minimum 50% of the total floor area of all buildings to have access to natural light from skylights, light shelves, light wells and northern glazed windows.
- Minimum of 15% of the total roof area to be fitted with skylights designed, shaded and/or oriented to minimise heat gain during the summer months.
- Minimum 20% of the northern façade to be glazed or provided with openings to allow daylight to infiltrate internal floor areas. Provide awnings or other architectural elements to adequately shade direct summer light. Best Practice Recommendations.

15.9 Inclusion of Blade Walls

The inclusion of blade walls protruding a maximum of 3 metres into the 6 metre front setback area may be acceptable, subject to the main portion of the building being setback behind the 6 metre setback line.

15.10 Architectural Endorsement

All applications for planning approval within Meridian Park Industrial Estate shall be accompanied by an endorsement of LandCorp via its appointed 'Estate Architect'.

PART 2 - EXPLANATORY REPORT

1.0 INTRODUCTION

The Neerabup Industrial Area (NIA) represents an opportunity for the development of a strategic General Industrial estate within the North West Corridor. Various proposals for Structure Plans including a Structure Plan review have been prepared for the site with varying outcomes and recommendations. This report represents a synthesis of the previous studies, and further consultation with key stakeholders, to determine the preferred structure for future development. Importantly, this study also assesses the resource extraction areas to determine the preferred ultimate site levels to facilitate industrial development.

The study therefore, produces two outcomes:

1. Structure Plan and Report
2. Final Surface Contour Plan

The Neerabup Industrial Area Structure Plan and report have been prepared to accord with the requirements of Part 9 of the City of Wanneroo District Planning Scheme No. 2 (DPS2).

The Structure Plan has been prepared by Taylor Burrell Barnett Town planning and design, in conjunction with Sinclair Knight Merz including engineering and environmental inputs. The preparation of the Structure Plan has been informed by consultation with existing landowners and key stakeholders. The consultation process and outcomes is discussed in **Appendix 1**.

1.1 Location

The NIA comprises approximately 1,000 ha of predominantly General Industrial land. The subject land is located approximately 30 km north of the Perth City Centre, and 4 kilometres north east of the Joondalup City Centre. **Figure 1.1** illustrates the location of the subject land.

The study area is bounded by Wattle Avenue and Barbagallo Raceway to the north, Lake Neerabup to the west, Flynn Drive to the south, and Orchid Road/Pederick Road/Wanneroo Golf Course to the east.

The site is strategically located within the North West Corridor with excellent existing and future road linkages.

Overall, the area shows attractive locational attributes for industrial land development within the short term 3-5 years and extending longer term 20-50 years.

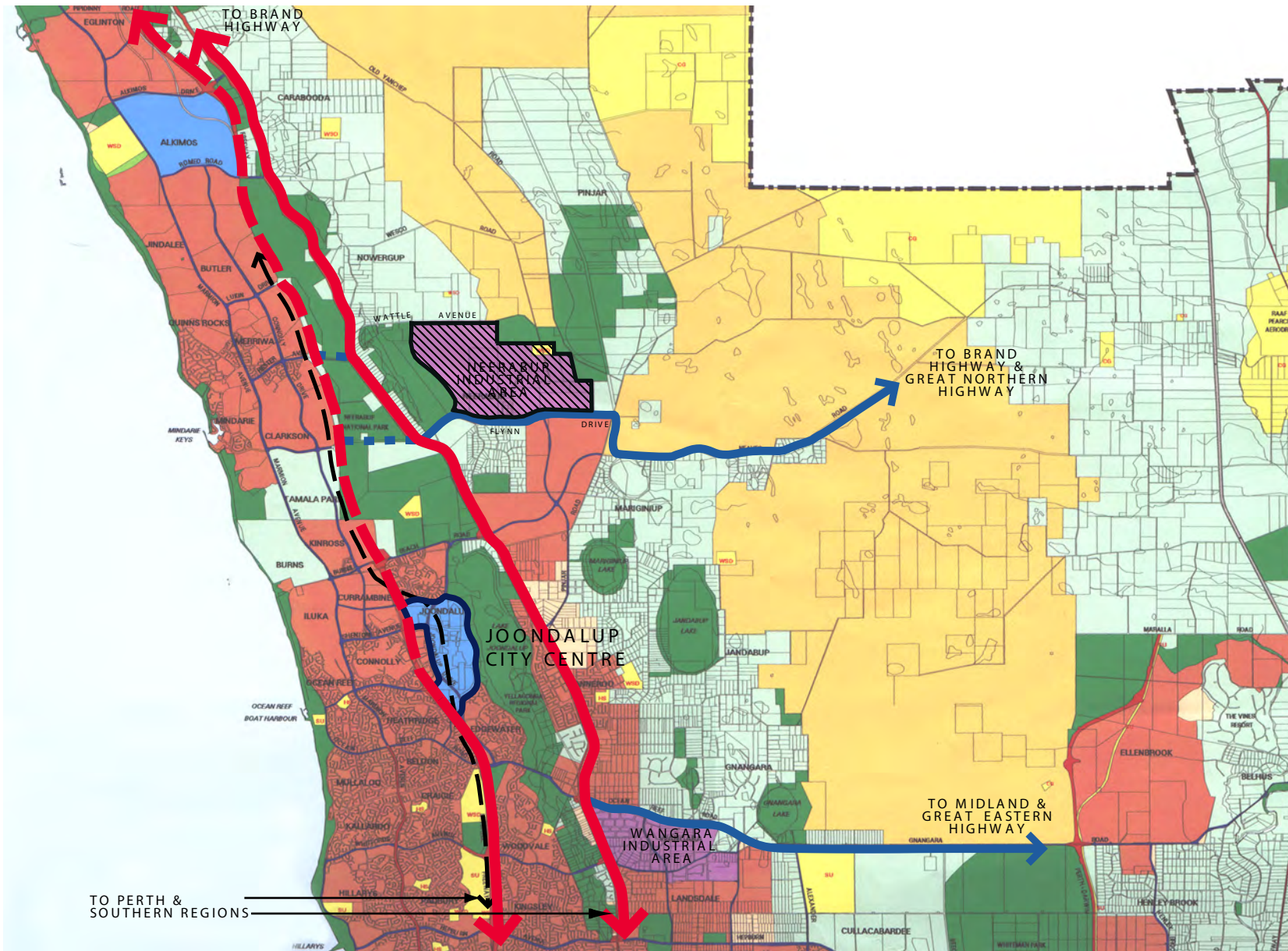
1.2 Preliminary Consultation

As mentioned, the preparation of the Structure Plan was preceded by a process of consultation with landowners and other stakeholders. Subsequently, a preliminary draft of the Neerabup Industrial Area Structure Plan was circulated to key stakeholders, including the City of Wanneroo, Department for Planning and Infrastructure (DPI), other state government authorities and landowners within the study area.

Some preliminary comments have been received from Council and state government stakeholders and, where appropriate, those comments have been further addressed in the final report.

In addition, follow-up consultation with landowners indicated that some further review was required, particularly in terms of development staging, and total extraction volumes. The key outcomes arising from the preliminary consultation with landowners may be summarised as follows:

- II) Cockburn Cement, the owner of Lot 21, proposes to develop a lime clinker plant to extract and process the lime resource from within its land holdings, (as well as other land holdings in the Nowergup area to the north). At this stage, Cockburn Cement has indicated that the proposed clinker plant is unlikely to be built within the next 10-15 years. Cockburn Cement have conducted site investigations to determine the extent of resource within their land and the Final Surface Contours reflect the advice received from their investigation.




LEGEND

-  IMPORTANT NORTH-SOUTH LINKS
-  IMPORTANT LATERAL LINKS
-  EXISTING AND FUTURE RAILWAY
-  PARKS AND RECREATION
-  STATE FORESTS
-  URBAN
-  URBAN DEFERRED
-  CENTRAL CITY AREA
-  INDUSTRIAL
-  SPECIAL INDUSTRIAL RURAL
-  RURAL
-  PRIVATE RECREATION
-  RURAL - WATER PROTECTION
-  PUBLIC PURPOSES

**NEERABUP INDUSTRIAL AREA
CONTEXT**



FIGURE 1.1



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Lot 22 (adjacent to Lot 21) will be available for resource extraction for a longer period than originally anticipated (although the existing quarrying activities in the southern portion of the site have now been completed and this area is presently undergoing rehabilitation).

Some landowners in the eastern sector (particularly Lot 5 and Lot 2477) are willing to make land available for industrial development in the short term.

As a consequence of these outcomes, the following key changes were made to the Final Structure Plan:

- i) The detail currently shown over Lot 21 includes the minimum structural elements (in terms of land use, road layout and finished levels) necessary to ensure proper integration between Lot 21 and the balance of the Structure Plan area. The indicative internal road layout is only shown to the boundary of Lot 21 to ensure proper integration between Lot 21 and the balance of the Structure Plan area.
- ii) An increase in the minimum finished surface contours within the eastern sector to reduce extraction timeframes and enable the more timely release of land for industrial development.
- iii) Minor changes to the road structure and staging plan to reflect items i) and ii).

2.0 RELEVANT STUDIES

2.1 Overview Strategic Planning Documents

Various strategic planning documents have been prepared which specifically address the significance of the Neerabup Industrial Area for Industrial Use. Of relevance is the North West Corridor Structure Plan (Department of Planning and Urban Development 1992).

The Northwest Corridor Structure Plan was prepared to accommodate part of the long term growth of the Perth Metropolitan Region in the North West Corridor. This included examining the need for future housing development, local employment, retail and commercial centres, efficient transportation networks and protection of areas of significant environmental qualities. The Structure Plan identified Neerabup as a strategic industrial area for larger scale industrial activities centrally located to serve the North West Corridor.

2.2 Basic Raw Materials Policy (WAPC July 2000) Statement of Planning Policy No. 10

The Basic Raw Materials Policy has been prepared by the Western Australian Planning Commission (WAPC) to facilitate the extraction of basic raw materials close to the major markets in the Metropolitan Region and to avoid sensitive development close to basic raw materials resources which could otherwise inhibit extraction of the resource. The objectives of the policy are to:

- Identify the location and extent of known basic raw materials resources;
- Protect Priority Resource Locations, Key Extraction Areas and Extraction Areas from being developed for incompatible land uses which could limit future land exploitation;
- Ensure that the use and development of land for the extraction of basic raw materials does not adversely affect the environment or the amenity in the locality of the operation during or after extraction; and

- Provide a consistent planning approval process for extractive industry proposals including the early consideration of sequential land uses.

The central and western portion of the Neerabup Industrial Area is identified as a limestone/limesand resource and is identified as a Priority Resource Location being known areas of high resource potential which should be held available for current and future extraction as illustrated in **Figure 2.1**. The eastern portion fronting Flynn Drive is identified as sand resource, again a Priority Resource Location. The basic raw materials policy does acknowledge that this area is also partly constrained by Bush Forever.

Within the NIA, the Basic Raw Materials Policy recognises the need for staged excavation to prepare the site for future industrial use.

2.3 Structure Planning

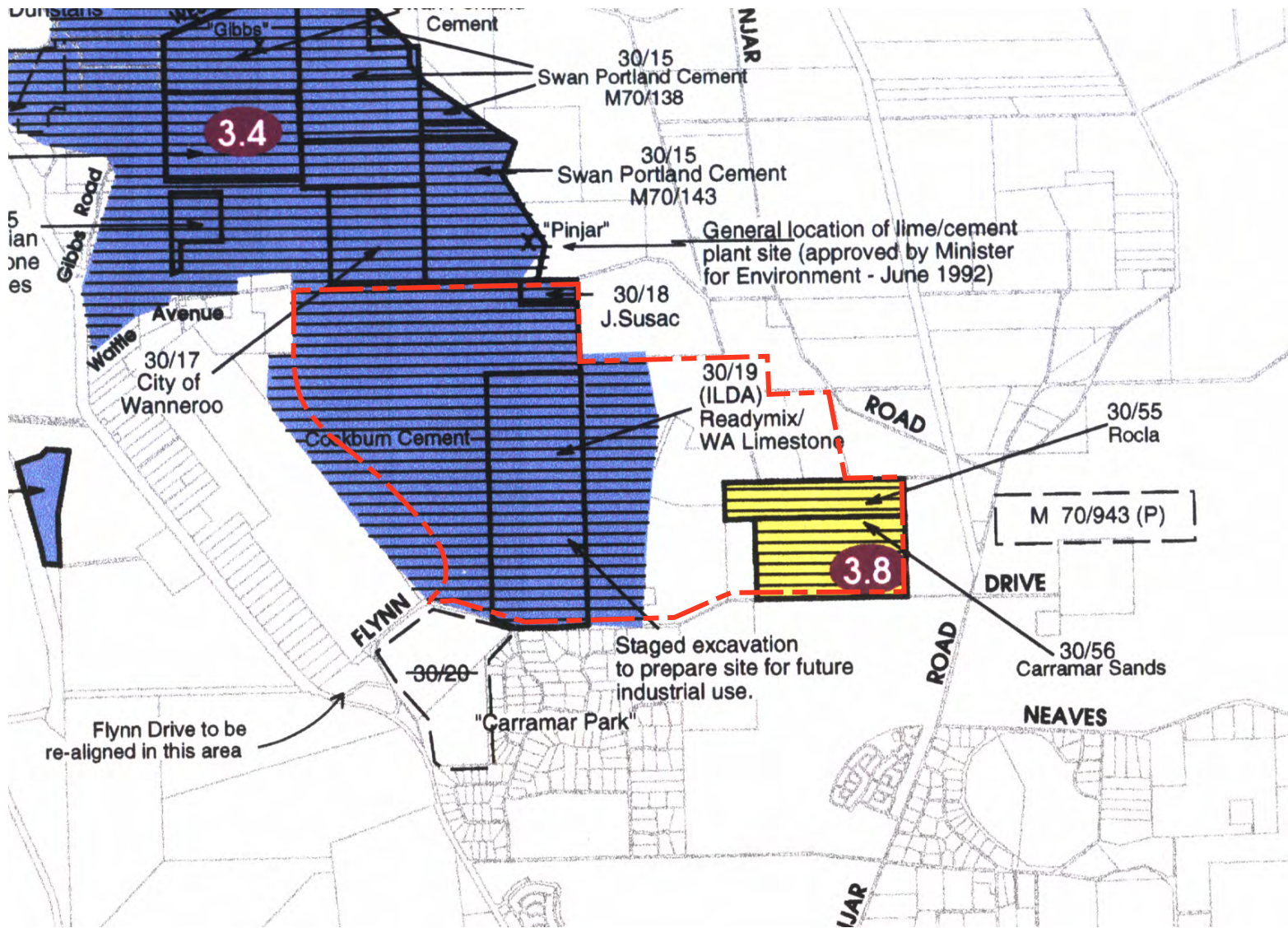
Since 1995, the NIA has been the subject of two separate Structure Plan proposals, and a Structure Plan review. The following is a brief summary of those studies.

2.3.1 *Flynn Drive Industrial Area District Structure Plan*

The first Structure Plan proposal, the Flynn Drive Industrial Area District Structure Plan (FDIADSP) prepared by Richard Pawluk and Associates et al, comprised a comprehensive overview of the physical environmental characteristics of the site and its environs and proposed a broad Structure Plan identifying the following key elements:

- Strong east/west links to the regional road system, complemented by north/south link roads between Flynn Drive to the south and the extension of Wattle Avenue to the north;
- A relatively permeable notional internal road layout; and
- A variety of land uses, with a predominance of General Industry, complemented by "Garden Industry" Light Industry, Mixed Business and Commercial.

A copy of the FDIADSP is illustrated in **Appendix 2**.



- LEGEND**
- APPLICATION AREA
 - LIMESTONE / LIMESAND RESOURCE
 - SAND RESOURCE
 - PRIORITY RESOURCE LOCATION
Known areas of high resource potential which should be held available for current and future extraction
 - EXTRACTION AREA
Areas of existing extractive industry operation
 - 30/55 WAPC REFERENCE NO.
 - 30/55 TENEMENT EXPIRED
 - M 70/945 DME REFERENCE NO.
 - (P) PENDING
 - 3.8 ENVIRONMENTAL AND CONSERVATION REFERENCE
(Bushplan Forever Site 295)

NEERABUP INDUSTRIAL AREA
BASIC RAW MATERIALS POLICY



FIGURE 2.1

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The FDIADSP addressed the key environmental issues, in particular buffer requirements from surrounding residential development as well as the Barbagello Raceway, and the wetland reserve requirements associated with Lake Neerabup.

The FDIADSP also addressed the potential of the area for the extraction of limestone and sand resources. The project engineers for the study, Sinclair Knight Merz, provided indicative finished surface levels, aiming to achieve an optimum between maximising resource extraction, and achieving appropriate surface grades for industrial development.

The report also addressed, in very general terms, the possible staging and servicing of the next stages of development in the short term.

2.3.2 Flynn Drive Structure Plan

In 1998, the City of Wanneroo commissioned the preparation of a new Structure Plan, Flynn Drive Structure Plan (FDSP) encompassing the NIA, and Nowergup and parts of Carabooda to the north, an area encompassing approximately 2,426 hectares, (refer **Appendix 3**).

This plan was prepared by Planwest (WA) Pty Ltd, in association with Bowman Bishaw Gorham and Ewing Engineers. The Structure Plan, as it related to the NIA, proposed a substantially different design philosophy to that promoted by the FDIADSP. In broad terms, the fundamental differences were:

- A stronger north/south emphasis in the road system, which appears to have the disadvantage of encouraging regional industrial traffic through residential areas to the south with less direct movement of such traffic onto the surrounding regional road system;
- The internal road system which, whilst only notional, was not as permeable and efficient for industrial traffic as the original FDIADSP; and
- Proposed less General Industrial land to be created.

2.3.3 Neerabup Industrial Area Structure Plan Review

An independent review was commissioned by LandCorp and undertaken by SMEC Australia, with the primary aim being to review the two previously mentioned Structure Plans, and to present recommendations on the most appropriate direction to progress planning to the next stage. A copy of the plan is illustrated in **Appendix 4**.

In presenting recommendations, the SMEC report indicated a clear preference for the original FDIADSP based on the following reasons:

- It provided a legible and regular road circulation system that discouraged the potential intrusion of industrial traffic into adjoining residential areas.
- The reliance on the use of existing roads such as Flynn Drive and the extension of Wattle Avenue provided further efficiencies for the development of the area.

It offered a pragmatic approach to one of the key objectives for the area, being the facilitation of the early release of industrial lots.

The SMEC report also identified a number of emerging issues which were significant to the NIA Structure Planning exercise. These included:

- The State Government's Bushplan initiative (now Bush Forever);
- Changing philosophies for regional road planning which encouraged permeability at the risk of introducing industrial traffic into residential areas;
- Management of noise and risk issues associated with development abutting motor sport venues; and
- The reduction of the reserve of General Industrial land held in estates through the region by the intrusion of Commercial and Mixed Business type uses.

The SMEC report recognised the ongoing importance of Basic Raw Materials policy as an interim factor in achieving the end objective of creating a high quality and modern industrial estate.

3.0 EXISTING ZONING & TENURE

3.1 Metropolitan Region Scheme Zoning

The Neerabup Industrial Area is predominantly zoned Industrial under the provisions of the Metropolitan Region Scheme (MRS). The only exception to this is a Public Purposes reserve in the north-eastern corner. It has now been determined that this reserve is no longer required (refer Section 5.8). The WAPC has recently initiated an amendment to the MRS to rezone the land to Industrial. The proposal is contained in Amendment No. 1037/33 North West Districts Omnibus No. 5, which commenced advertising on 11 December 2001.

Flynn Drive, forming the southern boundary of the Structure Plan, is an Other Regional Road Reservation. Lake Neerabup abutting the site to the west is included within Parks and Recreation Reservation, as is the western part of Lot 21. To the northeast abutting the site, there are various motor sports venues, which are also contained in Parks and Recreation Reservation.

The zoning and reservations for the land are identified within **Figure 3.1**.

3.2 Local Zoning

The land is subject to the provisions of the City of Wanneroo District Planning Scheme No. 2 (DPS 2), under which it is predominantly zoned Industrial Development. **Figure 3.2** shows existing zoning under DPS 2.

This zone is intended to facilitate future industrial development and provide for the comprehensive planning of larger areas for industrial and employment purposes.

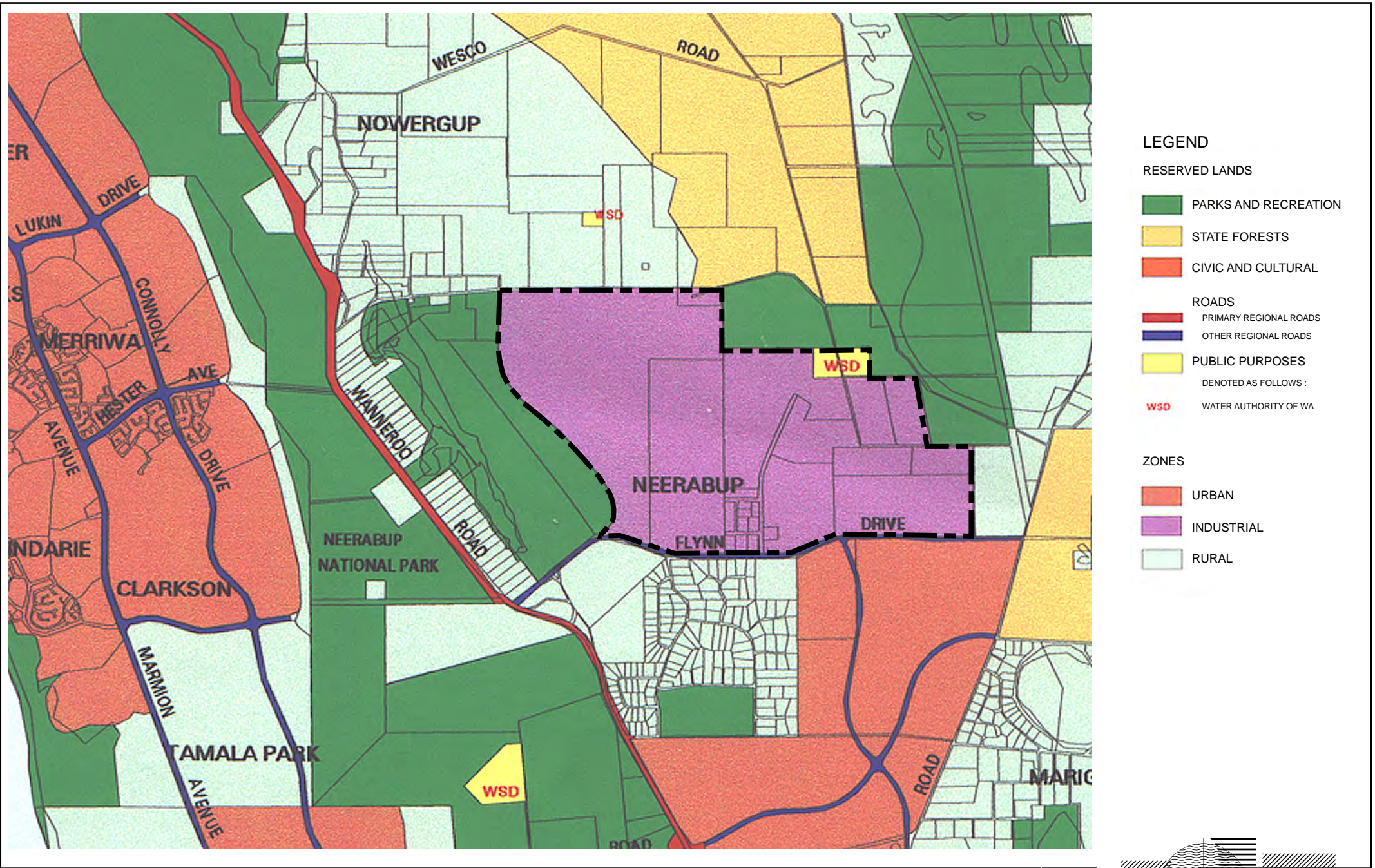
A key feature of the zone is the requirement that a Structure Plan be prepared and adopted, prior to any development or subdivision, to form the basis for consideration of all future subdivision and development proposals.

The major part of Lot 22 and the existing Mather Drive industrial area is zoned General Industrial, which is a continuation of a similar zoning under the previous Town Planning Scheme No. 1.

Consistent with the MRS, there is a Public Purpose reservation in the north-eastern corner of the site. When the MRS amendment (referred to in Section 3.1) is completed, the Public Purpose reservation under DPS 2 will be automatically removed, leaving the affected land unzoned. It will be necessary to undertake a subsequent amendment to the local scheme to apply a zoning consistent with the MRS. Given the zoning already applying to the balance of the study area, it would be appropriate to rezone the land to Industrial Development zone.

3.3 Current Land Ownership

The most recent land ownership is illustrated in **Figure 3.3**. The majority of the land is under private ownership although about 40% is owned by LandCorp and the City of Wanneroo.



- LEGEND**
- RESERVED LANDS**
- PARKS AND RECREATION
 - STATE FORESTS
 - CIVIC AND CULTURAL
- ROADS**
- PRIMARY REGIONAL ROADS
 - OTHER REGIONAL ROADS
- PUBLIC PURPOSES**
- DENOTED AS FOLLOWS :
- WSD** WATER AUTHORITY OF WA
- ZONES**
- URBAN
 - INDUSTRIAL
 - RURAL

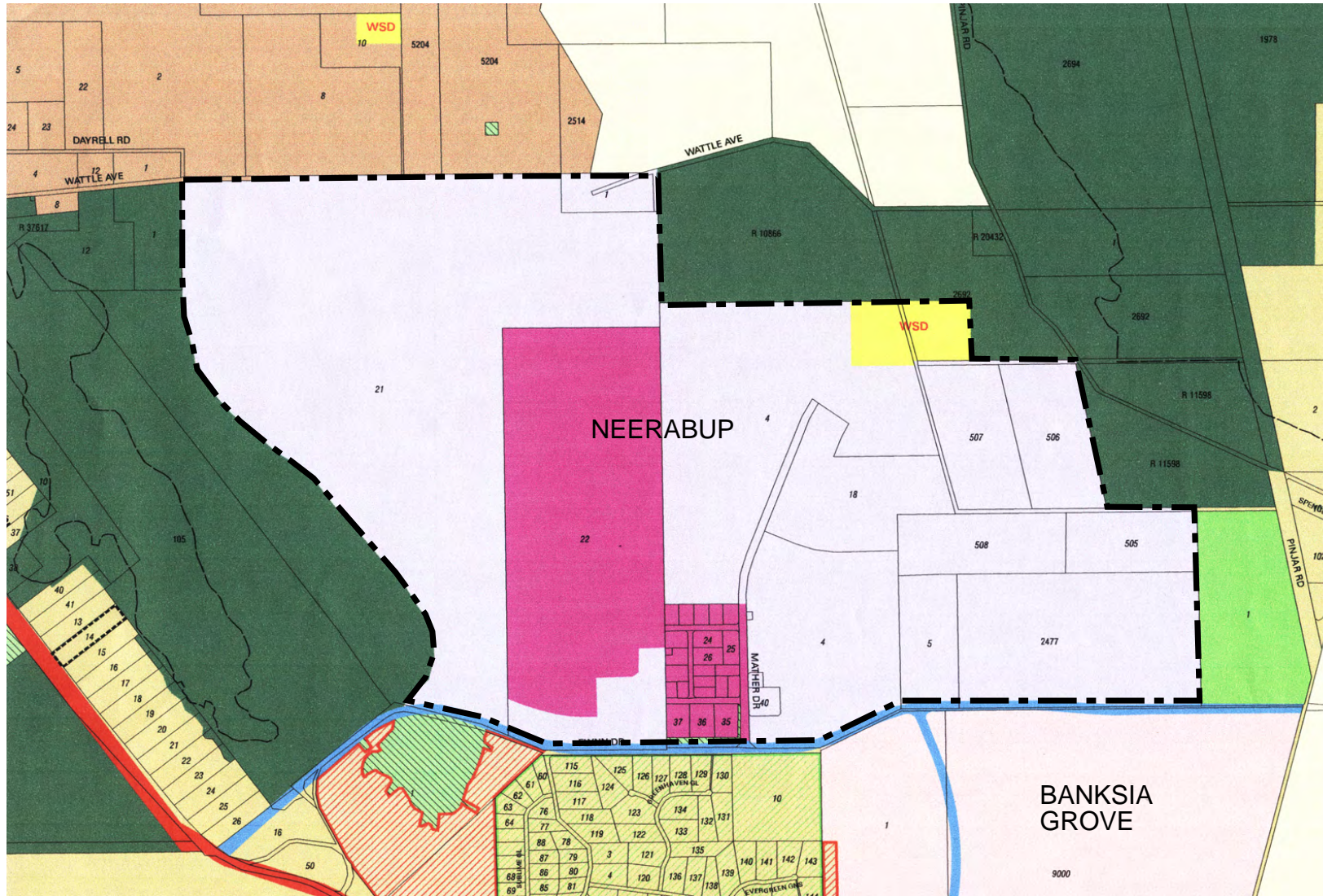
**NEERABUP INDUSTRIAL AREA
MRS ZONINGS**



FIGURE 3.1

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LEGEND

METROPOLITAN REGION SCHEME RESERVES

- PARKS AND RECREATION
- RESTRICTED PUBLIC ACCESS
- STATE FORESTS
- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS
- PUBLIC PURPOSES

LOCAL SCHEME RESERVES

- PARKS AND RECREATION

ZONES

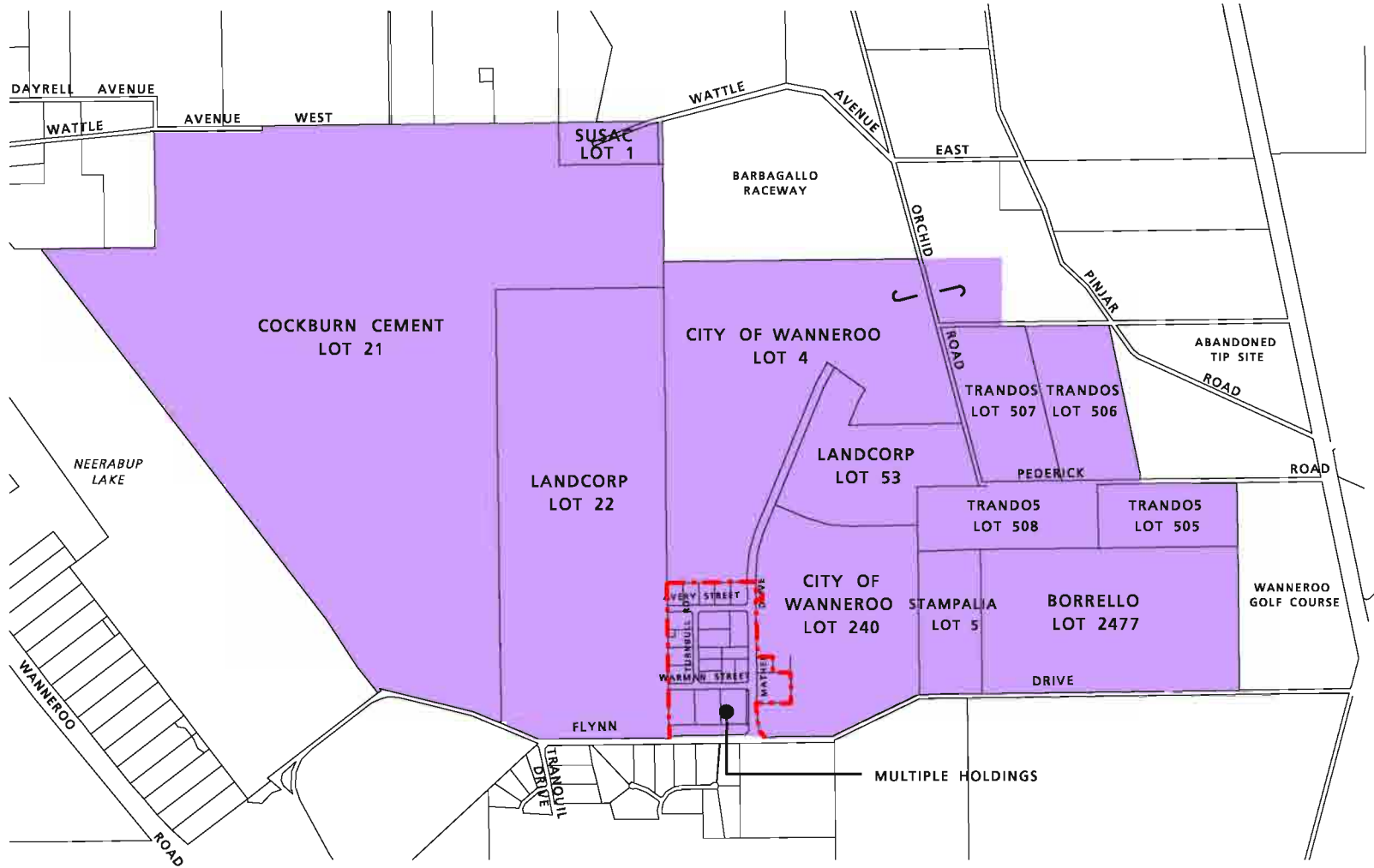
- SPECIAL RESIDENTIAL
- GENERAL INDUSTRY
- PRIVATE CLUBS / RECREATION
- URBAN DEVELOPMENT
- INDUSTRIAL DEVELOPMENT
- GENERAL RURAL
- RURAL RESOURCE
- SPECIAL RURAL
- ADDITIONAL USE
- RESTRICTED USE

**NEERABUP INDUSTRIAL AREA
ZONING CITY OF WANNEROO DISTRICT PLANNING SCHEME NO. 2**



FIGURE 3.2

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LEGEND

STRUCTURE PLAN AREA

LANDCORP LOT 63 OWNER / LOT No.

**NEERABUP INDUSTRIAL AREA
CURRENT LAND OWNERSHIP**



FIGURE 3.3

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4.0 SITE DESCRIPTION

4.1 Overview

The Neerabup Industrial Area is strategically located in close proximity to existing and future transport routes.

To the southeast of the NIA, significant future residential development is proposed within the urban cell known as Banksia Grove. Residential estates along the coastal strip of the North West Corridor (including the suburbs of Clarkson, Merriwa, Kinross, Mindarie) are currently developing approximately 3 km to the west of the Industrial Area (refer **Figure 1.1**).

4.2 Movement Network

4.2.1 External Road Network

4.2.1.1 Existing Road Network

The Neerabup Industrial Area is bounded to the south by Flynn Drive, which links Wanneroo Road in the west to Pinjar Road in the east. Pinjar Road in turn links to Neaves Road, which provides the most direct link to the east and the Great Northern Highway at Bullsbrook. Access to the south and north is currently provided by Wanneroo Road, which in turn also provides access to the Mitchell Freeway either at Hodges Drive or Ocean Reef Road.

To the west, indirect links to Marmion Avenue are via Quinns and Hester Roads and Burns Beach Road to the south. The Mitchell Freeway currently ends at Hodges Drive.

Wattle Avenue East and West currently provide access to north of the site from Pinjar Road and Wanneroo Road respectively. Wattle Avenue, however, does not connect to provide through access from Pinjar Road to Wanneroo Road. Whilst previously contemplated, the connection of Wattle Avenue East and West is not considered to be a requirement of the Structure Plan as Road A will provide better permanent access arrangements for the Barbagallo Raceway which has been experiencing traffic congestion problems during major events. At present the only permanent public road access to the

Raceway is from Wattle Avenue East; however, the City has recently permitted the Raceway to construct a temporary access road from Mather Drive, which alleviates, at least temporarily, the existing traffic problems.

4.2.1.2 Future Road Network

A number of road proposals have been identified in the Metropolitan Region Scheme and North West Corridor Structure Plan. Of relevance to this Structure Plan are the following:

Metropolitan Region Scheme Roads

- i) An east-west regional road connection between Neaves Road and Burns Beach Road south of Flynn Drive (classified as an "Other Regional Road").
- ii) A north-south regional road connection between Pinjar Road (at Clarkson Avenue) and Flynn Drive east of Mather Drive (also an "Other Regional Road").
- iii) A realignment of Flynn Drive at the western end and the inclusion of Flynn Drive on the MRS as an Other Regional Road.
- iv) An MRS amendment was prepared for the following:
 - Mitchell Freeway extension from Burns Beach Road to Romeo Road (as a Primary Regional Road)
 - Neerabup Road between Wanneroo Road and Mitchell Freeway ("Other Regional Road")
 - Hester Avenue between the Mitchell Freeway and Wanneroo Road ("Other Regional Road")

North West Corridor Structure Plan Roads

- A connection of Wattle Roads East and West to create an "Other Regional Road", between Wanneroo Road and Pinjar Road (forecast to carry 5,000 vpd).
- A north-south link on the western boundary of the Neerabup Industrial Area.

- An east-west link through the centre of the Neerabup Industrial Area, linking the previous proposal and Pinjar Road.
- A north-south road through the centre of the Neerabup Industrial Area between Flynn Drive and (ultimately) linking into Wanneroo Road just south of Pipidiny Road (forecast to carry 15,000 vpd).

These last four proposals are viewed as probable long term roads in the North-West Corridor Structure Plan.

The suitability of the above roads was outlined in the traffic report for the FDIADSP. These reasons are still valid and discussed further below:

Neaves Road - Burns Beach Road

Provides an important east-west strategic link between the future Mitchell Freeway and future development in the North-East Corridor.

Neerabup North-South Road

Provides a district distributor road connection at an appropriate offset from and parallel to Wanneroo Road for residential and industrial traffic accessing Joondalup (an important commercial and employment centre) via Burns Beach Road and destinations to the south-east via Wanneroo Road, Hepburn Avenue and the Tonkin Highway.

Wattle Avenue

Wattle Avenue west forms a district distributor road link facilitating movements between the northern part of the industrial area and the Mitchell Freeway via the proposed east-west link (Hester Avenue). It is intended to extend Wattle Avenue West to the north along the edge of the Bush Forever site to then ultimately link with Orchid Road or Wattle Avenue East. This will primarily facilitate access to developments north of Wattle Avenue. As previously mentioned in section 4.2.1, Mather Drive and Road A will provide alternate access to the Barbagallo Raceway which is of considerable concern to the Western Australian Sporting Car Club.

Neerabup Road - Flynn Drive Connection

This link is considered important as the main access link from the industrial area to the Mitchell Freeway. It also provides a link to the east and to the Great Northern Highway via Pinjar Road and Neaves Road.

4.3 Geology

Existing geological knowledge of the Neerabup Industrial Area (NIA) is limited to surface geological mapping by the Geological Survey of Western Australia (Yanchep and Muchea 1:50,000 Environmental Geological Series). In addition, bore logs provided by the Water and Rivers Commission for the Flynn Drive Structure Plan identified one borehole in the southern portion of the study area and two at the northern edge. At the southern bore, karstic limestone was encountered at heights of 20-70 metres AHD and depths of 0-65 metres below ground level. Karsts were recorded at up to 35 metres above the water table.

The geology map divides the area into two types of Tamala limestone:

- Ls1 A light yellowish brown, fine to coarse grained, sub-angular to well-rounded quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of Aeolian origin.
- Ls2 As Ls1, abundant karstic phenomena including caves, dolines, swallows.

The Tamala limestone is a sandy limestone deposited in the Pleistocene and of Aeolian origin. It was probably laid down in dunes and resolution of shell fragments caused it to become variably cemented. Generally the surface above the Tamala limestone is characterised by a deeply leached sand from which the carbonate has been removed often to be deposited on the underlying limestone surface as a hard calcrete layer. In some cases the solution of carbonate may continue to depth creating karstic cavities particularly where the limestone has more carbonate cement. This effect is unpredictable.

The division in the mapping appears arbitrary and based purely on surface expression. It is unlikely that there are separate units with one liable to developing karst and one without karst features. The Tamala limestone is likely to develop karstic cavities and the most likely areas for these to have developed are where there are other cavities/caves in the local area.

Therefore, the presence of caves in the vicinity of the NIA is considered to indicate that there may be further undiscovered caves within the study area. Some 15 kilometres to the north extensive caves are developed into similar rocks in the Yanchep National Park. In the Margaret River area caves again in similar material have remained undiscovered until relatively recent times.

4.4 Surface Hydrology/Wetlands

There are two wetlands mapped within the vicinity of the NIA, Lake Neerabup and Lake Pinjar. Both are protected by the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* refer **Figure 4.1**. The EPP protects these wetlands from mining, drainage, effluent disposal and filling (SMEC 1999). Both of these lakes have multiple management categories prescribed by the Water and Rivers Commission (WRC) and each category will cover different areas around each lake.

Lake Pinjar is located to the east of the NIA with only a small area contacting the boundary of the Structure Plan area. The open water of the lake and its adjacent bushland cover an area of approximately 735 ha. The WRC management objectives include some areas that have been set aside for Conservation and others for Multiple Use. The Australian Heritage Commission lists Lake Pinjar as an Indicative Place.

Neerabup Lake, the smaller of the two, is situated along the western boundary of the site. It covers an area of 242 ha, bushland inclusive. The WRC management objectives are for Conservation and also for Resource Enhancement, that is, the restoration and enhancement of natural attributes and functions through maintenance and management.

Previously a 250m buffer zone was recommended between the eastern shore of the lake and the NIA (Pawluk & Associates et al, 1995). This buffer zone lies within the existing MRS alignment, which was confirmed as adequate for the protection of Lake Neerabup and its representative habitats (SMEC, 1999).

4.5 Hydrogeology

It is estimated that there is a strong westerly flow of groundwater beneath the NIA, due to the high transmissivity of the limestone soils and also the relatively steep gradient in Average Annual Maximum Groundwater Levels (AAMGLs) (Planwest et al., 1999).

The NIA falls within a proposed Priority 3 Protection Area of the Perth Underground Water Pollution Control Area (refer **Figure 4.2**). General and light industry are compatible land uses within Priority 3 Protection Areas, however heavy industry and power stations are not (Planwest et al., 1999). Under the Priority 3 requirements, the NIA would need to be provided with deep sewerage (Planwest et al., 1999). To the north-east and east of the NIA are existing Priority 1 and 2 Source Protection Areas, which prohibit any industrial land uses.

The Draft Gnangara Land Use and Management Strategy (1999) proposes a change in the boundaries of the Priority 1 Source Protection Area, however this does not affect the proposed Priority 3 status of the NIA.

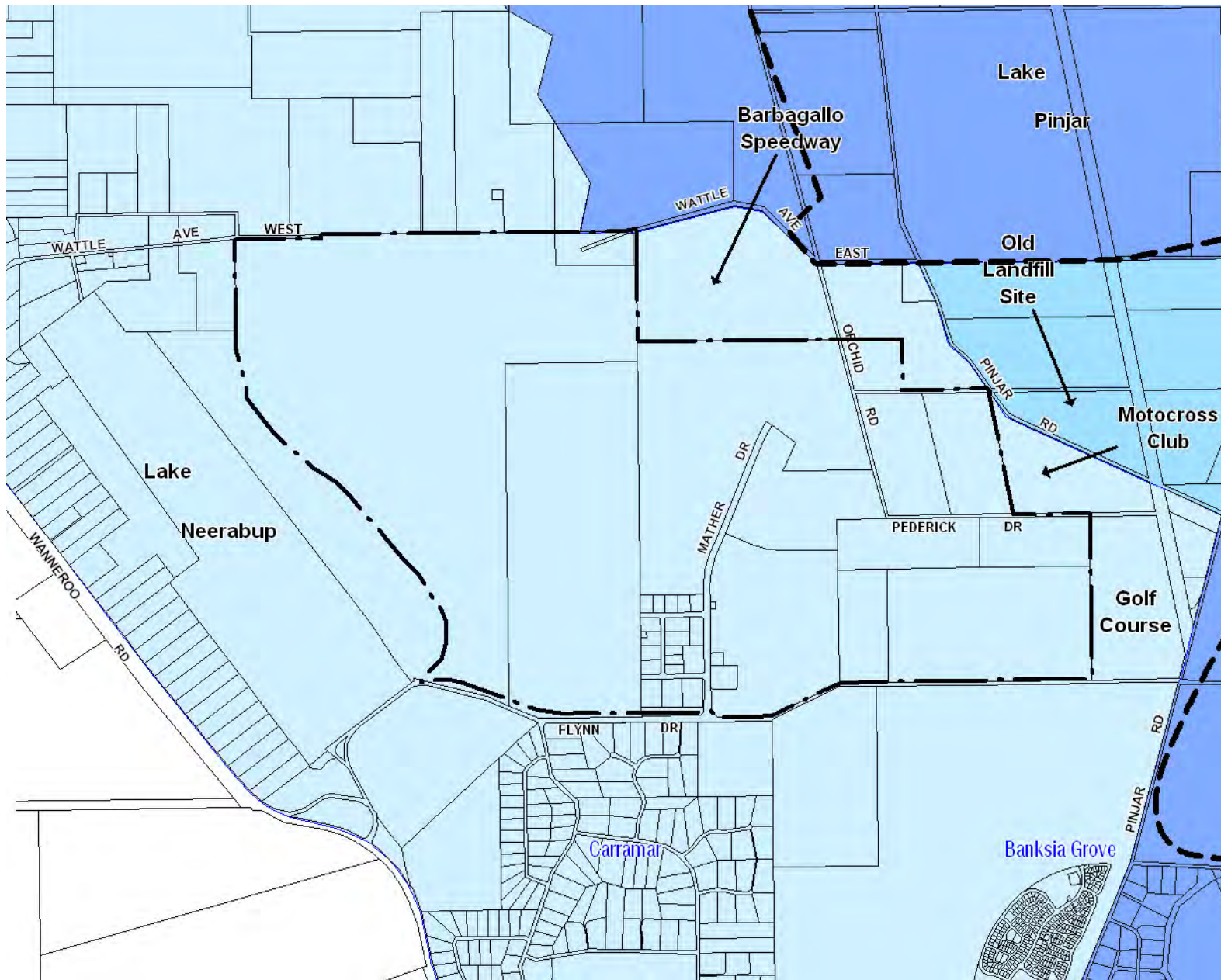
There is an abandoned putrescible landfill site located immediately east of Pinjar Road (refer **Figure 5.1**) below which a plume of leachate is spreading west towards the NIA (City of Wanneroo, pers. comm.). The landfill was previously operated by the City of Wanneroo and has been closed since the mid-eighties. Sampling of groundwater quality has been undertaken, and it is estimated that the leachate plume may extend as far west as Orchid Road (City of Wanneroo, pers. comm.). The presence of the plume should not prevent most industries from operating within the NIA, as the estate should be serviced with reticulated water, however it does present an issue of future liability for the future industries. This liability will need to be fully disclosed between the industries, landowners/developers and the City of Wanneroo.



**NEERABUP INDUSTRIAL AREA
AERIAL PHOTOGRAPH**



FIGURE 4.1



LEGEND

- STRUCTURE PLAN BOUNDARY
- CADASTRAL BOUNDARY
- PROPOSED PRIORITY 1 BOUNDARY

GROUNDWATER

- PRIORITY 1
- PRIORITY 2
- PRIORITY 3

**NEERABUP INDUSTRIAL AREA
GROUNDWATER PRIORITY SOURCE PROTECTION AREAS**



FIGURE 4.2

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5.0 OPPORTUNITIES & CONSTRAINTS

The site is characterised by a number of issues which are relevant in the Structure Plan formulation process and may ultimately influence the design outcome. The following is a summary of the key issues, many of which are also graphically depicted in **Figure 5.1**.

5.1 Air Quality

Air quality constraints are related to the potential impacts of industry on nearby areas in terms of emissions from stacks, odours and also the generation of dust. Given the typical industries to be established within the NIA, emissions should not be an issue (this is more related to heavy industry). Similarly, most general and light industry should not create odours. The soils in the area are typically medium to coarse grained sands, thus the potential for dust generation is low (Pawluk & Associates *et al.*, 1995). Dust may still be generated from on-site stockpiles, unpaved access roads, and also stack emissions.

In the event that an industry is proposed that is likely to generate potential impacts due to emissions, modelling of the emissions or odours would occur as part of the approvals process, and an acceptable placement of the particular industry determined from the results. Emission reduction measures may also be required to satisfy air quality standards.

5.2 Noise

5.2.1 Noise From Barbagallo Raceway

The issue of potential noise impact from the Barbagallo Raceway has been the subject of ongoing consultation with the Department of Environmental Protection (DEP). Under the Environmental Protection (Noise) Regulations 1997, noise levels considered tolerable for industrial land uses should not exceed 65 dB(A). DEP advice indicated that acoustic modelling based on a major raceway event (Australian Touring Car Championships) placed the 65 dB(A) noise contour at approximately 1500m from the Raceway Boundary. The most recent written advice from the DEP in this respect is contained in **Appendix 5**.

In summary, the DEP acknowledges that most land uses proposed to be accommodated within the NIA will not be adversely affected by noise from the Barbagallo Raceway, primarily for two reasons:

- i) General Industrial uses are not considered to be noise sensitive premises; and
- ii) The main high noise generating events at the raceway occur on occasional weekends, when most of the industrial and associated uses are closed.

The DEP advice listed some land uses which may be regarded as noise sensitive and therefore possibly not suitable within 1,500 metres of the raceway; those uses included auction rooms, landscape supplies, vehicle sales/hire, convenience stores, service station etc. These uses are, in any case, generally considered inappropriate within the General Industrial area, however they may be suitable within the Service Industrial areas or the Business core. Parts of these precincts are proposed to be located closer than 1,500 metres from the raceway.

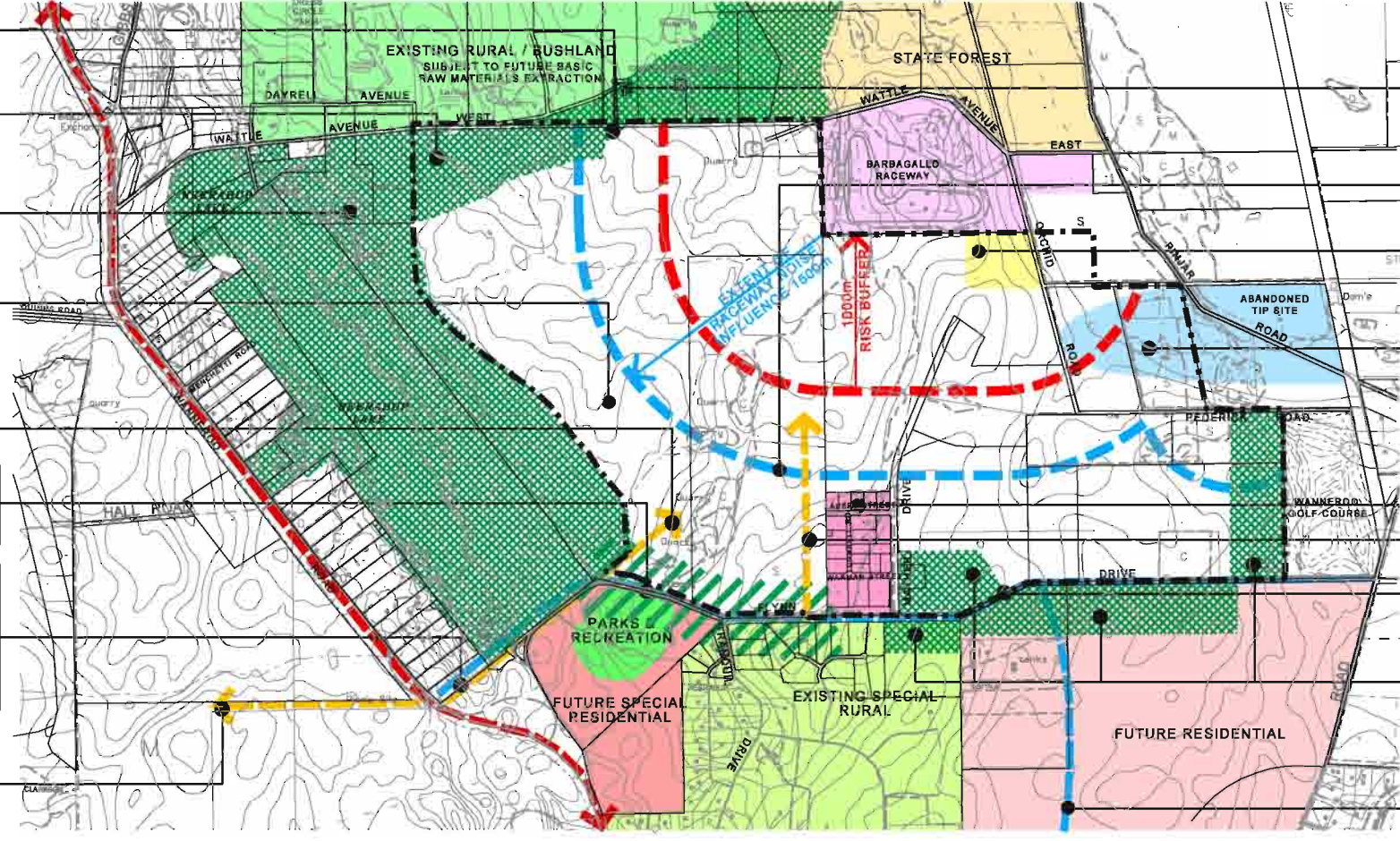
If the DEP advice were strictly applied, therefore, there are some uses within the Service Industrial, and Business precincts which could be considered unsuitable within 1,500 metres of the raceway, if such uses operated on the weekends.

Recent enquiries with the management of the Barbagallo Raceway have indicated that, apart from the Australian Touring Car Championship, the other events likely to generate high noise levels are club meetings which are generally held on one Sunday per month, with a total of eight events per year.

Based on this advice from the Raceway, it appears that the potential for conflict between the raceway and possible noise sensitive premises within the NIA is likely to be primarily confined to Sundays, and only on nine occasions per year. Whilst some businesses may be operational at sometime during the weekend, few would be open on Sundays, and therefore the frequency of potential conflict is minimal.

In summary, it is considered that a 1,500m noise contour may be overly conservative. Furthermore, given that the potential impact would generally be confined to eight Sundays per year the possibility of a noise conflict occurring at any distance is likely to be negligible.

- OPEN CAVE WITH APPARENT ABORIGINAL HERITAGE SIGNIFICANCE
- BUSH FOREVER SITE 203 IDENTIFIED TO CREATE LINK TO NEERABUP NATIONAL PARK
- EXISTING PARKS & RECREATION RESERVE - NEERABUP LAKE ENVIRONS. CONSIDER LAND USE INTERFACE
- POSSIBLE PRESENCE OF LIMESTONE KARSTS WITH RARE STYGOFAUNA MAY NECESSITATE DETAILED SURVEY AND POTENTIALLY CURTAIL SOME EXTRACTION / DEVELOPMENT OPPORTUNITIES, IF FOUND
- POTENTIAL TO CREATE MORE DIRECT CARRIAGE FROM ESTATE GATEWAY TO THE HEART OF THE INDUSTRIAL ESTATE
- NEED TO CONSIDER SENSITIVITY OF LAND USE INTERFACE WITH ADJACENT SPECIAL RURAL & SPECIAL RESIDENTIAL USES
- RECOMMEND REALIGNMENT OF FLYNN DRIVE
 - IMPROVED ROAD GEOMETRY FOR INDUSTRIAL TRAFFIC
 - OPPORTUNITY TO DEVELOP A PROMINENT GATEWAY - GIVING THE INDUSTRIAL ESTATE A WELL EXPOSED CORPORATE ADDRESS
- POSSIBLE FUTURE LINK TO FREIGHTWAY AND RAIL SYSTEM VIA EXTENSION OF NEERABUP ROAD (PROPOSAL INCLUDED IN CURRENT CLARKSON-BUTLER OMNIBUS AMENDMENT NO. 092/33)



- EXTENSION OF WATTLE AVENUE WEST
 - EXTENSION NORTH TO SERVICE NOWRUP AND REDUCE IMPACT ON THE BUSH FOREVER SITE SUBJECT TO FURTHER INVESTIGATION
- RACEWAY NOISE INFLUENCE AREA - ONLY EFFECTIVE ON OCCASIONAL WEEKENDS (MOSTLY SUNDAYS) NOT EXPECTED TO CAUSE ANY ADVERSE IMPACT ON INDUSTRIAL AND ASSOCIATED LAND USES
- PUBLIC PURPOSE RESERVATION NO LONGER REQUIRED BY WATER CORPORATION
- LEACHATE PLUME FROM OLD TIP SITE. POSSIBLE NEED FOR DISCLOSURE TO PURCHASERS
- EXISTING (UNSERVICED) INDUSTRIAL AREA - MATHER DRIVE PROVIDES ESTATE ENTRANCE. EXISTING USE & DEVELOPMENT MAKE THIS INAPPROPRIATE FOR USE AS HIGH QUALITY ENTRANCE TO A MAJOR NEW INDUSTRIAL ESTATE
- OPPORTUNITY TO ESTABLISH NEW ENTRY, AND KEY NORTH-SOUTH SPINE.
- FLYNN DRIVE CLASSIFIED AS OTHER REGIONAL ROAD UNDER MRS
- BUSH FOREVER SITES 206 & 404
 - COUNCIL HAS FORMALLY OBJECTED TO SITE
 - ADJACENT MATHER DRIVE
 - LAND SOUTH & EAST OFFER BUFFER AGAINST FUTURE RESIDENTIAL AND GOLF COURSE USES
- FUTURE DISTRICT DISTRIBUTOR THROUGH BANKSIA GROVE

NEERABUP INDUSTRIAL AREA OPPORTUNITIES AND CONSTRAINTS

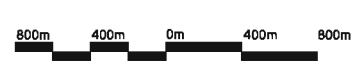


FIGURE 5.1

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More recent discussion with the DEP indicates that the Department agrees that even noise sensitive uses are likely to be permissible at a closer distance from the Raceway (eg, within the Service Industrial and Business Precincts) in view of the special factors noted above.

If this is accepted, it would also give continued flexibility for the raceway to occasionally exceed the 65 dB(A) noise limit specified by the DEP.

5.2.2 Noise from NIA Industries

Industrial noise has the potential to cause an adverse impact on residential amenity in circumstances where industrial and residential developments are placed in close proximity. It is therefore important to ensure that this issue is properly addressed through the planning process so that the development potential of strategic industrial areas such as Neerabup is not constrained by urban development. The onus of protection should, in some part, fall upon the urban developer to minimise potential land use conflicts in the future.

Given the strategic importance of the NIA, suitable separation needs to be maintained between the future northward expansion of the Neerabup Urban Cell (Banksia Grove) and the Industrial Development zone. This would be partially achieved through the retention of Bush Forever site 295 which would preserve a buffer of approximately 300 metres. In addition, consideration should be given to the use of memorials on titles notifying residential purchasers of their proximity to a strategic industrial area.

There is also merit in exploring the potential of applying for a Regional Factor under the Environmental Protection (Noise) Regulations 1997, following the precedent set by the Kemerton Industrial Park south of Perth. The Kemerton Industrial Park, in accordance with Schedule 3 clause (5) of the Regulations, has a Regional Factor assigned that allows noise emissions to be 5 dB(A) above the assigned noise levels under the Regulations.

5.3 Risk

Certain industries may pose a health or safety risk to the public, and the DEP has advised that this is of particular concern considering the numbers of people attending the Barbagallo Raceway (DEP, 1999). The DEP has advised that industries which pose an off-site risk (eg through storage of dangerous or hazardous goods) should be established at least 1,000m away from the raceway (DEP, 1999).

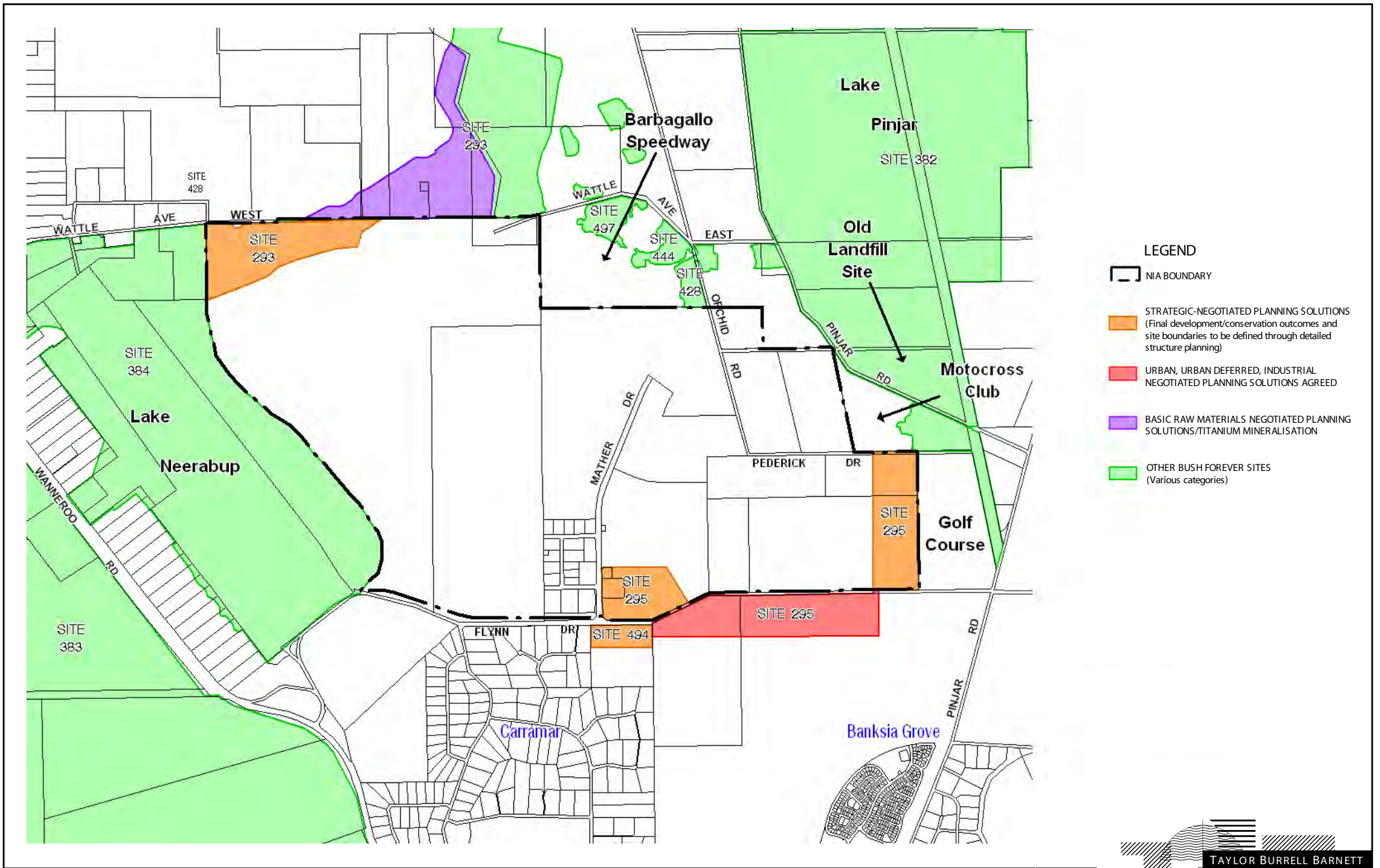
This is not considered to present any significant constraint as industries which pose such levels of off-site risk would, in any case, typically be unacceptable in a general industrial estate.

5.4 Flora, Fauna and Vegetation

5.4.1 Bush Forever Sites

In response to advice from the Minister for the Environment, the EPA has endorsed the Bush Forever strategy as a way forward for the Government to preserve regionally significant native vegetation within the Swan Coastal Plain area of the Perth Metropolitan Region. Two Bush Forever sites have portions that lie within the proposed NIA (Figure 5.2) site 293 in the north-west corner, and site 295 along the eastern and southern boundaries. The combined area of the two sites within the NIA is 89.82 hectares, or approximately 9% of the total area of the NIA. Bush Forever suggests that both sites represent significant conservation values in terms of biological diversity, ecological patterns, processes or communities, and are also representative of rare vegetation complexes.

- Site 293 in particular is in conflict with the linking of the east and west parts of Wattle Avenue, which is of strategic importance not only to the NIA but also to provide a vital alternative access route for the Barbagallo Raceway. Only 14.7% of this Bush Forever site's area (39.6 hectares) lies within the NIA. The linking of Wattle Avenue East and West, however, will need to recognise the site's function as a corridor between Lake Neerabup (site 384), a threatened flora community located north of the NIA, and State Forest areas located north-east of the NIA (Planwest et al., 1999; SMEC, 1999). This may be achieved through sensitive road design, including grade separated fauna links.



**NEERABUP INDUSTRIAL AREA
BUSH FOREVER SITES**



FIGURE 5.2

- Site 295 includes areas identified as habitat for the rare bee *Hylaeus globuliferus* (see **section 5.4.3** below). 42.5% of this site's area (50.2 hectares) lies within the NIA.

Both of the sites are identified by Bush Forever as containing areas intended for development, either through zoning or leases. Bush Forever recommends that conservation of the two sites be encouraged through consultation with the landowners.

In addition to sites 293 and 295, there are a number of Bush Forever sites adjacent to or near the NIA:

- i) Site 384, comprising Lake Neerabup and the bushland immediately west of the NIA, which connects to site 293;
- ii) Site 382, comprising Lake Pinjar and Site 494 West Flynn Drive Bushland, which connects to site 295; and
- iii) Sites 428, 444, 457 and 455, comprising remnant bushland in the vicinity of the Barbagallo Raceway.

5.4.2 Rare flora

Searches of the Department of Conservation and Land Management (CALM) Rare and Priority Flora Database and the WA Herbarium Specimen Database found no listing of declared rare flora within the NIA (Pawluk & Associates *et al.*, 1995).

5.4.3 Rare Fauna and Habitat

There are several issues relating to rare fauna:

- There is the potential for communities of troglobitic fauna to be present within the cave system in the vicinity of the NIA. This includes the open caves immediately west of the NIA, as well as possible subterranean areas below the NIA itself. Troglobitic fauna have been found within limestone caves in Yanchep, and will likely be assigned a high conservation value by the EPA (Planwest *et al.*, 1999; SMEC, 1999). Fauna surveys of the caves and groundwater are recommended at the subdivision and development stage (Planwest *et al.*, 1999) and management of groundwater levels is a critical issue in

maintaining the conservation values of any existing communities in the area (SMEC, 1999), however threatened ecological communities may exist within the NIA, and flora and vegetation surveys are recommended prior to development.

- The population of the rare bee *Hylaeus globuliferus* identified within the NIA is one of twelve populations known to exist (CALM, pers. comm.). The habitat of the bee, *Adenanthos cygnorum* (Woolly bush), appears to be restricted mainly to the area between Mather Drive, Flynn Drive, Wanneroo Golf Club and Pederick St to the north (Pawluk & Associates *et al.*, 1999). Part of the habitat area is covered by Bush Forever site 295. Conservation of site 295 enables appropriate protection for the bee.
- There are five threatened and priority fauna species recorded generally in the Neerabup and Nowergup area (Planwest *et al.* 1999). According to CALM, these species and their conservation status are:

Schedule 1 (Fauna which is Rare or likely to become Extinct)

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*)

Schedule 4 (Fauna which is Otherwise Specially Protected)

- Peregrine Falcon (*Falco peregrinus*)
- Carpet Python (*Morelia spilota imbricata*)

Priority Taxa

- Quenda or Southern Brown Bandicoot (*Isodon obesulus fusciventer*) P4
- Bee (*Hylaeus globuliferus*) P3

5.4.4 *Dieback Prevention*

During the public advertising of the Structure Plan CALM submitted that a Dieback Hygiene Plan should be prepared; Council supported this submission and resolved that an appropriate provision should be included in Part 1 of the Structure Plan requiring this work to be undertaken prior to subdivision and/or development. Discussions with the landowners in September 2004 indicated that they will prepare a Dieback hygiene Plan to suit either their extraction objectives or their development objectives prior to any activity on the individual sites.

5.4.5 *Implications for Structure Planning*

Where land is earmarked for industrial development, Bush Forever will seek to enter into Strategic Negotiated Planning Solutions (NPS) with landowners to achieve a balance between the needs of conservation and legitimate development expectations by acknowledging the full range of social and economic values attached to the land. Strategic NPS promote the protection of Bush Forever sites (in their entirety where possible) from proposals that would result in the direct loss of bushland through statutory planning and environmental approval processes.

Within the NIA, Bush Forever sites 293 and 295 are currently recommended for Strategic NPS by the Department for Planning and Infrastructure. The implementation status of these sites is **'To be determined'**, which requires further discussion and liaison between the affected landowners and State Government to establish the desired protection approach/mechanism to be adopted to secure the Bush Forever objectives for the defined sites. This may involve the development of planning and design solutions at detailed design stage, to achieve the core conservation values of the Bush Forever site, while still allowing some development to proceed.

As summarised in Section 5.4.3, there are five priority and threatened fauna species that reside within the NIA boundary and migrate to outer areas. These species need to be considered in the holistic planning and management strategy associated with Bush Forever sites 293 and 295 and the native vegetation within the boundary of NIA. The most significant issue associated with this proposal, which may affect the long-term survival of faunal populations in the area will be the fragmentation of ecosystems as a result of clearing native vegetation. Factors that need to be considered include:

- Implementation of bushland sensitive design techniques within Bush Forever sites to reduce fragmentation and maintain contiguous linkages between vegetated areas; and
- Liaison between individual landowners and CALM as to their development time frames, so that, if priority or threatened species are found to exist in a development site, there is ample opportunity to develop appropriate management and/or preservation strategies, prior to the clearing of native vegetation.

Given the existing conservation reserves in the region and Bush Forever strategy, these factors are considered to be manageable in the context of industrial development in the NIA, provided liaison is staged effectively between landowners and authorities prior to development.

5.5 **Karstic Features**

Karstic geology is extremely complex, difficult if not impossible to model and thus prediction of the location of cavities is not an exact process. In locating karst cavities in other areas detailed drilling even at 5 metres centres has proved to be expensive and of limited use. One hole may intersect a large cavity whereas the next may be in solid rock.

Most geophysical methods will only locate cavities when they are large and/or close to the surface. Resistivity, electromagnetic surveys, radar and/or micro-gravity have all been used with some success in location of cavities. However, they all work better where the cavity is in a more uniform medium than karstic limestone. This is because the limestone has varying resistivity and density changes that may be greater than that provided by a void.

The use of these test processes to locate large near surface cavities will provide some degree of safety. From such studies combined with detailed mapping and test drilling an estimation of the likely extent of cavities could be established and this testing should be conducted in conjunction with building design.

This information could then be used in building design to compensate for likely extent of cavities by over-engineering structures. Thus if the likely extent of cavities is estimated to be 10% then 10% of the foundations should be considered expendable. The best approach is a best guess.

If karstic formations are identified, certain issues may arise as a result. The porous nature of soils associated with karst topography and their direct connection to groundwater through cavities and solution channels provides a susceptibility to groundwater contamination. Certain industry activities that produce potential contaminants would be subject to normal environmental approvals and management controls. Proposals for such industries would warrant detailed geotechnical investigation to demonstrate site suitability.

A further downstream monitor of groundwater quality could also be undertaken, on an ongoing basis, by the Water and Rivers Commission through the installation by the Commission of monitoring bores within the Parks and Recreation reserve between Lake Neerabup and the industrial area.

In addition, the karst topography (caves in particular) located in and around the NIA may be of conservation significance due to the presence of rare fauna and to the recreational, ethnographic and palaeontological attributes they might possess.

5.6 Summary of Spatial Constraints

5.6.1 Buffer zones

The following buffer zones are of relevance to the NIA:

- 250 m buffer from eastern shores of Lake Neerabup, which is already provided by the MRS zoning and Bush Forever site 384; and
- 1,000 m risk buffer between the Barbagallo Raceway and industries with the potential for off-site risk impacts.

With regard to the impacts of specific industries on residential areas, the DEP recommends buffer distances based upon the pollution footprint of the industry. The DEP are currently reviewing their industrial buffer distances, and plan to release a new guidance document. The current recommended buffer distances are in **Table 5.1**.

Table 5.1: Industrial Buffer Distances (DEP, 1997)

Type of Industry	Buffer Distance (m)
Abrasive blasting works	Case by case
Artificial textiles & fibres	200
Automotive spray painting	150
Bakeries (night time)	500
(day time)	100
Carpet backing	500
Timber treatment plants	Case by case
Dry cleaners	100
Fibreglass works (LSE resins)	200
(non-LSE resins)	500
Joinery & wood working	100-200
Metal fabrication	500
Metal finishing	500
Motor body works/panel beaters	200
Other food or beverage products	Case by case
Paints & inks (blending & mixing)	300
(manufacture)	1,000
Pharmaceutical production	300-1,000
Quarry (non blasting)	500
Recycling waste facility	200
Rubber products	500
Service station (normal hours)	50
(24 hours)	200
Smallgoods (not abattoir or rendering)	100
Synthetic resins & rubber - other	1,000
Textiles (dyeing)	200
(treatment/production)	up to 500
Transport vehicles depot	200
Used tyres storage	1,000
Wreckers	300

5.6.2 Other zones

The following policy zones are of relevance to the NIA:

- Bush Forever sites 293 and 295;
- Groundwater Pollution Protection Area – Priority 3;
- The western boundaries of the Gngangara Park Concept Plan (CALM, May 1999) are in the vicinity of the eastern boundaries of the NIA. According to the GPCP, a park entry statement and recreation site (significant pine plot) is planned in the vicinity of the intersection of Neaves and Pinjar Roads. The Park boundaries do not clash with those of the NIA, and given the presence of other land uses between the two areas (eg Golf course, old landfill, raceway), there should be minimal constraint, if any, to the NIA. Consultation should still be undertaken with CALM, however, to resolve any outstanding issues regarding the Park and the NIA;
- There exists a zone of groundwater contamination approximately 1,000m long extending from the abandoned landfill east of Pinjar Road; and
- There exists an area of noise influence around the Barbagallo Raceway as shown on **Figure 5.1** (refer Section 5.2.1).

5.7 Key Road Linkages

5.7.1 Connections to Freeway

The current road connections to the Mitchell Freeway are indirect. Access is via Wanneroo Road and either Joondalup Drive to the Hodges Drive interchange or via the Ocean Reef Road interchange further south. The Mitchell Freeway currently ends at Hodges Drive.

A direct link to the proposed freeway extension at Neerabup Road (from a westerly extension of Flynn Drive) has been proposed in the North West Corridor Structure Plan, and was the subject of an MRS Amendment (No. 992/33).

This connection would be highly beneficial to the NIA in terms of the substantial improvements in accessibility to regional transportation infrastructure which would result. This is an important consideration given the scale and regional significance of the NIA.

5.7.2 **Wattle Avenue**

Wattle Avenue, to the north of the NIA, is a discontinuous road providing access to Wanneroo Road (Wattle Avenue West) and Pinjar Road (Wattle Avenue East). Wattle Avenue West does not currently serve any major land use. Wattle Avenue East is the main access for the Barbagallo Raceway.

5.8 **Public Purpose Reservation**

There is currently an existing Public Purpose reserve within the study area, reserved for water supply purposes under the provisions of the Metropolitan Region Scheme. This land, which is owned by the City of Wanneroo, is now surplus to requirements and is currently subject to an MRS Amendment to modify the zoning to Industrial (refer Section 3.1).

It is logical that this land now be incorporated into the NIA for industrial development. The City also owns the western portion of Bush Forever site 295; this presents a possible opportunity for Council to negotiate to achieve industrial potential on the Public Purposes site as a trade-off for the loss of the Bush Forever site. It is understood that this will be the subject of more detailed negotiations between the City and the Department for Planning and Infrastructure.

5.9 **Existing Industrial Development**

A small area of existing industrial development is located along the central frontage of the NIA along Flynn Drive at the intersection with Mather Drive. There is the need for the Structure Plan to recognise the existing industrial development in relation to both the extension of Mather Drive and linkages to future road and service infrastructure within the industrial area.

5.10 **Cockburn Cement Land Holding**

Cockburn Cement's land holding (Lot 21), in the western part of the site, contains a total area of 437 ha, of which approximately 300 ha is contained within the Structure Plan area. This represents approximately 35% of the total Structure Plan area. Cockburn Cement's primary objective for this land is to ultimately extract the valuable lime resource, after which they will make the land available for industrial development.

At the time of preparing this Structure Plan, the development intentions of Cockburn Cement, in terms of timeframes and anticipated resource extraction are not known. Cockburn Cement have completed additional site investigations and have determined an optimum final extraction surface which is included in this Structure Plan.

The discussions with Cockburn Cement have enabled the inclusion of Lot 21 in the Structure Plan area and have established a future development pattern encompassing the whole of the area, while allowing Cockburn Cement the greatest flexibility in their future operations.

5.11 **Future Residential Development**

It is important for the Structure Plan to recognise the surrounding land uses, particularly future residential development (Banksia Grove) proposed to be located to the south east of the NIA.

As illustrated within **Figure 5.1** Bush Forever site 295 extends south of Flynn Drive. The retention of this site provides a substantial advantage by forming a buffer of over 300 metres to the future residential development.

Also of relevance is the existing Special Rural and proposed Special Residential areas to the south of Flynn Drive, which will be potentially sensitive to any industrial uses at the interface with the Neerabup Industrial Area boundary.

In particular, the proposed Special Residential area, which carries a subdivision approval, will place approximately 150 Special Residential lots (ranging between 2,000m² and 5,000m² in area) in close proximity to the southern end of the Cockburn Cement land. This will have implications, not only for future industrial land uses, but any interim resource extraction activities.

5.11.1 Other Regional Road Link

The north south road link through the Banksia Grove urban cell, which intersects with Flynn Drive, presents the potential for industrial traffic from the NIA to be attracted to use that route through the heart of the urban cell. It will be important to ensure that the road pattern proposed for the NIA is designed to encourage industrial traffic to use alternative routes to reach the main arterial system.

6.0 RESOURCE EXTRACTION & SITE WORKS

6.1 Basic Raw Materials Policy

The Government of Western Australia through the offices of the DPI and the Department of Minerals and Petroleum Resources (DMPR) has adopted the Basic Raw Materials State Planning Policy No 10 (SPP 10) the aim of which is to preserve resources for future use at reasonable costs.

The policy was refined and upgraded, being gazetted on 28 July 2000. The City of Wanneroo is one of the local government areas included in the policy.

Within the NIA Structure Plan area the two materials are sand and limestone as illustrated in **Figure 2.1**. Limestone can be in cut block or rubble form.

Limestone and sand are not defined as minerals so that the DMPR do not have an extractive licensing function but have an operational safety function.

SPP 10 provides for the issue of extractive industry permits by combination of DPI and the Local Authority and every applicant must submit a management plan for the operation, final form and condition of the land. Control of these issues remains with the Local Authority and in this instance Council will also be the administrators of the Structure Plan.

Within SPP 10, WAPC Plan No. 1 5038 Sheet 3 identifies the bulk of the Structure Plan area and the area extending northwards in Nowergup as Resource Area.

6.2 Resource Extraction Objectives

6.2.1 Compliance with Policy

The existing extractive operations and the proposed final levels following extraction, provide for resource extraction complying with the State Government Policy, SPP10.

6.2.2 Forward Planning

The final surface contours shown on **Figure 6.1** will guide the forward planning of the extractive industry operators and the regulatory authorities in issuing licences for land within the Structure Plan area.

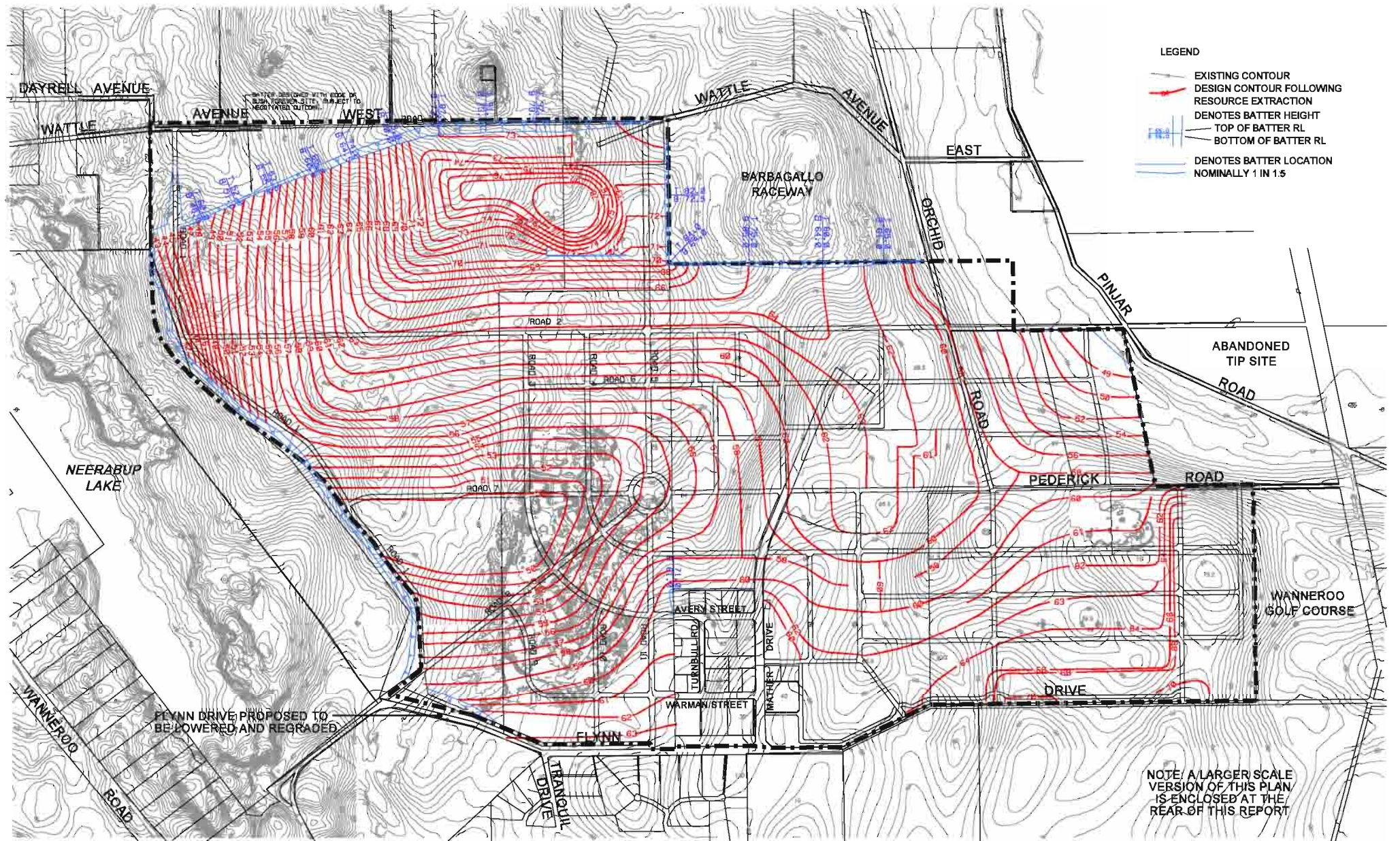
An operator may consider that alternative levels, or greater extraction and backfilling may provide an economic return and seek a variance to the levels shown. Any proposed variance should be considered on its merits and whether the resulting surface achieves these proposed guidelines in a manner which is compatible with the overall final surface contours adopted in the Structure Plan. Any significant variations would be required to be undertaken as a modification to the Structure Plan.

6.2.3 Liaison Across Land Ownership Boundaries

A significant issue is the possible extraction by one landowner to levels that create a discontinuity of the final surface across a common boundary. This could arise from differing rates for extraction and development of adjoining landowners. The finished levels shown on **Figure 6.1** form a basis for resource extraction and should only be varied where later changes in landowners planning require a review of the levels.

6.2.4 Final Surface Levels

The proposed final levels have been designed with the objective of enabling the optimum utilisation of the raw material resources, but ensuring that the final landform provides an optimum environment for efficient industrial development. On this basis, the levels are intended to create a finished surface with grades approaching 1% and ranging up to 2.5%. These grades have been applied to achieve planar surfaces conducive to road design and road drainage and to minimise subsequent development earthworks. Within the Cockburn Cement land the finished surface grades vary and are up to 5% and these will require consideration at land development time with possible batters or retaining walls to achieve site levels suitable for industrial development.



**NEERABUP INDUSTRIAL AREA
FINAL SURFACE CONTOUR PLAN (SEPT 2004)**



FIGURE 6.1

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The implementation of the final surface levels requires a strategy which provides for the variable extraction operations which will occur under the differing land ownership. The current situation where Cockburn Cement have indicated a preference to independently extract, LandCorp are proceeding with limestone extraction on Lot 22, City of Wanneroo are not extracting and two sand extraction operations are in progress, indicates the diversity of operation which must be accommodated, as far as is practicable given the strategic status of the NIA and the essential requirement to ensure that land is available to industry when needed to meet demand.

Landowners may wish to extract below the final surface contour levels with either refilling to level or proposing new levels. The levels can be influenced by project proposals for individual development sites.

The responsibility to ensure that adjoining landowners activities produce finished levels that will support and encourage integrated industrial development will be exercised by the City of Wanneroo through controls on the extractive industry licenses and permits. The NIA Structure Plan will provide Council with an appropriate framework for exercising that responsibility.

6.3 Current Extractive Operations

Several extractive businesses are currently operating in the Structure Plan area:

- Lot 22 Flynn Drive - basically limestone extraction under a joint venture arrangement.
- Lot 508 Pederick Street - an extraction operation by Rocla Industries.
- Loc 2477 Flynn Drive - a sand extraction operation by Carramar Sands.

These operations are all controlled by Licences issued by the City of Wanneroo. Further applications for licences have been submitted to the City including proposals to refill with inert waste. These were still under consideration at the time of writing this report.

6.4 Maximum Extraction Within Industrial Estate

6.4.1 Finished Levels

The final surface levels have been derived from consideration of the resource extraction objectives, current developments and quarrying and the need to achieve optimum grades for industrial development. The plan also considers a reasonable balance between the rate of extraction and the rate of land development. The final surface levels recommended discourage excessive extraction which may otherwise retard the rate of land release for industrial uses.

The levels have also been designed to facilitate efficient design and construction of stormwater drainage and gravity sewer systems.

Where extractive operations are undertaken, the individual landowners will be responsible for ensuring that finished ground levels, after extraction, comply with the Final Surface Contour Plan. In the absence of extractive operations, compliance with the Final Surface Contour Plan will be achieved through bulk earthworks operations prior to subdivision and/or development for industrial use.

Where it is necessary to fill particular areas to comply with the Final Surface Contour Plan (either following resource extraction or in the course of bulk earthworks) only clean fill material should be used and must be imported in a manner suitable for industrial development in accordance with the requirements of the City of Wanneroo.

The final surface contour levels may be influenced by the projected demand timeframes for General Industrial land as well as the timing of special industrial projects. These may occur out of sequence with the completion of maximum resource extraction. The location of sites for special industrial projects needs to be carefully considered and sited to achieve a balance between optimum extraction and minimum servicing costs with an overall benefit to the industrial area.

A review of the adopted Final Surface Contour Plan may be warranted if resource extraction rates are not enabling the timely supply of industrial land or in the event that land supply is required to be brought forward to support specific industrial proposals of strategic significance.

6.4.2 *Site Geology*

The Environmental Geology Mapping Series Muchea sheet indicates that limestone material occurs in the western portion of the Structure Plan area with a varying thickness of overlying sand. The eastern portion is generally sand material.

6.4.3 *Groundwater*

The existing groundwater levels and profile have been taken from the Perth Groundwater Atlas. The water levels fall reasonably evenly from Pinjar Road at RL46 westwards to RL24 near the boundary of Lot 22 then fall sharply to Neerabup Lake with a water surface at approximately RL15. The groundwater contours are generally in a north south direction as part of a reasonably uniform water table falling westwards. The maximum extraction levels have been established to remain above the predicted groundwater levels.

There has been some discussion concerning the rate of extraction of groundwater from the Gngara Mound and there is some possibility of reversing the groundwater gradient in the eastern part of the Structure Plan area. It is not considered that this will have any adverse impact on the Structure Plan or the finished levels.

6.4.4 *Extent of Resource and Timing*

A simplified bulk volume calculation, excluding the western portion of Lot 21, estimates that within the Structure Plan area the retrievable resource, based on the proposed finished levels, amounts to 57,700,000 cubic metres.

This is a combined sand and limestone resource volume.

Current extraction rates appear to average between 500,000 and 600,000 cubic metres per annum, which is mostly limestone rubble.

However, this does not account for the future resource extraction intention of Cockburn Cement in Lot 21, which is anticipated to remove in the order of 2,000,000 cubic metres per annum. That material will be used for different purposes and will therefore not impede existing extraction rates elsewhere within the estate. The calculated volume of resource in Lot 21 is approximately 65,000,000 cubic metres. This would mean that complete extraction of Cockburn Cement land would take approximately 32 years. The extraction area over the balance of the Structure Plan area (on current extraction rate) will take approximately 100 years to complete.

It is likely that the limestone resource, having greater value and demand, will be extracted at a more rapid rate than the sand resource leading to land development in two areas, commencing from Flynn Drive. It is also possible that industrial land demand will overtake the extraction of resources, based on an estimated development programme of approximately 25-30 years. Final surface contours in the sand extraction area (eastern sector) have been designed to balance optimisation of the resource with timely availability of industrial land. In the event that the ability to meet industrial land requirements is being impeded by the extraction rates, a review of final surface contours, and therefore ultimate extraction capacity, may be warranted.

6.4.5 *Surface Condition*

Within the Structure Plan area, it is desirable that, besides achieving finished levels in accordance with the adopted surface contour levels, the completion of extraction leaves the surface in a condition suitable for subdivision, sale and development. Testing and inspection for any Karst presence, if required, should be completed at this stage.

For the industrial area this should comprise of a minimum layer, 1.0 metre thick, of loose re-compacted material. This material could be sand or limestone broken up by ripping where necessary to facilitate development and building.

All surfaces should be compacted to a density suitable for building construction.

6.5 Design Criteria for Establishing Final Levels

Based on the comments and principles discussed in the preceding parts of this section, the following is a summary of the assumptions and criteria used in formulating the plan of recommended extraction levels.

6.5.1 Assumptions

- i) The timing/staging of industrial development will be conducive to enabling the complete extraction of basic raw materials to the levels proposed and given the projections available to date, this will be subject to ongoing monitor and review. Both Cockburn Cement and Landcorp have conducted site drilling to confirm the boundaries of the different materials and to define the extraction levels.
- ii) Final levels should attain an optimum balance between:
 - a) maximising resource extraction potential for individual landowners;
 - b) maintaining an integrated approach to the planning of final levels across the study area; and
 - c) ensuring that the level of resource extraction proposed does not compromise the ultimate industrial development objective.

The desirable gradient for the provision of optimum industrial land is 1% with a maximum acceptable gradient (without benching) of 2.5%.

Benching results in increased development costs and reduced effective land area and should be avoided where possible.

There are no environmental impediments to achieving maximum resource extraction.

6.5.2 Criteria

- i) Desirable finished gradient is 1% with a maximum (without benching) of 2.5%. Some parts of Lot 21 have steeper slopes which will require detailed consideration at subdivision stage.

- ii) Benching (retaining or battering) should only be used where necessary to meet existing base levels, to achieve higher value industrial land, or for other reasons which will add value to, or not compromise, the industrial development objective.
- iii) The design should, as far as possible within the broader strategic planning objectives, meet the known extraction and development aspirations of individual landowners.
- iv) The design should ensure that the land can be efficiently serviced and staged for subdivision, sale and development for industrial use after extraction is complete, having regard for the principal road and land use layout contained in the NIA Structure Plan.
- v) Final surface levels should remain above predicted groundwater levels.

7.0 NEERABUP INDUSTRIAL AREA DESIGN CONCEPT

7.1 Philosophy

The NIA Structure Plan will provide the planning framework necessary to ensure that the development of the area for its ultimate industrial purposes occurs in the most orderly and integrated manner, fulfilling the primary objectives of maximising the yield of General Industrial land, in a high quality estate environment, whilst respecting the prior need to utilise basic raw materials, and recognising the various physical/environmental constraints of its location.

7.2 Objectives

The NIA Structure Plan should:

- Depict a robust design, providing the broadest possible opportunities to accommodate the varying demands for general industrial land in a fluid development environment.
- Produce a three dimensional planning structure having regard for the fact that sand/limestone extraction activities will mean that the framework needs to define landform (vertical) as well as land use and movement (horizontal), and recognising that individual landowners will have varying development aspirations.
- Recognise environment and heritage issues within and around the study area and recommend best management practices.
- Provide a development and staging strategy which will promote the NIA as a commercially attractive corporate address.
- Produce a movement network which ensures the most direct connectivity with the central business core and the regional network from all parts of the estate, notwithstanding the differing resource extraction objectives of individual landowners, and isolates, as much as possible, industrial traffic from the nearby residential and rural environment.

- Ensure that advantage can be taken of future regional transportation (public and freight) opportunities, particularly in terms of more direct future links with the freeway and passenger rail system.
- Ensure the protection of industrial uses from other established and proposed land uses on the periphery of the NIA.
- Facilitate the efficient provision of all necessary engineering services and support infrastructure in an efficient manner to accord with the adopted staging strategy.
- Provide adequate commercial services to meet the needs of the Neerabup Industrial Area's industrial community at company and workforce levels.

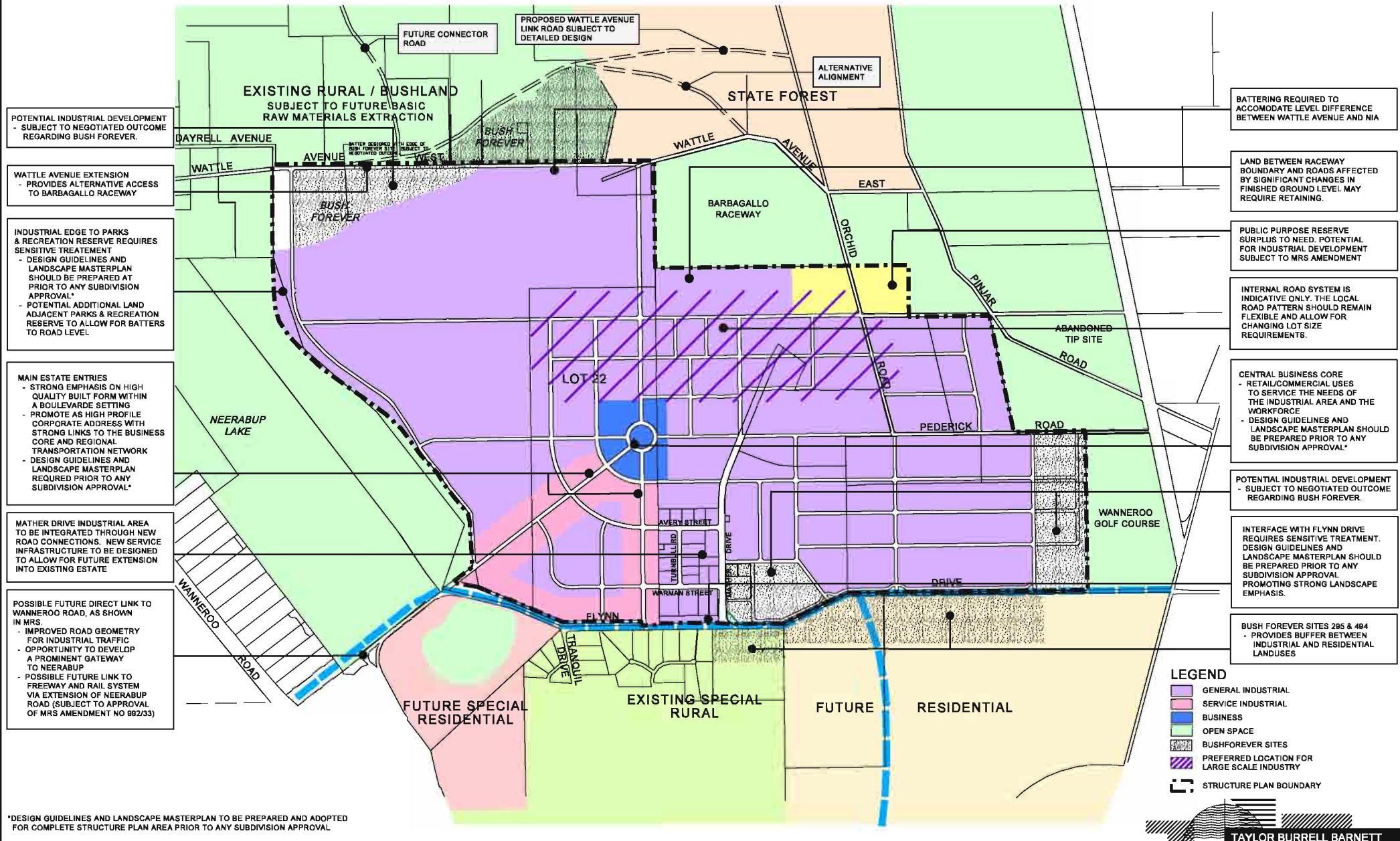
7.3 Indicative Development Concept

The NIA Indicative Development Concept provides a more detailed framework for planning and describes the many issues that must be taken into consideration when preparing detailed subdivision designs and development proposals (refer **Figure 7.1**). As the title suggests, this is an Indicative Concept and is for explanatory purposes.

It is anticipated that modifications will be undertaken at the detailed design phase; however, these must be assessed in accordance with the principles of the plan.

It should be noted that the Indicative Development Concept shows no detail, beyond the key structure planning elements, within Lot 21 (the Cockburn Cement land). In consultation with Cockburn Cement, it was agreed that the current lack of clarity about their future development objectives makes any meaningful detailed planning difficult.

It was, however, considered imperative that, regardless of the landowners eventual development intentions, a suitable standard of integration should be protected throughout the Structure Plan area by defining and enforcing the key planning elements embodied in the formal Structure Plan. This was reflected in the decision of the Western Australian Planning Commission to reinstate the need for the diagonal entrance road through Lot 21.



NEERABUP INDUSTRIAL AREA INDICATIVE DEVELOPMENT CONCEPT

800m 400m 0m 400m 800m



FIGURE 7.1

7.4 Movement Network

7.4.1 Principles and Objectives

The local road network has been structured in accordance with the following objectives:

- To maximise the general industrial land yield;
- To create a strong corporate address and direct access throughout the estate;
- To enable the development of a gridded road structure to ensure permeability and manoeuvrability for all movements throughout the industrial area;
- To maximise exposure to the regional roads by providing a series of service roads along the regional road system and prevent backing on;
- To provide a flexible and robust road system that provides for efficient movement throughout the estate and similarly provides the opportunity for alterations to lot patterns to accommodate changing land demands without the need for wholesale changes to the local road network;
- To recognise the fragmented nature of land ownership and provide for independent sub-division wherever possible; and
- To facilitate linkages to the existing Mather Drive industrial area.

7.4.2 Internal Road Network & Access

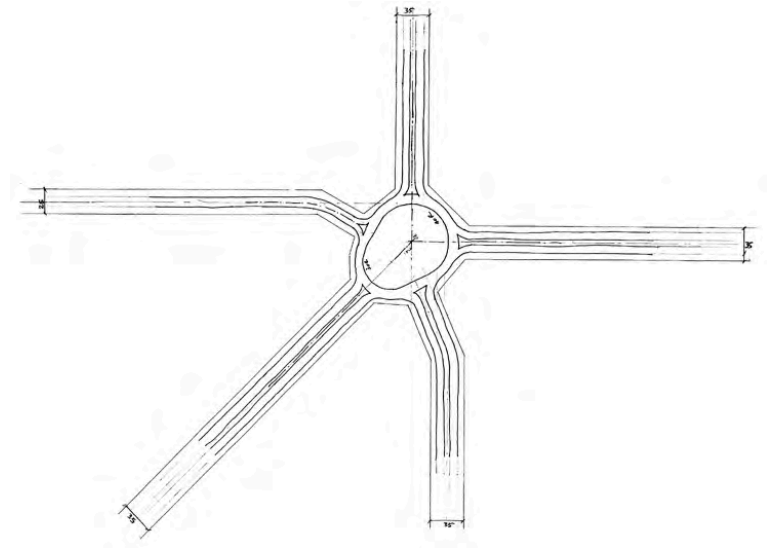
The road network is illustrated on **Figure 7.2**.

The internal road layout reflects a standard north-south rectangular grid pattern, apart from the south-west corner where a diagonal road is proposed. This is part of the "statement" planning for the Structure Plan area. As such the proposed layout provides good accessibility to all areas of the Structure Plan area while still maintaining a high standard of traffic management and safety.

It is important to note that the Indicative Development Concept provides a guide to the broad concept of the road network. It is expected review and refinement will occur over time, at the subdivision stage.

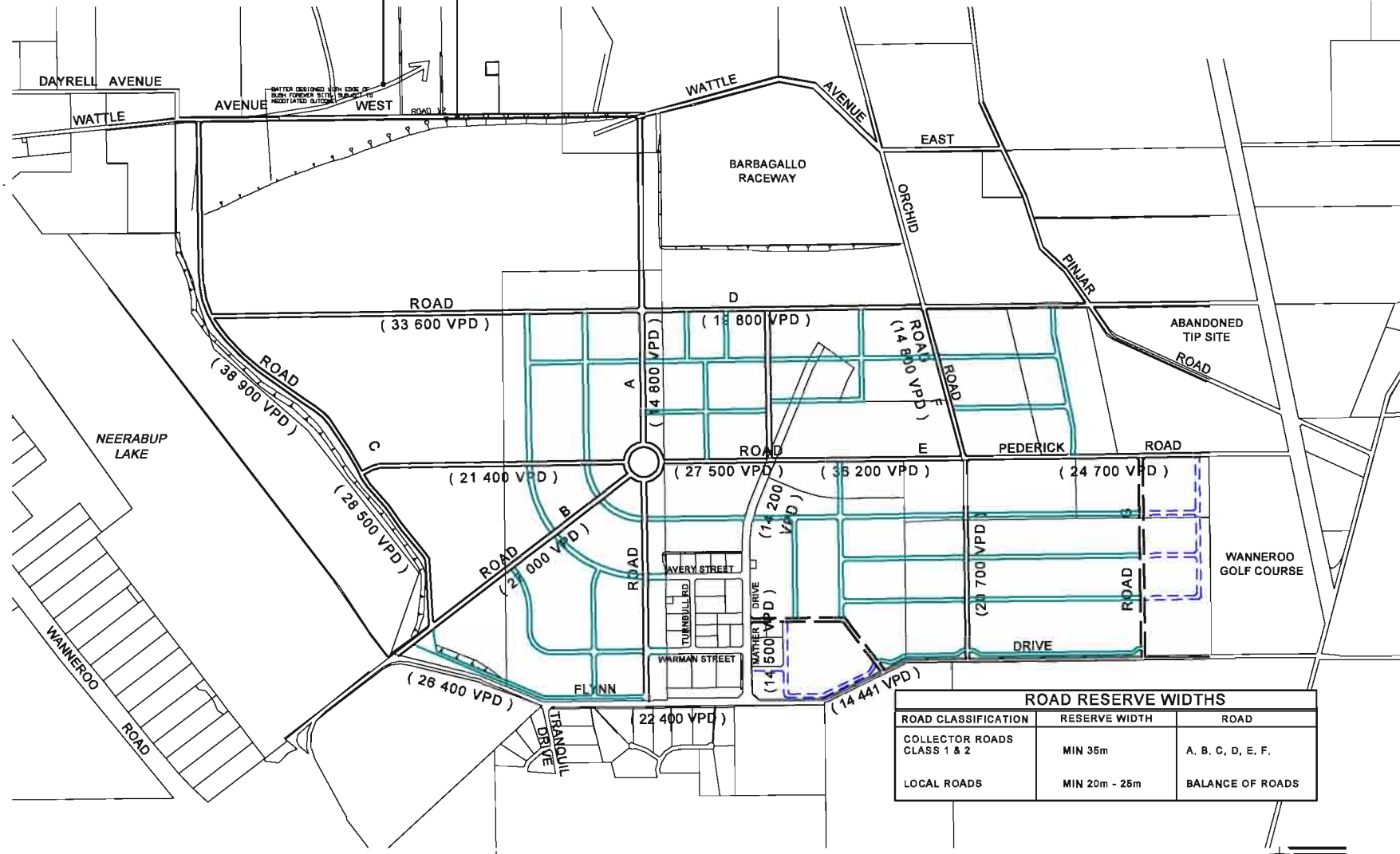
The Indicative Development Concept is characterised by a major north south central arterial spine linking into Flynn Drive (Road A). The diagonal road (Road B) and two other east west collector roads (Roads D and E) support this. It is envisaged that the major intersections on each of these roads will be either signal or roundabout controlled. The Concept Plan is cognisant of the high volume of heavy vehicles likely to use the road network; space will be provided for appropriate radii on roundabouts to accommodate articulated vehicles. Suitable intersection spacing has also been allowed between major intersections and the minor road network.

Two options for the central junction treatment are illustrated below. Option 1 is the design included within the Structure Plan and is based on a large roundabout.



Option 1

PREFERRED WATTLE AVENUE
EAST WEST LINK TO BE
FURTHER INVESTIGATED



ROAD RESERVE WIDTHS		
ROAD CLASSIFICATION	RESERVE WIDTH	ROAD
COLLECTOR ROADS CLASS 1 & 2	MIN 35m	A, B, C, D, E, F.
LOCAL ROADS	MIN 20m - 25m	BALANCE OF ROADS

NEERABUP INDUSTRIAL AREA INDICATIVE MOVEMENT NETWORK

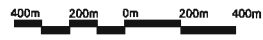
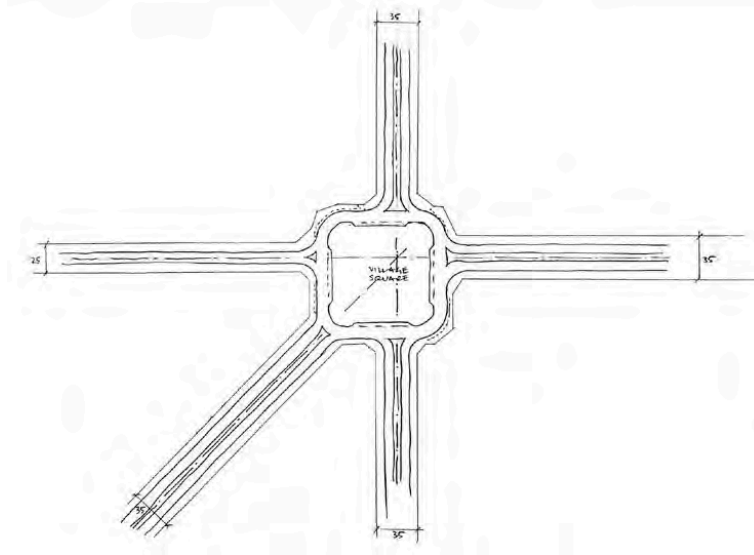


FIGURE 7.2

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Option 2

Option 2 includes the creation of a square roundabout and provides an alternative design. Importantly, both options will be subject to detailed design.

A separate traffic modelling exercise by Sinclair Knight Merz has recently been undertaken for this Structure Plan. This has determined indicative traffic volumes on the major roads, refer **Appendix 6**. This supersedes the previous traffic work undertaken for the City in 1996.

The complete Traffic Analysis is contained within **Appendix 6**, however, summarised below is a description of the road network proposed.

Road B is expected to carry a significant volume of traffic (approximately 27,000 vpd) with corresponding reduction on Road A (to approximately 14,800). This is due to the more direct access to the Mitchell Freeway via Flynn Drive provided by Road B.

Key road elements are discussed in more detail below:

Flynn Drive - Remains as the key southern east-west arterial road servicing the estate for the short to medium term. It is acknowledged as a defining edge between the Industrial Estate and Carramar Park and Banksia Grove to the south

Wattle Avenue - Forming the connection from the North West corner of the developed area to Wanneroo Road and the future urban development northwards along the coast. The portion of Wattle Avenue to be upgraded to a dual carriageway road.

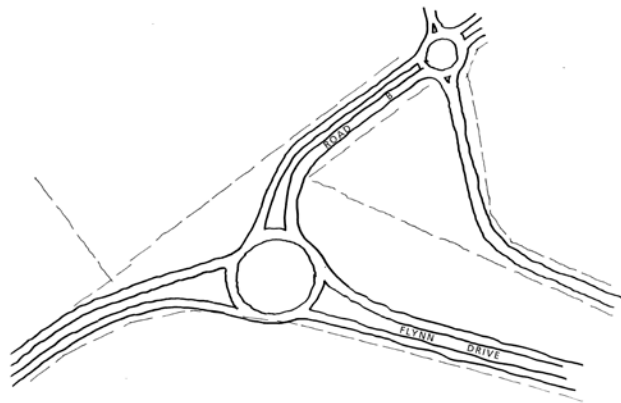
The future development of the Nowergup area to the north will require a connection for east-west traffic and this is envisaged to be on an alignment along the northern side of the Bush Forever site connecting to a future distributor road northwards into the area and further east to connect to Pinjar Road.

Road A - Forms the north south central arterial spine linking into Flynn Drive. It is proposed that Road A will be constructed in the short term to provide the main estate entrance.

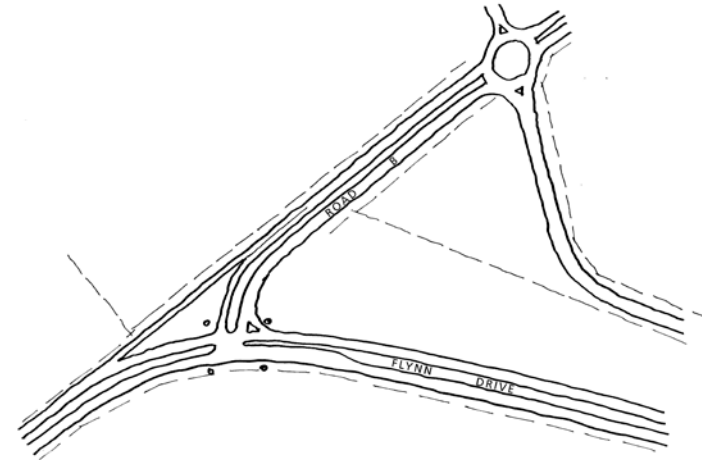
At the centre of the industrial estate Road A intersects with Road E (east west connector) and the diagonal Road B. The surrounding land is proposed to be developed as the core business area around a central traffic roundabout. The roundabout will have five legs and will accommodate the large number of heavy vehicles expected. The roundabout will be subject to more detailed design, however, some options have been prepared, as illustrated earlier in this section. It will also be necessary to review access into the uses located at the centre of the roundabout.

In the medium term, Road A will provide the sole connection to the extended Wattle Avenue, and one of the main connections to Flynn Drive. Other key connectors to Wattle Avenue and Flynn Drive (e.g. Road B, Road C and Road D) depend upon access through the Cockburn Cement land and may therefore not be available for development in the short- to medium-term.

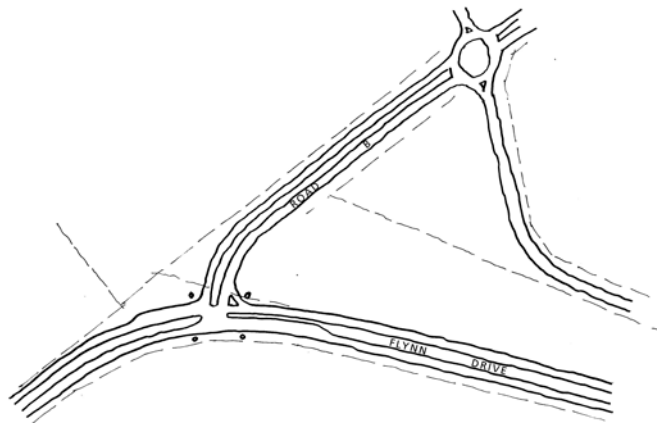
Road B is expected to become the main access into the estate extending from Flynn Drive. The section of Road B adjacent to Flynn Drive is expected to carry volumes in excess of 27,000 vpd and adequate capacity will be provided at the intersection with Flynn Drive. Possible treatments for the management of the intersection (signals or roundabout) are illustrated below.



Option 1: Roundabout



Option 3: Light Controlled With Left Slip Lane



Option 2: Light Controlled

The diagonal alignment of Road B is deliberate. It is intended to provide a future entry road for the estate, and more importantly, preserve a path for any potential transport or transit corridor for a more direct link between the estate and the Mitchell Freeway/Northern Suburbs rail corridor.

Road C – Provides a road edge to the western boundary of the NIA and delineates the edge to Lake Neerabup. The northern end of road C extends into Wattle Avenue. Forecasts for Road C estimate up to 39,000 in the northern section to 28,500 in the southern section near Road B.

Roads D & E – Both roads D & E form important east west connectors extending though the estate. Roads D and E connect with existing road reserves including Pederick Road to the east which, in turn, connects with Pinjar Road.

Road F – It is proposed to extend Orchid Road to the south to connect with Flynn Drive. This provides a direct route to the centre of the Structure Plan area and may be used as an alternative to Road A. The FDIASP indicated that this would form a continuous link with the north-south connection between Pinjar Road and Flynn Drive (see section 2.3). Under the current Structure Plan this link will be discontinuous and traffic will be encouraged to use Road A (if indeed this north south link is connected). Also the current plan encourages numerous access points to the NIA off Flynn Drive, further decreasing the earlier traffic forecast for Road F.

Road G – Provides for north south connections to Flynn Drive and increases permeability and accessibility at the eastern end of the estate.

Local roads - A highly permeable minor road network complements the arterial road network. Because of this permeability and linkage to the arterial road network, these minor roads are expected to carry low volumes of traffic. This is similar to the Wangara industrial area, which is served by 3 key arterial routes in Ocean Reef Road, Prindville Drive and Hartman Drive.

The Indicative Development Concept as presented provides a sound transport network which, with further detailed investigation, will adequately and safely manage the traffic demand.

7.4.2.1 Intersections

Priority control will exist at intersections within the minor road network, i.e. T-junctions and 4-way intersections. While the use of 4-way intersections has had some debate, they are considered an appropriate intersection control as long as certain issues regarding their use are addressed, as identified by the Department for Planning and Infrastructure Liveable Neighbourhoods Guidelines which are as applicable to an industrial estate:

- **Clear priority at the intersection should be given** which can be improved by; reduced minor leg approach distance, highly visible signage; threshold treatments; adequate sight distances.

- **Establish traffic volume limits;** as traffic volumes through the intersection increase, gap selection becomes more difficult and safety reduces. Rules of thumb suggest 2000 to 5000 vehicles per day (VPD) total intersection traffic. Traffic volumes at 4-way intersections in Neerabup are generally considered to be at or less than the lower end of this range. Clearly for intersections along the arterial roads where volumes are higher other traffic management techniques will be introduced such as left in-left out control. A traffic management plan may be developed as the minor road network is refined.
- **Speed control on the major leg;** approach speeds on the major approach should be assessed.

In relation to the proposed central roundabout, the design has been verified by preliminary traffic analysis and assignment of traffic volumes. The traffic assessment included the requirements for industrial traffic predicted for this area. The minimum outer diameter for the roundabout is 50 metres and the proposed reserve area is 100 metres diameter providing sufficient space for a final design in accordance with Austroads standards.

7.4.2.2 Road Reserves

Three broad categories (from the City of Wanneroo Land Development Standards) of road are present in the Structure Plan namely:

- Boulevard Collector road (Class 1) such as the north-south spine road (Road A) and the diagonal road (Road B and the western part of Road E);
- Major Collector roads (Class 2) such as the major east west collector roads supporting the north-south spine (Roads C, D, E and west F); and
- Local roads (balance of roads)

The Wanneroo requirements are shown in Table 7.4 below.

Table 7.4: City of Wanneroo Road Requirements

Road Class.	Reserve Width	Pavement Width	Verge Width
Collector Roads			
Class 1 and Class 2	Min 32-35m	13.4m	Min 5.1m
Local Roads	Min 20-25m	10.0m	Min 5.1m

Given these requirements and the high proportion of heavy vehicles, it is recommended that, for the Class 1 Boulevard Collector roads and Class 2 Major Collector Roads, a 32 m road reserve is allowed, which provides a minimum of 2 x 5 m verges, 2 x 8 m carriageways and a 6 m median. A 35 metre reserve is proposed where there is the requirement for on road cycle lanes. These have been identified on Road C and the extension of Orchid Road.

The Local roads (Class 2) require a 20-25 m road reserve to accommodate 2x5 m verges and a 10m carriageway, with the option to include a median treatment or traffic management measures if required.

7.4.2.3 Public Transport

At this stage it is understood that there are no planned public transport routes for the area but it is considered that bus services could be developed on the proposed Class 1 and 2 collector roads in the Structure Plan, all of which have sufficient width to carry buses.

It is also noted that the alignment of Road B preserves the opportunity for direct dedicated transit links into the Estate should such be contemplated in the long term. It may be appropriate therefore to allow a wider median on Road B to accommodate this. An appropriate road reserve is 40 m, which would allow for a dedicated transit lane in each direction to be constructed either in the median or kerbside.

7.4.2.4 Mather Drive

The unconstructed northern section of Mather Drive (bordered by Lots 4, 53 and 240) would be superfluous in the context of the local road pattern shown in the Indicative Development Concept. If development is proposed in accordance with the Indicative Development Concept, the unconstructed section of Mather Drive should be closed and the land offered for acquisition by adjoining landowners.

Within the constructed southern section of Mather Drive, the road reserve width of 40m is excessive in relation to its local road function. The potential to reduce the reserve to a minimum 32-35 m, with the balance land being returned to adjoining owners, may be explored.

7.5 Lot Sizes

Within Business Park and Industrial Estates, land area demands vary considerably from a typical minimum of 2000m², to 2-5 ha, with major industrial uses sometimes requiring sites of 30 ha and larger. The Indicative Development Concept depicts a road network capable of sustaining this variety of lot sizes. Importantly, however, the lot pattern depicted is purely indicative and should be refined at the time of subdivision approval when consumer demand can be properly assessed.

The network is sufficiently robust to provide the opportunity for a range of different lot sizes. It may be necessary to add roads or remove others should lot sizes vary significantly from those shown in the Indicative Development Concept.

Such modifications should be entertained provided they are consistent with the Structure Plan and Policy Precinct objectives and demonstrate compatibility with the surrounding road structure.

The NIA Indicative Development Concept shows preferred locations for larger scale industrial sites. These areas are considered most appropriate due to the following factors:

- Separation from the urban cell;
- Proximity to raceway (less likelihood of land use conflict between raceway and larger industries); and
- Minimum impact on servicing efficiencies.

This should not, however, preclude consideration of large industrial sites outside of the depicted areas.

Siting of industries would also need to reflect their potential for off-site impact in terms of air quality, noise and risk (refer to **Section 5.0** and **Figure 5.1**).

7.6 Open Space & Drainage

Public open space within an industrial area shall be provided in accordance with clause 6.3 of the Commission's Policy DC4.1 Industrial Subdivision. There is also the opportunity to accommodate drainage within areas of public open space. These will perform both drainage and aesthetic functions and will provide some passive recreation opportunities for workers.

An area of 5,000 m² of open space is to be provided in the estate core (business park). This should be included on either Lot 22 or Lot 4. This may include seating areas, public art, etc.

The final detailed configuration of this open space and drainage would be depicted at the time of subdivision; however, indicative locations of the drainage are illustrated on the drainage plans.

During the public advertising of the Structure Plan the then DEP submitted that a Drainage and Nutrient Management Plan should be prepared. Council supported this submission and resolved that an appropriate requirement be included in Part 1 of the Structure Plan.

7.7 Landscape

The approach to be adopted for the landscape of the industrial estate is to create a low maintenance street tree scheme which will aid orientation within the site (by giving different avenues individual character) while helping integrate the area within the wider context. It is envisaged that streetscape tree planting will be determined as part of the preparation of design guidelines.

7.8 Interface with Surrounding Land Uses

7.8.1 Lake Neerabup

The western boundary of the Neerabup Industrial Area is defined by the existing Industrial Zoning under the Metropolitan Region Scheme. This abuts the Parks and Recreation reservation containing Lake Neerabup. As mentioned previously, the existing Parks and Recreation reservation adequately accommodates the lake and associated wetland buffer.

To delineate the Parks and Recreation boundary and industrial development, a road edge is proposed. To the south near Flynn Drive the road predominantly follows the edge of the industrial zoning.

Further north, additional land has been allowed within the NIA and adjacent to the Parks and Recreation reserve to allow for batters to the road level, given that the final levels proposed for industrial development (post extraction) will be substantially lower than natural ground level at the reserve boundary. The final position of the edge road will be determined after a Final Surface Contour Plan has been adopted for Lot 21, to ensure that any battering between road level and Parks and Recreation reserve is accommodated within the Structure Plan area.

It is proposed that a Landscape Master Plan is prepared at the detailed design stage to ensure sensitive treatment of development adjacent to the Parks and Recreation reservation.

7.8.2 Residential

Residential development is proposed on the southern side of Flynn Drive at the eastern end of the NIA. Given the strategic significance of the NIA for accommodating future industrial growth in the Metropolitan Region, and as a major employment centre for the north Metropolitan Region it is important that the future residential development recognises the potential impacts of industrial land use, and plans for appropriate separation. Bush Forever site 295 abuts Flynn Drive to the south and is approximately 300m wide, providing a significant buffer between future residential and industrial development.

7.9 Staging

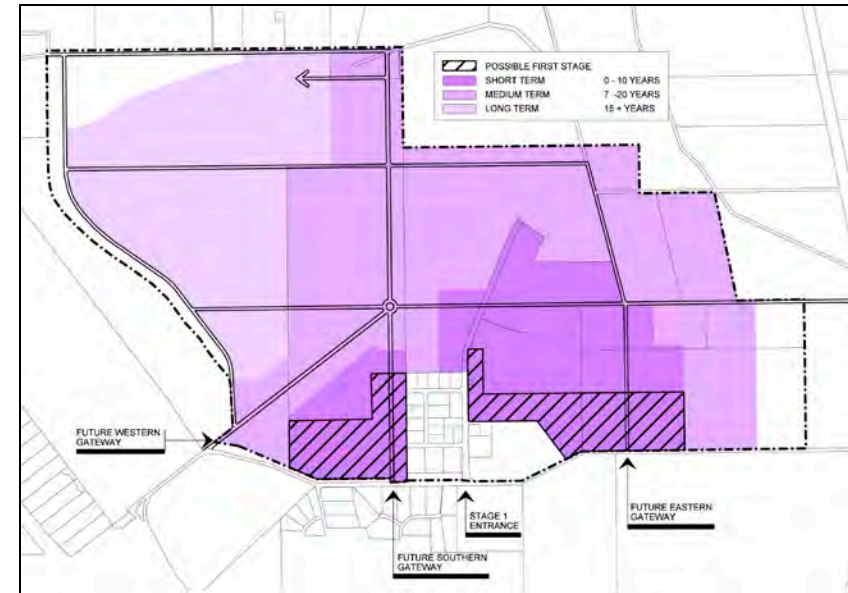
The timing for industrial development within the NIA will be primarily influenced by four factors:

- Fragmented land ownership, and the varying intentions of individual landowners;
- The substantial potential of much of the area for basic raw material extraction as an interim to the end industrial use;
- Proximity to service infrastructure; and
- Rate of industrial land demand.

It is important to consider the possible staging of the development to assist the servicing authorities to plan for future infrastructure development, and also to provide some guidance for landowners. At this early stage in the planning process, a staging programme will be highly speculative as it will be based on very generalised assumptions about resource extraction rates, landowner intentions, and industrial land demand.

The staging plan shows, in general terms, the potential staging of development. It is emphasised that this staging plan is basically a composite reflection of known landowner intentions, and development practicalities (such as proximity and accessibility to services). It should not be construed as a recommended development staging programme to be used in controlling the timing of development.

Due to its preliminary nature, the staging plan seeks only to distinguish between short, medium and long term development. The time spans applying to each of the stages overlap with each other, reflecting the fact that there should not be an absolute time delineation between stages at this point.



Staging Plan

Furthermore, it is acknowledged that the amount of land identified in each of the stages may provide sufficient industrial land supply for a period longer than the defined timeframe. For example, whilst the short term development timeframe is 0 - 10 years, the amount of land shown within the short term stage may in fact satisfy demand for a considerably longer period. The intent of the staging plan in this regard is not necessarily to indicate the amount of land required within a 10 year period, it is more intended to indicate those areas with potential for development within the defined timeframe.

In terms of short term stages, two areas have been identified as having the highest potential for development within the next 7-10 years.

1. Lot 22 - Southern Portion (57 ha)

This area abuts Flynn Drive and encompasses the southern part of the limestone quarry on Lot 22, where extraction has been completed. The land is therefore, ready to be reinstated at a suitable finished ground level for development; this factor, together with the lands abuttal with the primary road infrastructure and the industrial development objectives of the landowner makes this the most logical location for the first stage development. The Structure Plan also supports this through the placement of a main estate entry point within this area.

2. Land extending from Mather Drive fronting Flynn Drive (170 ha)

This land contains some sand quarrying activity (western end of Lot 2477) and some areas (particularly southern part of Lot 240) will have limited potential for resource extraction based on the proposed levels. The willingness of at least two major landowners to make land available for development and abuttal with Flynn Drive presents an alternative location for first stage development. This potential may be enhanced with the possible development of a major industrial enterprise (Laminated Veneer Lumber Plant) on Lot 53, which may generate some initial development impetus.

Given that the short term areas contain approximately 227 hectares, this is likely to satisfy short term demand assuming the land is made available during that period. The medium term areas mostly reflect remoteness from service infrastructure and likely first stage development areas, rather than the development intentions of the landowners.

The exception is the southern portion of Lot 21 (Cockburn Cement land). The location of this land is ideally placed for short term development, having close and direct linkage to Wanneroo Road via Flynn Drive. Its identification as medium term is a direct reflection of the stated intentions of the landowner to maintain the land in an undeveloped state in the short term.

8.0 NEERABUP INDUSTRIAL AREA STRUCTURE PLAN

8.1 Structure Plan

The Neerabup Industrial Area Structure Plan, shown in **Figure 8.1** provides the statutory framework for planning within the NIA.

The Structure Plan demonstrates the preferred land uses and movement network within the NIA. Any modifications to the Structure Plan will need to be undertaken in consultation with Council and the WAPC.

8.2 Zones

The zones for the NIA are as follows:

- General Industrial;
- Service Industrial; and
- Business

These zones will facilitate predominantly development of General Industrial land being the primary purpose of the estate and will also allow flexibility for a variety of activity in particular locations within the estate with differing development criteria to support the General Industrial activities. Design guidelines may be prepared for the various zones to control and guide particular aspects of development. For example development at key intersections may be encouraged to include reduced setbacks and promote particular architectural styles.

The zones applied are in accordance with the zoning classifications under DPS2. The scheme provisions for these zones will be applied to development with some exceptions and additions as specified in Part I of the document as described below.

8.2.1 General Industrial

The General Industrial Zone encompasses the majority of the land within the Structure Plan area.

In accordance with DPS2, "the General Industrial Zone is intended to provide for industrial development which the Council considers would be obtrusive in, or detrimental to, the amenity of the Service Industrial Zone.

The objectives of the General Industrial Zone are to:

- a) accommodate a wide range of industrial activities, including those generally involving production, processing, storage, wholesaling or distribution processes; and
- b) minimise adverse visual and environmental effects of industrial uses on surrounding areas."

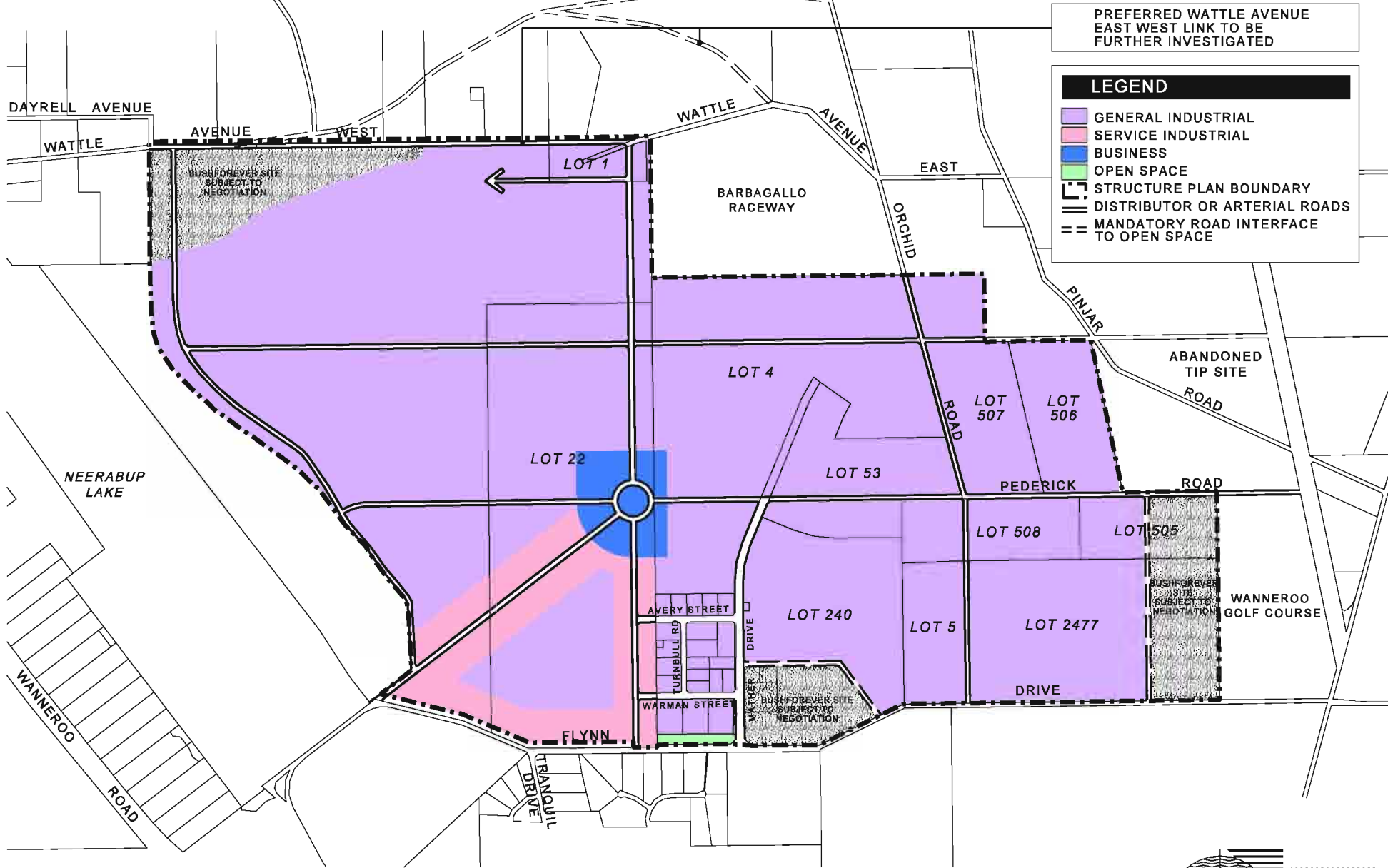
Specifically, the NIA General Industrial Zone is intended to provide attractive industrial sites harmonious with surrounding land uses.

The permissibility of uses and development provisions shall be in accordance with the General Industrial Zone. As mentioned within Section 5.3, there is the need to ensure that industries which pose an off-site risk through storage and handling of dangerous or hazardous goods are established at least 1,000m away from the Raceway. For this reason, it is proposed to exclude hazardous industry from the General Industrial precinct. This is not considered to present any significant constraint, as hazardous industries would not typically be desirable within a General Industrial estate.

8.2.2 Service Industrial

The Service Industrial Zone is generally located adjacent to Flynn Drive and the major internal spine roads connecting to Flynn Drive, to take advantage of the greater exposure in these locations.

Possible extensions along peripheral roads may be entertained, but this should be reassessed as development and demand unfolds. Extension of the Service Industrial land should not be allowed to detract from the principal purpose of the Neerabup Industrial Area as a location for General Industry.



**NEERABUP INDUSTRIAL AREA
ZONING AND LOCAL STRUCTURE PLAN**



FIGURE 8.1

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In accordance with DPS2 *"the Service Industrial Zone is intended to provide for a wide range of business, industrial and recreational developments which the Council may consider would be inappropriate in Commercial, Business and General Industrial Zones and which are capable of being conducted in a manner which will prevent them being obtrusive, or detrimental to the local amenity."*

The objectives of the Service Industrial Zone are to:

- a) accommodate a range of light industries, showrooms and warehouses, entertainment and recreational activities, and complementary business services which, by their nature, would not detrimentally affect the amenity of surrounding areas; and
- b) ensure that development within this zone creates an attractive façade to the street for the visual amenity of surrounding areas."

Specifically, the objectives of the NIA Service Industrial Zone are to:

- a) encourage high quality service, business and commercial activity at the entrance to the NIA to take advantage of greater exposure generated by the industrial park and passing trade at these locations; and
- b) enable the seamless transition of uses extending into the General Industrial Area

The permissibility of uses and development provisions shall be in accordance with the Service Industrial Zone of DPS No.2.

8.2.3 **Business**

The Business Zone is located at the centre of the Structure Plan on the major north south spine road. This precinct has been identified in recognition of its strategic location at the centre of the Structure Plan area to encourage more service uses such as banks, local shop, newsagent etc to service the Industrial Estate, both businesses and employees.

In accordance with DPS2, *"the Business Zone is intended to accommodate wholesaling, retail warehouses, showrooms and trade and professional services and small scale complementary and incidental retailing uses, as well as providing for retail and commercial businesses which require large areas such as bulky goods and category/theme based retail outlets that provide for the needs of the community but which, due to their nature, are generally not appropriate to or cannot be accommodated in a commercial area."*

The objectives of the Business Zone are to:

- a) *provide for retail and commercial businesses which require large areas such as bulky goods and category/theme based retail outlets as well as complementary business services; and*
- b) *ensure that development within this zone creates an attractive façade to the street for the visual amenity of surrounding areas."*

Specifically, the objectives of the NIA Business Zone are to:

- a) facilitate the provision of community/commercial services to support business and the workforce within the industrial estate;
- b) minimise the need for local (work day) convenience retail and support business demand to leave the NIA and access centres in other localities (i.e. maximise sustainability); and
- c) ensure that development within this precinct creates an identifiable central place for functional and legibility purposes.

The permissibility of uses and development provisions shall be in accordance with the Business Zone of DPS No.2 to ensure that the necessary support activities are able to locate within the NIA. In addition to those uses permitted under the Scheme, it is considered appropriate to allow limited shop development in the Business precinct. This will ensure that uses such as a newsagency, chemist, delicatessen etc, which are entirely appropriate within the Business precinct, are allowed.

It is therefore, proposed to include Shop as an 'A' use and to limit the floorspace per shop to 300m² NLA. This will ensure development in scale with the NIA and in particular the Business Zone.

9.0 SERVICING

9.1 Sewerage System

9.1.1 Internal System

The lots created within the NIA Structure Plan area are proposed to be served by a gravity sewer system. The system will gravitate to two pump stations located at the west and east boundaries of the area.

The current developed area on Mather Drive is served with individual septic tanks and these lots would be connected to the system when constructed.

The system will be designed in accordance with the Water Corporation Sewer Design Guidelines and would cater for waste waters as permitted in their Industrial Waste Policy. This policy generally requires pre-treatment of waste where the waste characteristic exceeds allowable discharge quality. The policy is applied on an individual industry basis.

The system derived for this Structure Plan assumes that resource extraction will occur to the levels indicated in the Final Surface Contour Plan. Alternatives of temporary pump stations exist where extraction and development do not occur sequentially.

9.1.2 External System

The NIA Structure Plan area is immediately north of Carramar and Cockman areas which are serviced through the North West Special Headworks Agreement (1989). The northern limit of this agreement area is Flynn Drive. The sewer planning is in a very preliminary stage. The proposed two permanent sewer pump stations as described in the Internal Sewers section with pressure mains to the Burns Beach Main Sewer in Connolly drive to the north west is the Water Corporations preferred system. Part of the Burns Beach sewer is constructed in Connolly Drive but is dormant and not connected to an outfall. Depending on the rate of development required within the industrial area it may be necessary to construct the permanent pump station and temporary pressure mains to existing sewers in Carramar and Banksia Grove Estate south of Flynn Drive.

An economic analysis will be required to determine this alternative when development rates become apparent.

An economic analysis will be required to determine this alternative when development rates become apparent.

9.2 Potable Water

9.2.1 Internal System

The lots created within the NIA Structure Plan area are proposed to be served with a water distribution system constructed in accordance with the Water Corporation Design Criteria.

The existing developed area on Mather Drive is not serviced by a system but uses individual bores. It is proposed that these lots would be incorporated into the Water Corporation scheme.

To preserve potable water it is appropriate for individual lot owners to use superficial groundwater drawn from bores for fire and landscaping requirements where possible.

9.2.2 External System

The water supply for the study area will come from the Wanneroo Tank and large connecting main to a high level tank on land immediately north of Wattle Avenue. The Water Corporation has advised that a site has been secured and this is near the Fire Lookout. These are major headworks for which the Water Corporation has yet to derive a full scheme.

9.3 Electrical Power

Electrical power will be distributed by means of an underground power system throughout the study area in accordance with State Government Policy.

Power supply will come from a proposed 132Kv main to be constructed from the Pinjar Power site through the estate including a transformer site. Power will be fed from this system.

Initial supply into the study area is envisaged to comprise a series of feeders from existing aerial mains in Flynn Drive.

In an industrial estate there is considerable difficulty in determining ultimate power load requirements in a manner which enables economical construction and avoids reworking live cables. The rational approach is to develop the system in a piecemeal fashion to retain the greatest flexibility.

Western Power has implemented a cost sharing process to achieve equity between adjoining owners for the High Voltage network.

Western Power has provided confirmation of its proposal for the area, refer **Appendix 7**.

9.4 Stormwater Drainage

The stormwater drainage system will be constructed in accordance with City of Wanneroo Design Guidelines. This will entail a two part system.

The first part is within the individual lots where the lot owner will control and dispose of the stormwater from the lot, within the lot. This can be achieved by soakwells or open soakage sumps to suit the lot owner's planning. Care will be needed at the time of Development Application to control what is disposed into the soakage system to maintain the groundwater quality.

The second part is the management of stormwater from road reserves and public spaces. This is proposed to be managed with a series of fenced open soakage basins located throughout the Industrial Area. A preliminary assessment of locations and land area requirements has been made and these are shown on **Figure 9.1**.

With regard to the estate amenity it may be beneficial to convert some of these soakage structures from a fenced arrangement to an open landscaped style to create parkland settings which would permit passive surface use for most of the year. The locations for this type of drainage structure can be as shown for the fenced sumps or can be relocated to road intersections. Land area requirements are in the order of three times the land requirements for fenced sumps.

To ensure an appropriate level of environmental protection, a Drainage, Nutrient and Water Management Plan will be required to be prepared prior to any subdivision or development.

9.5 Gaseous Energy

Gas will be distributed by means of a reticulated system connected to the Alinta Gas suburban system.

The gas supply will be drawn from existing mains in Pinjar Road.

9.6 Waste Disposal

9.6.1 Solid Waste Disposal

Solid waste generated by industrial activity remains the responsibility of the lot owner to dispose of in accordance with relevant local and state regulations.

The lot owner has several options depending on the volume and nature of the waste either through the municipal system, waste recyclers or disposal to an appropriate facility.

Disposal of solid waste would be assessed at Development Application stage with the major consideration being health and protection of groundwater.

9.6.2 Liquid Waste Disposal

The provision of a sewerage system will provide for the disposal of sewage and wastewater. Wastewater will need to meet the requirements of the Water Corporation and their licensing provisions before discharge to the sewer system.

The disposal of other liquids such as oils, solvents, fats and hydrocarbon derivatives will be the responsibility of the creator of the liquids. The disposal of these liquids is governed by local and state laws and environmental legislation.

9.7 Forward Service Planning

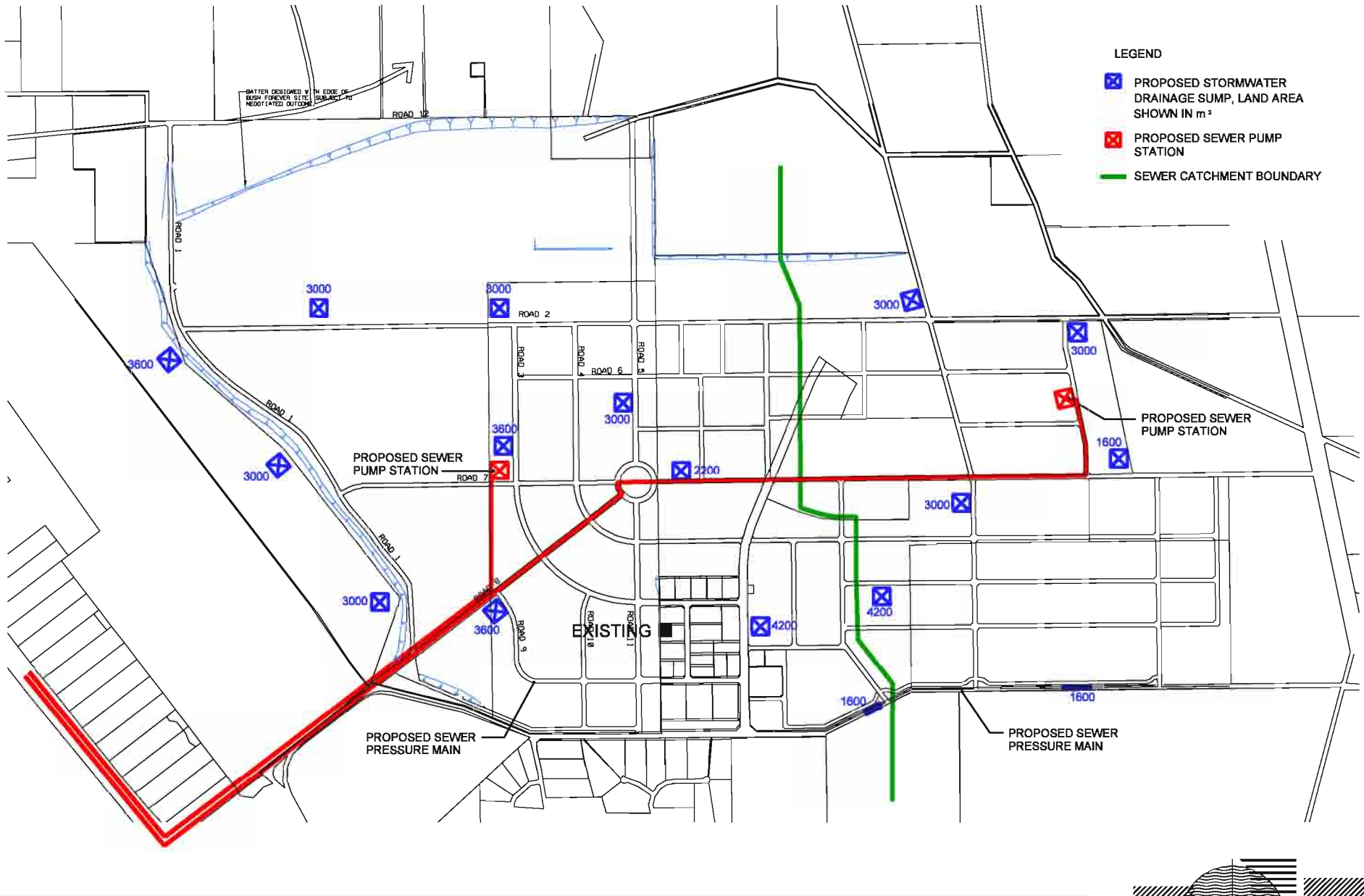
To achieve the proposed Structure Plan preliminary service layouts have been derived to establish broad service planning.

To achieve orderly development it is important that applications be made to service agencies, particularly the Water Corporation to determine service schemes and provide for construction under capital work budgets.

It is recommended that, prior to commencement or development commencing within the Structure Plan area, service concept plans be prepared for sewer, water, electric power, drainage, gas and communications services and submitted and agreed with the service authorities. These concepts will be based on a total development philosophy and will provide a basis to coordinate future individual lot owner developments.

The preparation of service concept plans at the initial development stage will ensure compliance with current standards. It should be noted that several design standards are under major review in 2002. For drainage and sewer preliminary concept plans have been prepared and are included in the Structure Plan document. Provisions for cost sharing are being developed by Water Corporation for minor works and Western Power have a system for sharing HV reticulation costs. Thus cost sharing under a development cell arrangement could be developed in conjunction with these systems.

The adoption of service concept plans will also enable forward planning by the service authorities for capital works funding for the external site service connections.



- LEGEND**
- ☒ PROPOSED STORMWATER DRAINAGE SUMP, LAND AREA SHOWN IN m²
 - ☒ PROPOSED SEWER PUMP STATION
 - SEWER CATCHMENT BOUNDARY

**NEERABUP INDUSTRIAL AREA
MAIN SEWER AND DRAINAGE INFRASTRUCTURE**



FIGURE 9.1

TAYLOR BURRELL BARNETT
Town Planning and Design
187 Roberts Road Subiaco
Western Australia 6008
Telephone: (08) 9382 2911
Facsimile: (08) 9382 4588
admin@tbbplanning.com.au

10.0 IMPLEMENTATION

The primary objective of the NIA Structure Plan is to establish a planning framework that will enable the area to develop in the most orderly and integrated manner, meeting sound planning principles, and promoting high quality development solutions.

The statutory vehicle used to implement this objective is DPS2, which was promulgated in July 2001. DPS2 is important for two reasons:

- i) It applies an Industrial Development Zone over the majority of the study area. This zoning will facilitate all of the development objectives defined in this Structure Plan; however, it also requires that the Structure Plan be adopted by both the Council and the WAPC (pursuant to Part 9 of the Scheme) prior to the commencement of any subdivision or development.
- ii) The Scheme contains a comprehensive set of Structure Plan provisions which gives the Structure Plan the same force and effect as if it were a provision of the Scheme, once it is formally adopted.

In order for the Structure Plan to fulfil its function as a formal component of the planning framework a number of actions are required to be undertaken, or finalised. The following are the key actions required to complete the framework.

10.1 Structure Plan Adoption

Pursuant to Clause 3.15 of the Scheme, it is a prerequisite of subdivision or development that an Agreed Structure Plan has been prepared and adopted by Council and the WAPC under the provisions of Part 9 of the Scheme.

10.2 Infrastructure Cost Sharing

Some of the major infrastructure works necessary as part of the Structure Plan are likely to pose significant cost burdens on some landowners whilst others may derive the benefit of such works without contributing to their development.

There are three main methods of land development co-ordination and cost sharing:

- i) Development Town Planning Schemes:
 - a) Resumptive Development Schemes;
 - b) Guided Development Schemes.
- ii) Provisions incorporated into District Zoning Schemes (Generic Provisions);
- iii) Private Landpooling Schemes.

The incorporation of generic provisions into District Zoning Schemes is becoming an increasingly popular method, particularly within Local Authorities with considerable scope for land development.

This is the case in the City of Wanneroo, where infrastructure cost sharing provisions have been included in DPS2 (Parts 10 and 11). Whilst they are generic provisions, they are primarily tailored to the East Wanneroo area which is divided into a number of development cells, including the industrial development areas contained within Cells 7 and 8 (Wangara).

In considering the application of comprehensive cost sharing arrangements, such provisions add complexity to the development process, and should only be imposed where there are substantial inequities between landowners - typically where land ownership within the Cell is highly fragmented.

The NIA contains only 7 landowners in total (not including owners within the developed Mather Drive area), and three of those landowners LandCorp, Cockburn Cement and the City of Wanneroo occupy approximately 80% of the total area. However, notwithstanding the small number of landowners, it is reasonable that some method of cost sharing should be applied so that the major infrastructure works, such as upgrading and construction of the surrounding district/regional roads and major intersection treatments will be equitably funded by all landowners.

Given that Council's Town Planning Scheme is already structured around the use of generic cost sharing provisions, it is considered that this would be the most appropriate and straight forward manner of implementing a cost sharing arrangement for Neerabup.

Unfortunately, the specific reference of the existing Scheme provisions to the East Wanneroo planning cells makes it difficult to simply extend their application to the Neerabup Industrial Area, notwithstanding that the provisions relating to Cells 7 and 8 (Wangara Industrial Area) would fulfil a similar function.

It is therefore recommended that new provisions be introduced into the Scheme, by way of a scheme amendment, to establish a cost sharing arrangement particularly related to, and suitable for, the NIA.

10.2.1 Structure of Scheme Provisions

To be consistent with other similar provisions in the Scheme, the Infrastructure Cost Sharing Provisions will be made up of three separate components:

- i) Generic Scheme Provisions
Providing the statutory framework for requiring the payment of contributions; these provisions will be contained in the main body of the scheme text.
- ii) Schedule to Scheme
Defines the actual infrastructure items (cell works) which are to be funded through developer contributions.
- iii) Schedule to Local Structure Plan
Provides specific details of the actual/projected costs of the cell works, and the resultant developer contribution rates.

The relationship between these components is graphically illustrated in **Figure 10.1**. This figure also includes, for discussion purposes, infrastructure items which are likely to be included as cell works for the purpose of developer contributions. It is emphasised that the defined items are based on preliminary considerations at this time, and it will be necessary to undertake a more detailed assessment of infrastructure requirements in order to properly define the cell works.

10.2.2 Implementation Actions to Facilitate Infrastructure Cost Sharing

The facilitation of a cost sharing arrangement for the NIA will require the following actions:

1. Scheme Amendment

a) General Scheme Provisions

The Scheme will require amendment to introduce the statutory framework to empower Council to require Developer Contributions. This could be effected in one of two ways:

- i) Introduce new provisions specifically related to the NIA; or
- ii) Modify the existing generic provisions relating to East Wanneroo cells 1 to 8.

Given the structure of the East Wanneroo provisions, their modification is likely to be complex, and it is considered that the most straight forward method would be through Option (i).

b) Introduction of a new Schedule to the Scheme to define Specific Cell Works.

2. Introduction of Scheme Costs into Structure Plan

Under the City of Wanneroo Structure Planning provisions, the details of cell works and infrastructure costs are contained in a Schedule within the Statutory Planning section of the Structure Plan. The schedule may be included in the initial Structure Plan documentation adopted by Council and the WAPC; alternatively it may be introduced at a later stage, as an amendment to the Structure Plan.

In the case of the NIA, it is likely that the actual cell works, and cost estimates, will not be sufficiently defined to include in the initial Structure Plan documentation. It may therefore be presented to Council at a later stage as an amendment to the Structure Plan.

FIGURE 10.1: Infrastructure Cost Sharing Structure

Relationship between Scheme, Structure Plan and Precinct Contribution Arrangements

Generic Scheme Provisions

- Structure Plans
- Infrastructure Cost Contributions

Schedule to Scheme

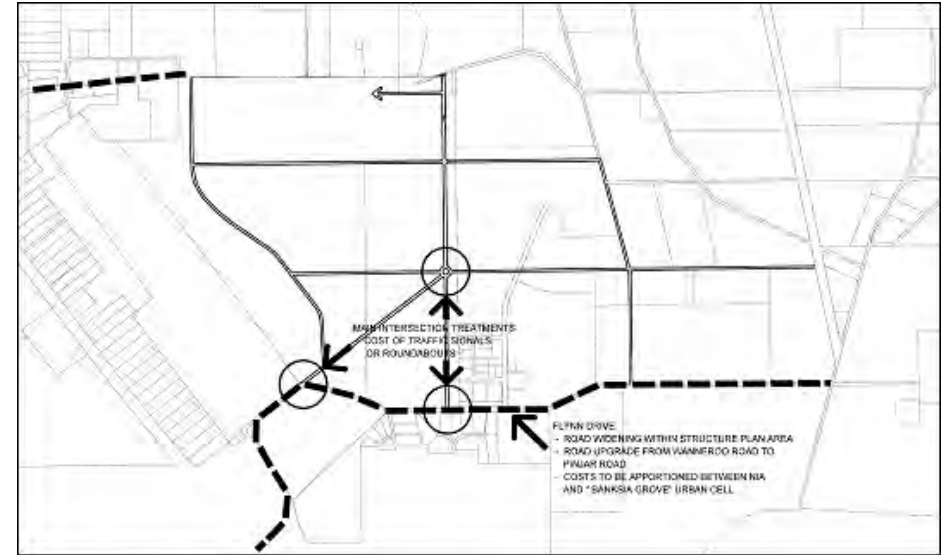
Neerabup Industrial Area Planning & Developer Contribution Arrangement
Cell Works and Contribution Provisions

Suggested Cell Works

- Structure Plan costs (including specialist studies)
- Scheme Amendment costs
- Flynn Drive - road widening (within site)
 - construction/upgrade from Wanneroo Road to Pinjar Road
- Major Intersection Treatments - signals or round-a-bouts
 - main entrance west
 - main entrance east
 - central intersection
- Costs of preparing other strategies and management plans such as:
 - Landscape Master Plan
 - Design Guidelines
 - Service Concept Plans
 - Flora, Fauna, Karat surveys
 - Drainage, Nutrient and Water Management Plan
- Admin & other costs

Schedule to Local Structure Plan

Summary of actual/estimated infrastructure costs and contribution rate



Plan Showing Proposed Cell Works

Note: The suggested cell works listed above are indicative only. A complete list of cell works will be identified in future following a more comprehensive assessment of detailed infrastructure requirements. The final contribution arrangement may include items not listed above and may remove some of the items listed above. In particular Section 7.0 Cell Works of Part I of the Structure Plan identifies the Cells Works contemplated at this Stage.

10.3 Additional Works Prior to Subdivision and/or Development

10.3.1 Preparation of Design Guidelines and Landscape Master Plan

The visual amenity and design standards are important to ensuring quality industrial development. It is therefore, recommended that Design Guidelines and a Landscape Master Plan are prepared covering key elements of the NIA. These include:

- Main estate entries;
- The Core Business area;
- Areas adjacent to the Lake Neerabup Parks and Recreation reservation; and
- Service Industrial areas fronting Flynn Drive.

The Landscape Master Plan should address the opportunities for planting of the woolly bush to support the population of rare bees where possible.

10.3.2 Bush Forever - Negotiated Outcomes

It is necessary for individual owners affected by Bush Forever sites to negotiate outcomes direct with the DPI. The Structure Plan has been designed to allow for industrial expansion in the event that the sites are removed or reduced.

10.3.3 Karsts

Due to the potential for karsts (caves and channels) including communities of troglobitic fauna and stygofauna within the NIA there may be the need at the subdivision and development stage to liaise with the Department of Environmental Protection regarding appropriate management requirements.

10.3.4 Public Purpose Reserve

Completion of the MRS amendment to rezone the Public Purpose reserved land to Industrial zone, and subsequent amendment to DPS2 to effect a similar change to the local zoning.

10.3.5 Groundwater Contamination

It is recommended that the City of Wanneroo undertake a detailed assessment of groundwater quality to determine the extent of the leachate plume and undertake remediation where necessary.

10.3.6 Flora and Fauna

Prior to the clearing of natural vegetation and habitat, surveys of flora and fauna may be required to be undertaken.

If it is identified that there is priority or threatened species located within the NIA, it will be necessary for individual owners to liaise with CALM as to their development timeframes to ensure that there is ample opportunity to develop appropriate management and/or preservation strategies.

Prior to land clearing by individual owners, a Dieback Hygiene Plan should be prepared.

10.3.7 Stormwater Management

Prior to subdivision or development commencing within the Structure Plan area, a Drainage, Nutrient and Water Management Plan should be prepared, and such plan should, if considered necessary by Council, include a contingency plan to ensure the protection of Lake Neerabup.

The cost of preparing the Drainage and Nutrient Management Plan should be included as a Cell Work under the developer contribution arrangement.

APPENDIX 1
Consultation

DRAFT

Larger Landowners within the NIA Structure Plan

Consultation was undertaken with the larger landowners within the Structure Plan area. An information package, refer attached, was sent to landowners who were also invited to attend a meeting on the 11th of October 2000. The purpose of the meeting was to discuss the purpose of the study and present the opportunities and constraints and obtain any comments from owners that may inform the preparation of the Structure Plan.

It was requested that owners complete a Landowners Intentions Survey to enable the consultants to include this information within the Structure Plan, particularly when determining issues such as staging. Those responses to the survey are attached.

Existing Industrial Landowners

A letter was sent to those owner of land within the existing industrial area fronting Flynn Drive at the intersection with Mather Drive, refer attached. The letter was to advise the owners of the study and provide an opportunity to phone the consultants to discuss any issues that may be relevant in the preparation of the Structure Plan.

There was a very minimal response to the letter.

Barbagallo Raceway

A meeting was held with the General Manager of the Barbagallo Raceway. The feedback from the raceway is summarised as follows:

- The raceway is urgently in need of a second access road into the facility. This is partly for safety reasons, but also to alleviate the major congestion currently occurring during major events.
- Whilst the connection of Wattle Avenue is seen as the ultimate solution to this problem, the raceway would be happy for an alternative access road as an interim measure. This need not be a fully constructed public as long as access is suitable for large freight vehicles carrying racing cars, and for emergency purposes.
- The raceway does not consider there to be any undue conflict between its operations and future industrial development within the NIA. In fact, the raceway considered that the NIA would open up opportunities for automotive industries, particularly related to car racing, to locate, in close proximity to the raceway facility.
- The raceway is progressively constructing earth bunding around the track to improve spectator visibility. In this regard, the raceway is looking for any excess landfill which may arise as a result of the earthworking for the industrial estate.

Government Stakeholders

The following government agencies were consulted during the research phase:

- City of Wanneroo

DRAFT

- Ministry for Planning
- Department of Environmental Protection
- Water and Rivers Commission
- Water Corporation
- Department of Minerals and Energy

Summary notes of meetings with these agencies are appended.

MEETING REPORT

Neerabup Industrial Structure Plan

Meeting Held with the City of Wanneroo and Ministry for Planning

Venue: Offices of City of Wanneroo

Date: 23rd August 2000

Attendance: Lex Barnett
Nick Hodges
Charles Johnson
Phil Thompson
Carlo Famiano

Taylor Burrell
LandCorp
City of Wanneroo
City of Wanneroo
Ministry for Planning

Lex Barnett (LB) opened the meeting by explaining the primary objectives and current status of the Structure Plan study, and that the meeting was part of the preliminary stakeholder consultation.

Carlo Famiano (CF) indicated that, whilst he was representing the MFP at the meeting, he was not familiar with the site or its history.

LB explained that he had invited Neil Foley from the MFP to the meeting, and had endeavoured on several occasions over the past week to secure confirmation that Mr Foley would be available, knowing that Mr Foley was familiar with the past history of the Neerabup Industrial Area. Despite having left several messages, and explaining that the meeting could be rescheduled if Mr Foley were not available at the allocated time, LB received no response from the Ministry until Mr Famiano rang on the morning of the meeting to obtain some details.

Previous Structure Plans

LB raised the matter of the 3 previous structure plan documents and the events surrounding those studies were generally discussed. LB queried the current status of the most recent structure plan review undertaken by SMEC.

Phil Thompson (PT) explained that Council had considered the report at officer level, and were generally in agreement with its conclusions and recommendations. Council had forwarded a copy of the report to the Ministry for its comments; however, no response had been received at this stage.

CF agreed to pursue the matter in the Ministry and advise Council in due course.

Zonings

PT confirmed that, under the current TPS No. 1, the major part of Lot 22 (LandCorp land) as well as all of the existing Mather Drive Subdivision, is zoned General Industrial. The balance of the study area is primarily zoned Rural.

Under the proposed DPS No. 2, it is proposed that all of the study area will be primarily zoned Industrial Development.

Key Issues

In considering design opportunities and constraints for an Industrial Structure Plan, the key issues were identified:

- The Barbagello Raceway is in desperate need of an alternative access road, which would logically be created by the future connection on Wattle Avenue west and east.
- BushPlan sites - Council is not necessarily in agreement with the identified Bush Plan sites. In fact, Council has submitted an objection to the portion of site 295 that affects Council's own land on Flynn Drive.
- Council will be concerned to ensure that the Structure Plan discourages industrial traffic from using the future Blue Road link to Flynn Drive from the south extending through the Banksia Grove Urban Cell.
- It was agreed that Flynn Drive would form the major road connection between the N/A and the regional road system, with a possibility that a direct link to the Freeway and passenger rail system may ultimately be developed through the extension of Neerabup Drive through to Wanneroo Road. In this regard, the existing alignment of Flynn Drive, in the vicinity of Wanneroo Road intersection, is regarded as inadequate, both in construction standard and road geometry. A more direct route, consistent with the MRS Blue Road alignment, would be strongly preferred by Council.
- Basic Raw Material Extraction - in addition to the limestone extraction activity on LandCorp's site, there are a number of sand extraction operations at the eastern end of the study area. Council is currently experiencing some pressure to increase the extent of extraction operations; however, Council does not wish to entertain any additional extraction, until such time as the Structure Plan defines the desired finished levels. For this reason, Council is keen to see the structure plan progressed as quickly as possible.

Consultation

LB explained that it was intended to hold a meeting with landowners within the study area during the early stages of the study, to explain the study objectives, and obtain feedback prior to finalising the Structure Plan.

PT agreed to provide an up to date list of landowner contact details for this purpose.

Formal Approval Process

LB explained that, in contrast to the previous structure plan exercises, the objective of this study was to produce a Structure Plan and Report to a level of detail and in a suitable format for formal adoption by Council and the Ministry for Planning in accordance with the Structure Plan provisions of either TPS 1 or DPS 2. This would provide Council with a formal planning framework to consider, not just industrial land development proposals, but also future resource extraction proposals.

MEETING REPORT

Neerabup Industrial Structure Plan

Meeting with Department of Environmental Protection & Water and Rivers Commission

Venue: Offices of Department of Environmental Protection

Date: 25th August 2000

Attendance:	Darren Walsh	DEP
	Cilla de Lacey	DEP
	Marnie Leybourne	WRC
	Lex Barnett	Taylor Burrell
	Barbara Brown	Sinclair Knight Merz

LB explained the purpose of the meeting and the general objectives of the NIA Structure Plan.

Key issues raised during the meeting were:

- Water Quality Management - any contamination of groundwater within the NIA may impact upon Lake Neerabup. WRC and DEP are aware that Basic Raw Materials extraction may lower ground levels to within close proximity of groundwater in some areas. Treatment of groundwater quality will be an important environmental issue.
- It was acknowledged that Lake Neerabup and its environs are adequately protected by the existing MRS Parks and Recreation Reservation.
- BushPlan - the Structure Plan will need to acknowledge the proposals contained in Bushplan. DW acknowledged that BushPlan is not yet ratified, however, the strategy is at an advanced stage, and has received general endorsement by Cabinet and all relevant government agencies. LB made the point that, if the BushPlan sites were currently to be shown as open space or conservation, then it would pre-empt the final outcome of BushPlan and diminish the ability of the affected landowners to negotiate an alternative outcome. DW agreed with this, and agreed that the acknowledgment of the Bushplan within the Structure Plan could be presented in a neutral manner, which simply identified the BushPlan sites as areas requiring further negotiation.
- See P3 - LB noted that the southern BushPlan site (295) appeared to be primarily intended to protect the habitat (Woolly Bush) of a rare bee. LB questioned whether the particular type of Woolly Bush was also rare, or whether it was possible to relocate the bee given that Woolly Bush is generally a common species in the region. It was acknowledged that this was a valid question, which could not be answered at the meeting.
- Barbagello Raceway noise - the previous written advice of the DEP was generally discussed. There was general acknowledgment that the potential for noise conflict with the raceway for businesses which will ultimately situate within a General Industrial Area is likely to be minimal; however, DW made the point that

if the DEP received a noise complaint which found the raceway to be contravening the noise regulations, then the DEP would be obliged to act against the raceway. It was agreed that the issue of potential noise conflict would need to be thoroughly addressed in the Structure Plan Report.

- Risk - the DEP is concerned to ensure that the Industrial area does not allow potentially high risk industry (ie industry which stores large quantities of hazardous materials) which may cause risk to the safety of raceway patrons.
- Karsts - BB acknowledged the potential existence of karsts in the area, although it was agreed that the known formations are not actually within the proposed development area. There may be a need to examine the area for the existence of karstic formations at some stage during the planning process. Of particular concern is the potential existence of rare Stygofauna known to exist within such formations near the groundwater table.
- Process - DW acknowledged that the Industrial Zoning of the NIA has been considered by the DEP as part of DPS 2, and this fulfils the statutory assessment responsibilities of the DEP. There would be no further statutory obligations to refer the Structure Plan to the DEP, unless new environmental issues are deemed to arise as a result.

Notwithstanding, it is possible for the City of Wanneroo to refer the proposal to the DEP for informal comment.

MEETING REPORT
Neerabup Industrial Structure Plan
Meeting with Water Corporation

Venue: Offices of Water Corporation, Leederville

Date: 25th August 2000

Attendance: Mike Hollett
Lex Barnett
Bruce Keay

Water Corporation
Taylor Burrell
Sinclair Knight Merz

LB explained the purpose of the meeting, and the objectives of the Structure Plan proposal.

BK asked for confirmation that the NIA would fall within the Special Agreement area for sewer and water provision, which applies to the urban development to the south. MH confirmed that the NIA has been factored into the Special Agreement area. This will mean that the Water Corporation will, subject to suitable notification, provide all main sewer and water infrastructure, and recover costs through a special headworks agreement with subsequent developers.

The issue of the Public Purpose Reservation in the north eastern corner of the study area (which was reserved for water supply purposes) was raised. BK advised that he had received conflicting advice about the future need for the site, and asked for confirmation.

MH was unable to confirm at the meeting, and agreed to investigate and advise at a later date. (subsequent advice from MH confirmed that the Water Corporation no longer required the reservation for Water supply purposes, and that it was no considered surplus to requirement).

MH requested that the Water Corporation be kept informed of the progress of the NIA Structure Plan, and in particular any future staging proposals, so that the corporation could continue to review its own infrastructure planning strategy.

MEETING REPORT
Neerabup Industrial Structure Plan

Meeting with Department of Minerals and Energy

Venue: Offices of Dome

Date: 1st September 2000

Attendance: Tony Smurthwaite DOME
Lex Barnett Taylor Burrell
Bruce Keay Sinclair Knight Merz

LB explained the purpose of the meeting, and the general objectives of the Structure Plan proposal.

TS welcomed the opportunity for input, and explained that DOME recognised the importance of balancing the need to protect Basic Raw Materials against the needs for the provision of land supply for various purposes (urban, industrial, etc)

TS also explained that the Basic Raw Materials Policy was reviewed about 12 months ago and the revised BRM Policy was promulgated as section 5AA Policy (SPP10), gazetted on the 28th July 2000.

One of the key distinctions between the revised policy and the original policy was that SPP10 recognises the influences of BushPlan.

TS acknowledged that there was a problem with landowners in some priority resource areas who were not utilising the resource in a timely manner, effectively "locking away" not only the Basic Raw Material, but also the potential subsequent use of the land. It is currently difficult to place any pressure on extraction licence holders, as the length of licences are typically 21 years plus 2 options. DOME is currently looking at the possibility of issuing reduced lease periods on a "use or it lose it" basis.

Rehabilitation

One of the problems currently experienced in limestone extraction areas, is the quality of land rehabilitation after extraction is complete. Rehabilitation to a natural state is difficult, after the limestone is removed, as many of the native species live only on limestone cap. In circumstances where the land is ultimately proposed to be developed for an alternative use (such as the Neerabup Industrial Area) this alleviates the rehabilitation problem.

Other Contacts within DOME

- Charles Newland - Mining Operations Division (oversees Notices of Intent and Environmental Management Plans)
- Mark Cannon

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187 Roberts Road Subiaco 6008
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Telephone (08) 9382 2911 Facsimile (08) 9382 4586
Email planning@taylorburrell.com.au

Our Ref: KW/kj00/47

Dear Sir

RE: Preparation of Structure Plan for Neerabup Industrial Area

We refer to the recent letter from Council advising that Taylor Burrell will be undertaking the preparation of the Neerabup Industrial Area Structure Plan. We are currently in the initial phases of the project, this includes collating and reviewing any relevant information and reviewing the previous studies.

We would also appreciate your input into the process and as such we invite your attendance at a meeting to be held at the City of Wanneroo Civic Centre, Civic Drive Wanneroo (located above the Wanneroo Library) on Wednesday the 11th of October at 4.30pm.

The purpose of the meeting is to introduce the study team, discuss your development intentions and present our initial findings including the opportunities and constraints to the site. These discussions and your input will then be used in the formulation of the Structure Plan for Neerabup. Attached is a draft agenda for your consideration.

Could you please confirm your attendance with Liliانا Greco by Friday the 29th of September 2000.

Should you wish to discuss this correspondence please do not hesitate to contact Karen Wright of this Office on 9382 2911. We look forward to seeing you on the 4th of October 2000.

Yours faithfully
TAYLOR BURRELL

LEX BARNETT
Director

Toddville Prospecting Pty Ltd DIRECTORS
ACN 008 735 153 William H Burrell MIS Aust, LFRAPI • Lex Barnett MRAPI
SENIOR ASSOCIATE
Peter Clemitis MRAPI
ASSOCIATES
Samantha Thompson • Karen Wright



LANDCORP
DEVELOPING LAND FOR THE COMMUNITY

Neerabup Industrial Area – Landowners Intentions Survey

Name and Address

Have your intention for your land altered since the release of the SMEC report (refer attached) Yes / No

If yes please complete the questions below.

What is your likely extraction timetable?

When is extraction likely to be complete?

What is your timing for the ultimate industrial development of your land?

Please complete and return to:

Taylor Burrell
PO Box 503
WEST PERTH WA 6872

or

Bring along to Landowners meeting on 1st October 2000

3 LAND OWNERSHIP

3.1 OVERVIEW

Figure 3.1 shows the land ownership within the study area. There are seven landowners within the study area with properties zoned industrial on the Metropolitan Region Scheme. These landowners are:

- Cockburn Cement
- City of Wanneroo
- LandCorp
- Trandos
- Borrello
- Stampalia
- Susac

The development and subdivision of the Neerabup Industrial Area for industrial uses will initially be dependent on the intentions of these landowners. Their intentions, documented in this section, reflect discussions held with each during the preparation of the structure plan review.

3.2 LAND OWNERS INTENTIONS

3.2.1 Cockburn Cement - Lot 21 Flynn Drive

Cockburn Cement owns approximately half the land in the study area. The company's holding lies in the western portion, bordering Lake Neerabup. The site represents a long-term limestone resource for the company. Representatives from the company estimate that the land will not be available for industrial development for the next 20-30 years.

3.2.2 City of Wanneroo - Lot 4 and 240 Flynn Drive

The City of Wanneroo's Lot 4 and 240 are available for industrial development.

3.2.3 LandCorp - Lot 22 and 053 Flynn Drive

LandCorp is eager to commence the development of Lot 22 for general industrial purposes. The southern portion of Lot 22 is an active limestone quarry, due for completion within five years. The quarry face moves northwards. LandCorp anticipates commencing industrial subdivision and development in a staged manner, both temporally and spatially. Staged development can coincide with landscape rehabilitation of the quarry sites.

The second of LandCorp's holdings is Lot 053 which is available for early development, assuming the availability of necessary services.

3.2.4 Trandos - Lot 505, 506, 507 and 508 Pedric Street

A sand resource on the eastern three-quarters of Lot 505 is currently being extracted. The lease is due to expire in 5-7 years.

WATTLE AVENUE

PINJAR

ROAD

PEDERICK ROAD

WANNEROD ROAD

FLYNN DRIVE

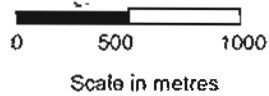
PINJAR ROAD

NEAVES ROAD

Carramar Park

LEGEND:

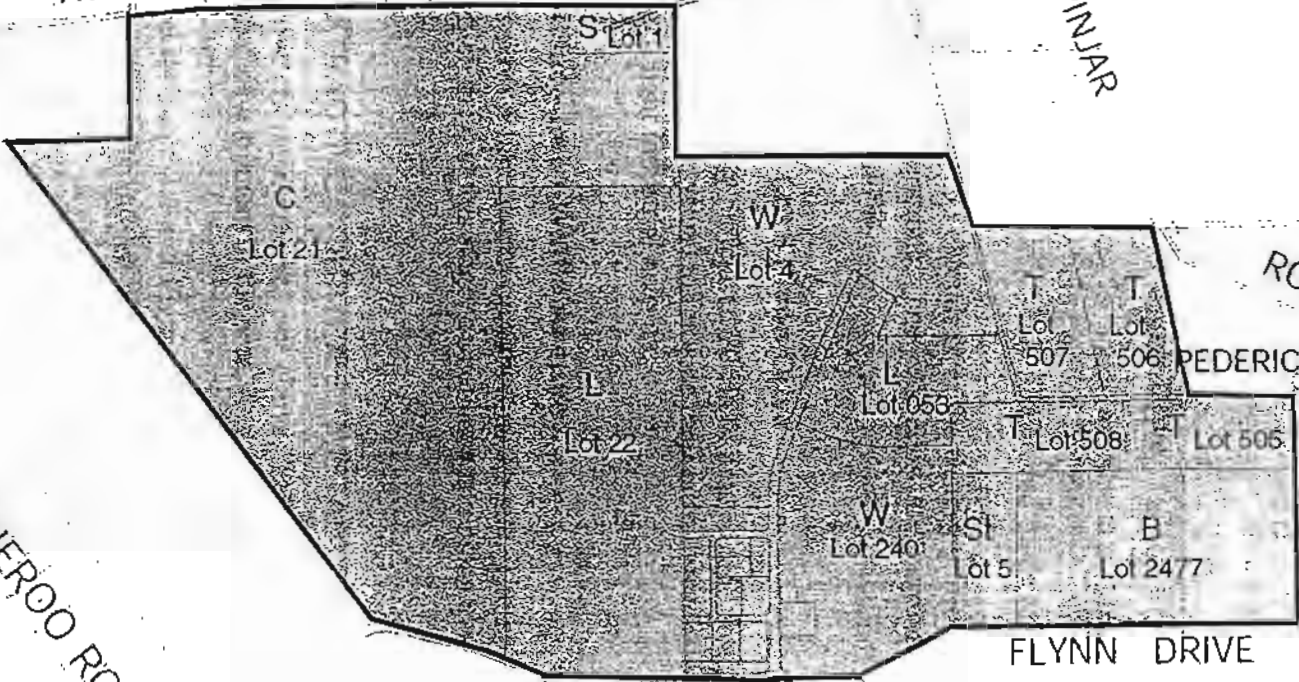
- C** Cockburn Cement
- L** LandCorp
- S** Susac
- T** Trandos
- W** City of Wanneroo
- B** Borrello
- SI** Stampalia



SMC

ACN: 070 250 290
Level 5, 12 St Georges Terrace
PERTH WA 6000
Tel: (08) 9221 5800 Fax: (08) 9221 5301

Landownership in the Neerabup Industrial Area		
Project Number:	Drawing Number:	Issue:
36003	FIGURE 3.1	A



The Trandos' have a chicken farm in the north-west corner of Lot 506. A turf farm covers the remaining area with a life expectancy of approximately five years.

The Trandos sons have a five year renewable lease managing market gardens on Lots 507 and 508. However Mr Trandos does not see this as a limiting factor to this land being used for industrial activity in the short-medium term.

The family would like to see the land developed for industrial activity in seven to ten years.

3.2.5 Borrello - Lot 2477 Flynn Drive

The Borrello family holding is under a four-stage sand excavation programme. The western portion, stage 1, is currently being mined and due for completion within five years. Following this, the Borellos would like the land rehabilitated and made available for industrial development.

Bushplan site number 295 extends over the eastern portion of Lot 2477, covering stages 3 and 4 of their excavation programme. The Borrellos are currently examining the implications of the Bushplan site to their plans.

3.2.6 Stampalia - Lot 5 Flynn Drive

The Stampalias recently purchased 20 Ha of unused land from the Borrello family. They have short-term plans (within five years) to relocate their current truck depots services to the site and develop it for associated light industrial activity.

3.2.7 Susac - Lot 1 Wattle Avenue

The Susacs have a lime works operation at the site. The holding also contains untapped limestone resource which they, at this stage, do not have any plans to mine.

3.3 EXTRACTIVE INDUSTRIES TIMETABLE

Given the owners intentions set out above, Table 3.1 and Figure 3.2 document likely timing of industrial land development in the area.

As indicated by Table 3.1 and Figure 3.2 the staging of industrial development will be determined by the intentions of the various landowners.

Essentially this means:

- Cockburn Cement's land will not be available for industrial purposes for some time. The layout of the structure plan and development staging should be cognisant of this.
- The City of Wanneroo has no immediate development intentions for the properties. Council supports the industrial development of the area proceeding and would anticipate being involved in the earlier stages of development, with any viable basic raw material being extracted beforehand.

- LandCorps' holdings, particularly Lot 22, should be developed in a self sufficient way. This will allow early release without the complications of joint subdivision.
- Trandos' land will be available for industrial development in the medium-term but may have to rely on the provision of services from other areas within the estate.
- Borrello and Stampalia are looking forward to developing their land for industrial purposes in the near future. The eastern portion of Borrello's land is currently under negotiation with government conservation initiative, Bushplan.
- Susacs have long-term intentions for current limestone processing activity on their property.

Table 3.1 Extractive Industries Inventory and Land Owner Intentions

Landowner	Lot no.	Area	EIS	Existing Use	Landowner/Leasees Intentions	Availability			Servicing/Issues
						Short Term	Medium Term	Long Term	
Landcorp	Lot 22	170.026 Ha	(30/19) To CSR Readymix, WA Limestone and Concept nominees until 2005	Limestone quarry.	Develop for general industrial activity as soon as possible.	✓	✓		Services should commence and proceed eastwards.
	Lot 053	40.026 Ha			Available for early development.	✓			Assumed availability
City of Wanneroo	Lot 4	203.916 Ha		Uncleared.	No immediate development intentions. Keen to develop for general industrial activity.	✓			City of Wanneroo considering developing for industrial lots.
	Lot 240			Uncleared.	No immediate development intentions. Keen to develop for general industrial activity.	✓			City of Wanneroo considering developing for industrial lots.
Bonello	Lot 2477	83 Ha	Caramar Sands Stage 1 Being mined.	Commenced 4 stage sand excavation programme. 20 Ha in western extremity of lot has been excised.	Sand excavation for 3-5 years. Considering Industrial development once excavation complete	✓	✓		Tap into servicing facilities developed for preceding industrial development.
Cockburn Cement	Lot 21	437.498 Ha	(M70/346)	Leased for a horse riding school.	No development intentions for 20-30 year timeframe.			✓	
Trandos	Lot 505	20.027 Ha	Eclipse resources	Sand excavation over entire Lot.	Sand excavation to continue.		✓		Tap into servicing facilities developed for preceding industrial development.
	Lot 506	28.575 Ha		Semi cleared and accommodates a chicken farm and a turf farm.	Retain as a chicken farm. Turf farm, approximately 5 years remaining.		✓		Assuming availability of necessary services.
	Lot 507	28.606 Ha		Market Garden.	3-5 year renewable lease remaining on market garden.		✓		Assuming availability of necessary services.
	Lot 508	25.926 Ha	Eclipse resources	Market Garden.	3-5 year renewable lease remaining on market garden.		✓		Assuming availability of necessary services.
Susac	Lot 1	8.806 Ha	30/18 Mr Susac	Small limeworks operation in south western corner, remainder unutilised.	Retain quarry and lime production activities.		✓		
Stampalia	Lot 5	20 Ha		Uncleared.	Relocate truck depot activity within 3 years.	✓			

ATTENDANCE REGISTER

Neerabup Industrial Area Landowners Meeting 11/10/2000

Name	Interest / Address of property	Have your intentions for your land altered since the SMEC report Yes /No	Phone No.
NICK TRANDOS	3 SETOMA CRT JOONDALUP 6027	YES	93000321 FAX 93000228
JACK SUSIAC	41 Bernedale Way Duncraig 6023	Yes	94481079
MARK STAMPALIA	LOT 5 FLYNN DRIVE	YES.	9405-1077
FRANK BORRELLO	PTN SWAN Lx 2477 FLYNN DR	YES	9402 0211 9306 1155 FAX
PAUL ROKICH	CSR		
TONY DOBBS	COCKBURN CEMENT	NO BUT HAVEN'T NO SEEN THE REPORT	94111020
Genny Davies	Knight Frank for Cockburn Cement		93257533
Phil Thompson	City of Wanneroo	No	94055469
ROMAN ZASLAWKI	"	"	"
PAUL NEILSON	"	"	9405 5465



LANDCORP

DEVELOPING LAND FOR THE COMMUNITY

Neerabup Industrial Area – Landowners Intentions Survey

SUSAC LIME SUPPLY PTY LTD

A.C.N. 059 089 922

41 BERNHEDE WAY

DUNCRAG 6023

Name and Address

Have your intention for your land altered since the release of the SMEC report
(refer attached) Yes / No

If yes please complete the questions below.

What is your likely extraction timetable?

LONG TERM LIMESTONE RESOURCE

When is extraction likely to be complete?

NOT BEFORE 30 YEARS

What is your timing for the ultimate industrial development of your land?

Please complete and return to:

Taylor Burrell
PO Box 503
WEST PERTH WA 6872

or

Bring along to Landowners meeting on 1th October 2000



LANDCORP

DEVELOPING LAND FOR THE COMMUNITY

Neerabup Industrial Area – Landowners Intentions Survey

Name and Address

TARRANT FAMILY 3 SE-TORNA COURT
DOONDAKUP 6027

Have your intention for your land altered since the release of the SMEC report
(refer attached) Yes No

If yes please complete the questions below.

What is your likely extraction timetable?

When is extraction likely to be complete?

What is your timing for the ultimate industrial development of your land?

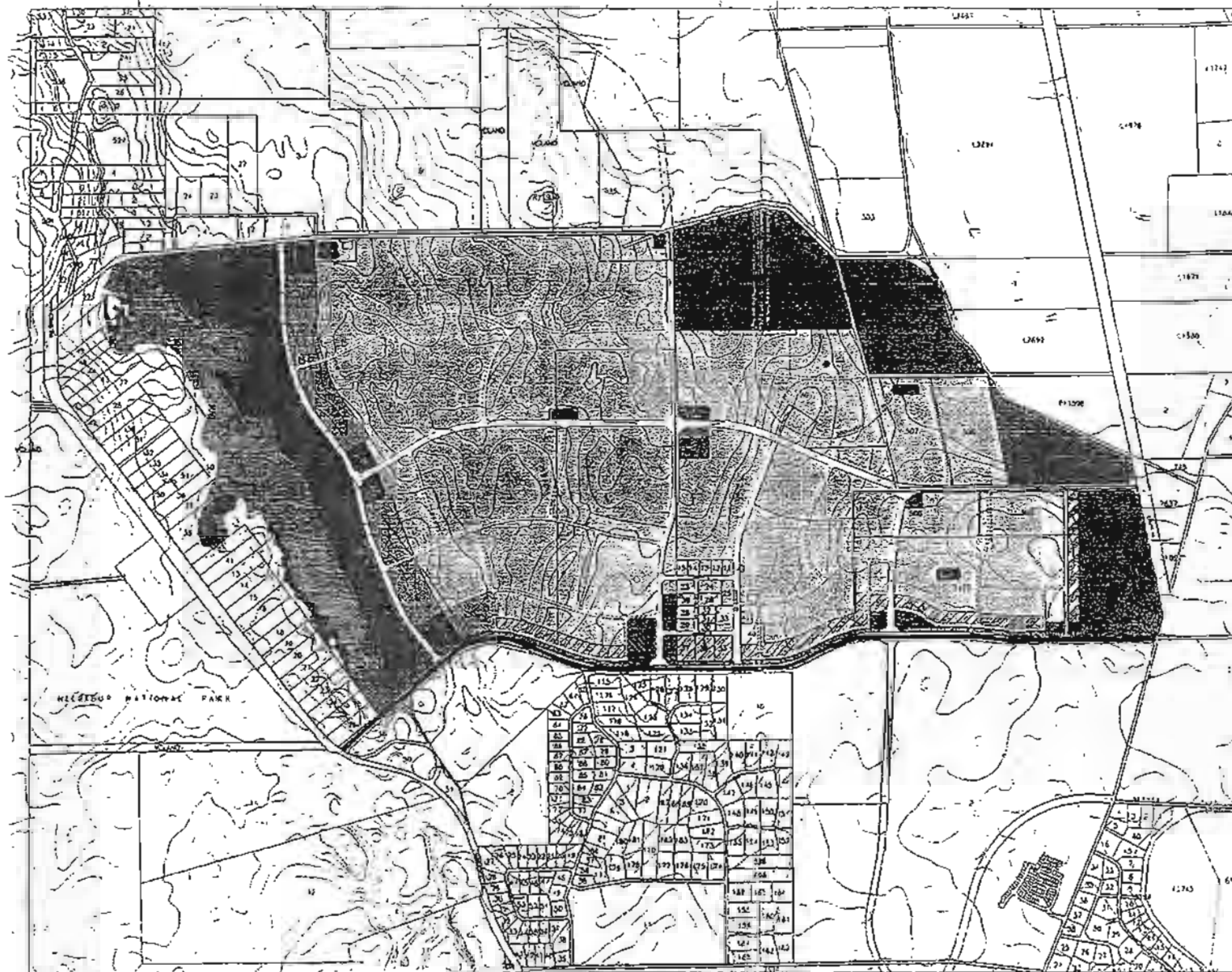
Please complete and return to:

Taylor Burrell
PO Box 503
WEST PERTH WA 6872



or

Bring along to Landowners meeting on 1st October 2000

APPENDIX 2
Flynn Drive Industrial Area District Structure Plan



LEGEND

-  OPEN SPACE
-  INDUSTRIAL
-  GENERAL PURPOSE
-  GREEN BELT
-  HIGH DENSITY
-  PARK AND RECREATION
-  LOW DENSITY
-  INDUSTRIAL RESIDENTIAL
-  OFFICE
-  COMMERCIAL
-  LAND RESERVE
-  EXISTING RESIDENTIAL
-  PROPOSED INDUSTRIAL



Scale 1: 10,000

0 500m 1km

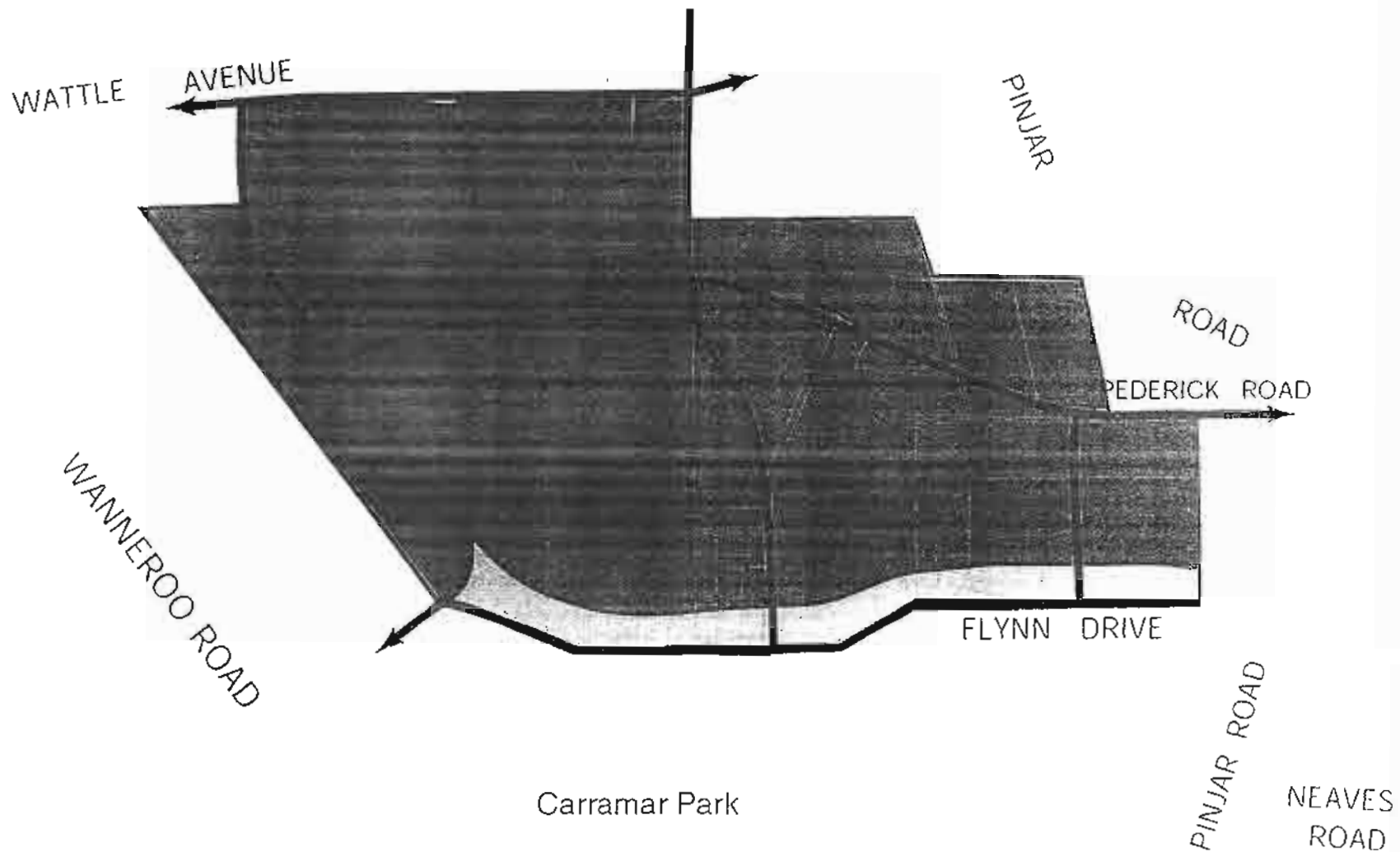
FLYNN DRIVE INDUSTRIAL ESTATE
DISTRICT STRUCTURE PLAN

for City of Wanneroo, Landcorp, Borrello
Cockburn Cement, Trandos, Susac.




RICHARD PAWLAK
&
ASSOCIATES
MASTERPLAN CONSULTANTS
7, 100 HAY STREET, ST-BIAZ
PH 381 6677 FAX 381 1888
TOWN PLANNING CONSULTANTS

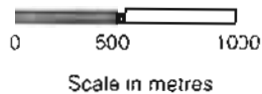
APPENDIX 3
Flynn Drive Structure Plan

APPENDIX 4
Neerabup Industrial Area Structure Plan Review



LEGEND:

-  Parks & Recreation Reserve
-  General Industrial
-  Light Industrial/ Mixed Business




SMIEC

40N 070 269 260
Level 5, 12 St Georges Terrace
PERTH WA 6000
Tel 089 221 5900 Fax 081 021 5421

Structure Plan for the
Neerabup Industrial Area

Project No.
36003

Figure No.
FIGURE 5.1

A

APPENDIX 5
DEP Advice

Head Office:

Westralia Square
141 St Georges Terrace
Perth, Western Australia, 6000
Tel: (08) 9222 7000 Fax: (08) 9322 1598
<http://www.environment.gov.au>

Postal Address:
PO Box K821
Perth, Western Australia 6842

Steve Wiencke
Landcorp
Locked Bag 5
Perth Business Centre
PERTH WA 6849

Your Ref 99P490

Our Ref TP96.005
Enquiries Cilla de Lacy

NEERABUP INDUSTRIAL AREA

Thank you for your letter of 16 December 1999 in which you express concerns about the imposition of a 1500m buffer (to protect future industrial landusers from excessive noise) to separate general industry from the Wanneroo Raceway.

It is understood that the majority of the Neerabup Industrial Area (a portion of the Flynn Drive Structure Plan area) will be zoned for Industrial Development in the City of Wanneroo's new Town Planning Scheme (due for gazettal in March this year). The new Scheme states that permitted uses within this zone will be identified through the development of a Structure Plan agreed to by the relevant government agencies and the City.

As mentioned in your letter, the Department of Environmental Protection (DEP) has been liaising with your planning consultants, SMEC Australia, with regards to the types of industrial uses which would be suitable within the 1500m buffer. Firstly, a meeting was held on 29 October 1999 with representatives from SMEC and with Nick Hodges to ascertain the implications for industrial development adjacent to the Raceway. The outcomes of the meeting were as follows:

- The DEP was to properly define the 1500m buffer, where it came from and what it means;
- Landcorp and SMEC were to forward to the DEP a list of the industrial landuses which would most likely develop within the Neerabup Industrial Area; and
- The DEP was to provide comments to SMEC and Landcorp on the issue of risk associated with industrial development adjacent to the Raceway.

SMEC promptly forwarded a letter to the DEP (see attached) providing information on the landuses which may establish within the industrial area. The DEP provided a draft response to this letter, which you already have a copy of. However, it appears as though there is still some confusion as to the DEP's position with regards to industrial development adjacent to the Raceway. Therefore, following on from our meeting of 28 January 2000 the DEP offers the following advice.



Noise issues

Definition of the noise buffer

Acoustic modelling was undertaken by Herring Storer Acoustics in 1995 to investigate buffer requirements for proposed landuses adjacent to the Wanneroo Raceway. The modelling was based on noise measurements made by the DEP during the Australian Touring Car Championships in July 1994. The results of the study indicated that the 65dB(A) noise contour was approximately 1500m from the boundary of the Raceway. Noise levels greater than this, ie within 1500m of the Raceway, would exceed the *Environmental Protection (Noise) Regulations 1997* for industrial landuses. Therefore, noise levels for industrial landuses which are closer than 1500m to the Raceway are expected to be above the levels recommended by the DEP as tolerable by industrial landuses.

The DEP is not aware of any complaints relating to noise emissions from the Barbagallo Raceway affecting extractive industries already operating in the area. As discussed at the meeting, however, future industrial development will need to be in compliance with the regulations. To achieve this compliance an application for a Regulation 17 approval to vary the assigned levels will need to be lodged with the Minister for the Environment. However, to grant this exemption the Minister, on the advice of the Environmental Protection Authority (EPA), would need to be confident that the particular industrial landuse was not classified as a noise sensitive premises.

The DEP recognises that this may seem a little onerous because there are special circumstances associated with Raceways, in that they operate only on weekends and, in the case of Wanneroo Raceway, only a few times a year, whereas industrial activities are mostly operational on weekdays. However, the Regulations do not distinguish between weekend noise levels and weekday noise levels, therefore an exemption will need to be sought.

Industrial landuses which may and may not be permitted within the 1500m noise buffer

The DEP recognises that the noise conflicts may be overcome by different timing of the two landuses (ie the Raceway and the industrial landuses) with weekends for racing and weekdays for industry. Therefore, the particular types of landuses which may possibly be permitted include those, eg. Milk depot, which do not require sales and/or service to the public on the weekend.

Information provided in your letter describes the dominant class of industry as general industry (eg engineering workshops, structural steel fabrication, sheetmetal works, concrete products, plastics manufacture, food and beverage processing, transport depots, wholesale warehousing etc.).

The DEP considers that these uses are not noise-sensitive premises and, therefore, may possibly be suitable within the industrial area. The DEP has also been through the list of permitted and not permitted uses (but subject to council approval) taken from the Use class table within the City's new Scheme for General Industrial areas, and has identified uses which may possibly be permitted within the 1500m noise buffer.

Landuses which may possibly be suitable	Landuses which may possibly not be suitable
Car park Dry cleaning premises Fuel depot Laundry supplies Milk depot Motor vehicle repairs Storage yard Transport depot Wholesale warehousing Bakery Communication Antenna - Commercial Communication Antenna - Domestic Concrete Batching plant Industry - Rural Smash repair station Trade display Open Air display Salvage yard - industrial Vehicle wrecking	Auction room Landscape supplies Vehicle sales/hiire premises Convenience store Equipment hire Lunch bar Road House (service station and lunch bar) Service Station

Industrial activities involving distribution processes, storage, processing and production activities may possibly be suitable. Extractive and noxious industries may also possibly be suitable landuses within the noise buffer, provided they do not present a risk to Raceway patrons (see below). Therefore, a timber mill could possibly be acceptable.

The DEP is also aware that ancillary services (eg doctor's surgery) will be needed within the industrial area. These sorts of services are most likely to be noise sensitive premises, therefore, it is recommended that they be located outside of the 1500m buffer. To this end, the DEP supports Landcorp's intention to develop the Neerabup Industrial Area on a precinct basis as this will assist in the siting of noise sensitive premises outside of the 1500m buffer.

Risk issues

The issue of the level of risk associated with locating a Raceway adjacent to an Industrial area has been recently addressed by the EPA in its assessment of the proposal by the Western Australian Sports Centre Trust to build and operate a motorsport facility (Motorplex) adjacent to the Kwinana Industrial Area (KIA). The KIA includes a number of industries which store or process hazardous materials which may, if inappropriately managed, cause an industrial accident putting patrons of the Motorplex at risk from serious injury. The EPA concluded that there remains considerable uncertainty concerning the level of societal risk which would be imposed by locating a Motorplex facility adjacent to the KIA.

Certain types of industry which pose an off-site risk could possibly locate in the Industrial Development Zone. Examples include LPG storage and transfer depots, dangerous goods storages (chlorine drums), small chemical works (plastics).

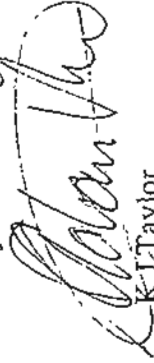
Large chemical processing works, which are classified as major hazard facilities according to the Worksafe Standard for the 'Control of Major Hazard Facilities' (Worksafe, September 1996) should not be allowed in the Industrial Development Zone. The reason being the close proximity to the raceway and the urban development area.

Apart from major hazard facilities, there are two types of industry, as defined in the State industrial Buffer Policy (SPP No. 4); those industries which contain their impacts on-site, and those industries which have off-site impacts.

It is a good policy to keep those industries which have an off-site risk impact approximately 1000m away from residential areas and from areas where crowds gather (ie the raceway). However, the DEP recognises that the area in the northwest corner of the Industrial Development Zone, which is 1000m away from the Raceway, is held by Cockburn Cement who intend to mine the area for limestone, which may not be concluded for another 50 years. Therefore, whilst this area would result in a 1000m separation distance to the raceway and about the same distance to the rural-residential area to the west and the commercial node to the south it will not be available. In this instance, the DEP recommends that any development application for an industry which poses an off-site risk, and is lodged before the land held by Cockburn Cement has been mined, be referred to the EPA under Section 38 of the Environmental Protection Act 1986 for assessment.

Assessment

The DEP advises Landcorp that individual proposals for industrial development within the Neerabup Industrial Area will require referral to the Environmental Protection Authority under Section 38 of the Environmental Protection Act if, once implemented, they appear likely to have a significant effect on the environment.



KJ Taylor
DIRECTOR
EVALUATION DIVISION

14 February 2000

Enc

APPENDIX 6
Flynn Drive Traffic Assessment

Date 19 November 2004
 Project No DE02660
 Subject **Neerabup Industrial Estate Traffic Review**

1.1 Introduction

Sinclair Knight Merz was commissioned by Taylor Burrell Barnett on behalf of Landcorp to model the future traffic volumes predicted to be generated by the Neerabup Industrial Estate (fully developed) to determine an appropriate road network and road reserve requirements.

The purpose of this report is to outline the methodology used in the traffic model and the outcomes from the model including the proposed road network and road reserve requirements.

1.2 Existing and Future Road Network

The site is located south and west of Barbagallo raceway and is bound by Wattle Avenue to the north, Pinjar Road to the east, Flynn Drive to the south and Neerabup Lake to the west.

Wattle Avenue, Pinjar Road and Flynn Drive are classified as Access Roads under the *Perth Metropolitan Area Functional Road Hierarchy (November 1997)*. The most recent Average Daily Traffic (ADT) counts sourced from the City of Wanneroo are shown in **Table 1**.

■ **Table 1 Traffic Volumes of Existing Road Network**

Location	Year	Average Daily Traffic (vehicles per day)
Wattle Ave (east of Wanneroo Rd)	1993	200
Wattle Ave (west of Pinjar Rd)	1995	120
Pinjar Rd (north of Wattle Ave)	1995	150
Pinjar Rd (south of Wattle Ave)	1991	500
Pinjar Rd (south of Pederick Rd)	1995	300
Flynn Drive (west of Pinjar Rd)	2003	1,000
Flynn Drive (east of Tranquil Dr)	1991	1,000

Table 1 shows that the existing traffic volumes are appropriate for the current classification of roads.

The proposed future road network is shown in **Figure 1** of this report. From a review of the road network shown in the previous version of the Neerabup Industrial Area Structure Plan¹, it is considered that the majority of the road network is still appropriate.

There could be merit in providing a more direct road link between Flynn Drive (to the west of Tranquil Drive) and the north-south road (running along the eastern boundary of the site) to encourage traffic to travel on the perimeter of the site rather than through the industrial area.

However, such a proposal is subject to land considerations and needs to be further investigated at the stage of detailed sub-division design.

The traffic modelling of the future road network (discussed in the following sections of the report) has identified that Wattle Avenue West from Wanneroo Road to the north west corner of the site needs to be upgraded as the northernmost connection to the Neerabup Industrial Area.

The previous Structure Plan included the extension of Wattle Avenue West eastwards across the northern boundary of the site. As part of this assessment, the road network was modelled with the Wattle Avenue extension (Scenario 1) and without the Wattle Avenue extension (Scenario 2) to determine if the extension is necessary to cater for predicted traffic volumes.

The Scenario 1 traffic model indicates that the extension of Wattle Avenue along the northern boundary of the site is not necessarily required as the east west road parallel to and north of Pederick Road is expected to adequately cater for the traffic that otherwise would have used the extension.

For the purpose of the traffic modelling, it is assumed that the Mitchell Freeway will have been extended north of the subject area at the time of full development of the Neerabup Industrial Estate.

1.3 Future Traffic

1.3.1 Main Roads Traffic Model

For this study, Landcorp contacted the Main Roads WA Traffic Modelling Section to request 2001 and 2031 Standard Base Link traffic volume estimates and 2031 daily trips generated from the area bounded by Wanneroo Road, Flynn Drive, Wattle Avenue and Pinjar Road.

The traffic forecasts for 2001 and 2031 for Flynn Drive, Wanneroo Road and Wattle Avenue West (extracted from the Main Roads Transport Model using 24 hour Annual Average Weekday Traffic) are shown in **Table 2** (volumes have been rounded up to the nearest 5 vehicles).

¹ Neerabup Industrial Area Structure Plan, December 2001, prepared by Taylor Burrell and SKM



■ **Table 2 Main Roads WA Traffic Forecasts 2001 and 2031**

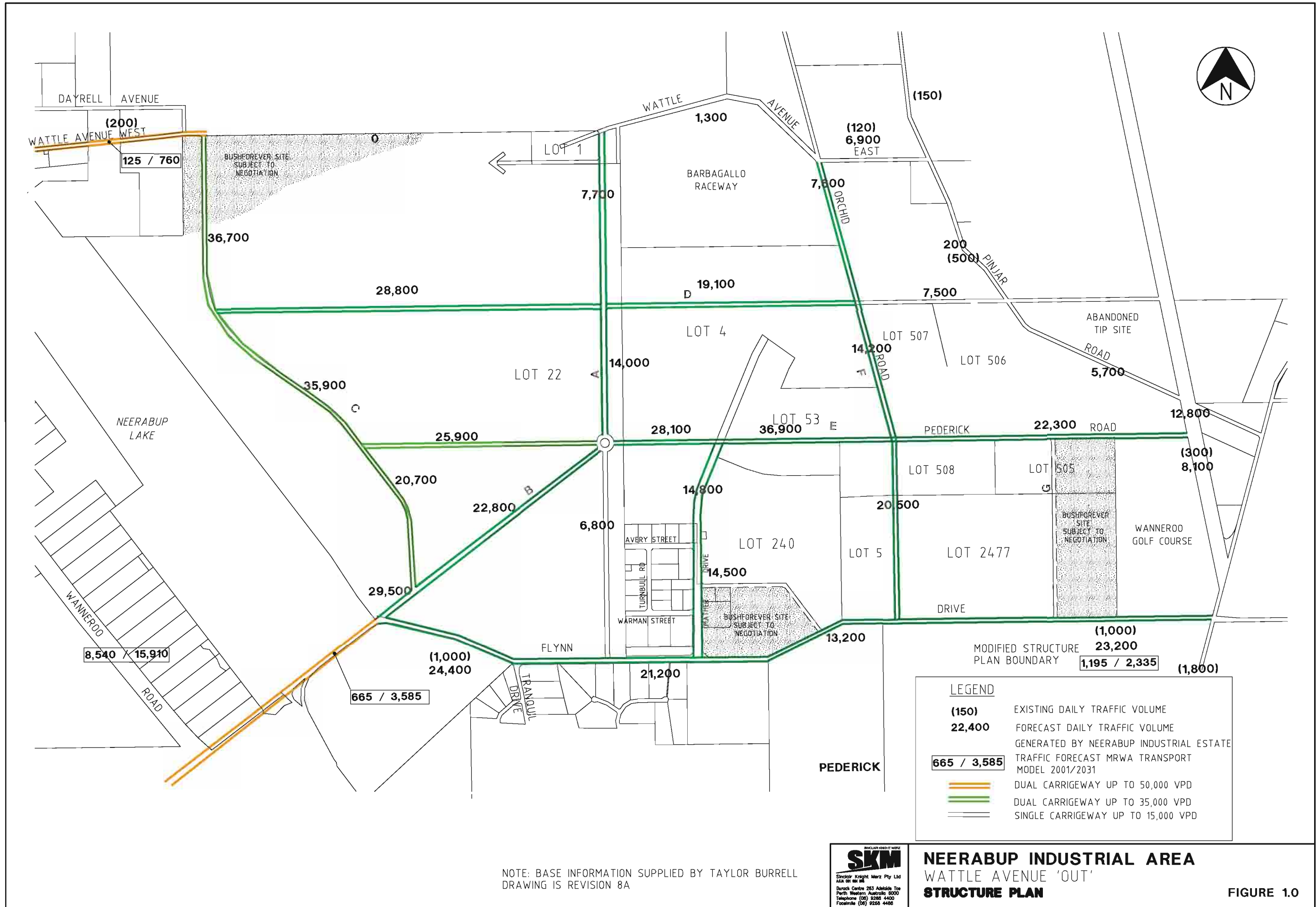
Road		Two way traffic volumes (veh/ day)	
		2001	2031
Flynn Drive	East of Wanneroo Road	665	3585
	West of Pinjar Road	1195	2335
Wanneroo Road	North of Flynn Drive	8540	15910
Wattle Avenue West	East of Wanneroo Road	125	760

Main Roads note that the modelled forecasts for 2031 are unadjusted and that this should be taken into account for the analysis purposes. The 1998/1999 Annual Average Weekday Traffic Flow of 12,460 vehicles per day (vpd) on Wanneroo Road north of Flynn Drive (quoted by Main Roads WA in their memorandum) is higher than the 8,540 vpd indicated in **Table 1** above.

The traffic forecasts obtained from the Main Roads Transport Model are based on the 'trend case' land use as provided by the Department for Planning and Infrastructure (DPI) and differ fairly significantly from the predicted traffic forecasts indicated in **Figure 1** of this report. It is therefore duly noted that the 'trend case' land use data is not reflective of the proposed land uses for the Neerabup Industrial Estate.

In this case, the Main Roads WA traffic forecasts from the Transport Model are shown on **Figure 1** to provide an indication of forecast traffic movements through the area generated by other land uses outside of the industrial estate area. However, as these traffic forecasts include some element of traffic volume that is generated by the land uses in the Neerabup Industrial Estate Area (albeit significantly less than predicted by the SKM traffic model), these traffic volumes are therefore conservative.

A full copy of the memorandum from Main Roads WA is contained in **Appendix A** of this report.



9X000/BRB

I:\DEVN\Projects\DE02660\Deliverables\Drawings\Neerabup Traffic Volumes Figure 1 Revision 8A

NOTE: BASE INFORMATION SUPPLIED BY TAYLOR BURRELL
DRAWING IS REVISION 8A

SKM
SHOULDN OBEY IT HERE
Skelton Knight Merz Pty Ltd
J24 on the Hill
Derock Centre 283 Adelaide Tce
Perth Western Australia 6000
Telephone (08) 9258 4400
Facsimile (08) 9258 4488

NEERABUP INDUSTRIAL AREA
WATTLE AVENUE 'OUT'
STRUCTURE PLAN

FIGURE 1.0



1.3.2 Vehicle Trip Generation Rates

There are no accepted guidelines for trip rates for industrial areas specific to Western Australia.

The following details the sources of data that have been researched to determine appropriate trip generation rates for industrial areas and business parks for the traffic model.

- **Trip Rates for Industrial Areas**

The NSW Roads and Traffic Authority (RTA) *Guide to Traffic Generating Developments* (October 2002) provides a trip rate of 5 trips per 100m² of gross floor area (GFA) for factories and 4 trips per 100m² (GFA) for warehouses.

SKM previously undertook a traffic review of the Pinelands Industrial Area in Darwin for the Department of Environment (DoE). As part of this study, a trip rate of 5 trips per 100m² GFA for the industrial area was determined from an analysis of the existing traffic volumes entering and exiting the site and calculation of the building areas of operating businesses. To estimate the future traffic volumes, the trip rate of 5 trips per 100m² GFA was adopted to represent standard growth in future development and, at the request of the DoE, a trip rate of 7 trips per 100m² / GFA was adopted to represent a high growth in future development.

For this study, SKM reviewed the existing traffic volumes in the Osborne Park Industrial Estate to determine a trip rate for the area. It is estimated that the total GFA for Osborne Park (calculated to be 104 ha) generates in the order of 49,900 trips on a typical weekday (excluding through traffic) resulting in a trip rate of 4.8 trips per 100m² GFA.

Table 3 summarises the range of trip rate values. The range of values for Osborne Park industrial area reflects the different traffic volumes occurring on the local street network, taking into account an estimated percentage of through traffic.

- **Table 3 Trip Rates for Industrial Sites**

Industrial Area	Daily Vehicle Trip Rate / 100 ² GFA
Guide to Traffic Generating Developments	4.0 – 5.0
Pinelands Industrial Estate	5.0 – 7.0
Osborne Park Industrial Estate	2.0 - 9.0

For the purpose of this study, a trip rate of 5.5 trips per 100m² GFA has been adopted to provide a conservative estimate of future traffic volumes generated by the general industrial and service industrial land uses.



- **Trip Rates for Business Parks**

The NSW RTA Guide to Traffic Generating Developments does not provide a daily trip rate but provides a peak hour trip rate of 1.1 vehicles/ 100m² gross leasable area (GLA) for business parks.

From a review of the trip rates for business parks contained in the Institute of Transportation Engineers Trip Generation² the peak hour trip rate represents approximately 11.3% of the daily trip rate.

If we assume that peak hour trip rate of 1.1 vehicles/ 100m² GLA represents 11.3% of the daily trip rate, the resulting daily trip rate would be 9.7 trips per 100m².

As such, a daily trip rate of 9.7 trips per 100m² has been adopted for the daily trip rate for the business land uses.

1.3.3 Vehicle Trip Generation, Distribution and Assignment

The assessment of future vehicle trip generation, distribution and assignment has been undertaken for the ultimate scenario assuming full development of the Neerabup Industrial Estate.

For the assessment, it has been assumed that the gross floor areas for the industrial land use is 30% of the measured land areas (excluding the indicative road reserve areas shown on the current structure plan).

For the business land uses, it has been assumed that the gross leasable area is 50% of the measured land areas (excluding the indicative road reserve areas shown on the current structure plan).

The areas of development were calculated for 33 different nodes and the resultant trip generation calculated for each of the nodes.

Adding the trip generation for each node, the Neerabup Industrial Estate (fully developed) is estimated to generate approximately 140,000 trips per day.

The generated traffic for each node was distributed onto the road network based on the distribution pattern shown in **Table 4**. The distribution pattern is based on the percentage of traffic generated by the site that is estimated to use the five major access points from the regional road network.

² Trip Generation – An Informational Report, 5th Edition, Institute of Transportation Engineers (ITE), 1991, Washington DC.



■ **Table 4 Traffic Distribution Pattern**

Origin/ Destination	Description	Traffic Distribution (%)
North-western suburbs and Mitchell Freeway north	Intersection of Wattle Avenue West and Dayrell Avenue	25
North-eastern suburbs and Brand Highway	Intersection of Wattle Avenue East and Pinjar Road	5.0
	Intersection of Pinjar Road and Spence Road	12.5
South-eastern suburbs	Flynn Drive and Pinjar Road	17.5
South-western suburbs and Mitchell Freeway south	Flynn Drive and Wanneroo Road	40

The assignment of trips on the road network for Scenario 1 (without Wattle Avenue extension) and Scenario 2 (with Wattle Avenue extension) are shown in **Figures 1** and **2** respectively.

Note that the traffic volumes shown in the figures indicate only those volumes predicted to be generated by the Neerabup Industrial Estate. Main Roads WA are to provide future forecasts for the external roads from their traffic model for year 2031.

1.4 Road Hierarchy and Road Reserve Requirements

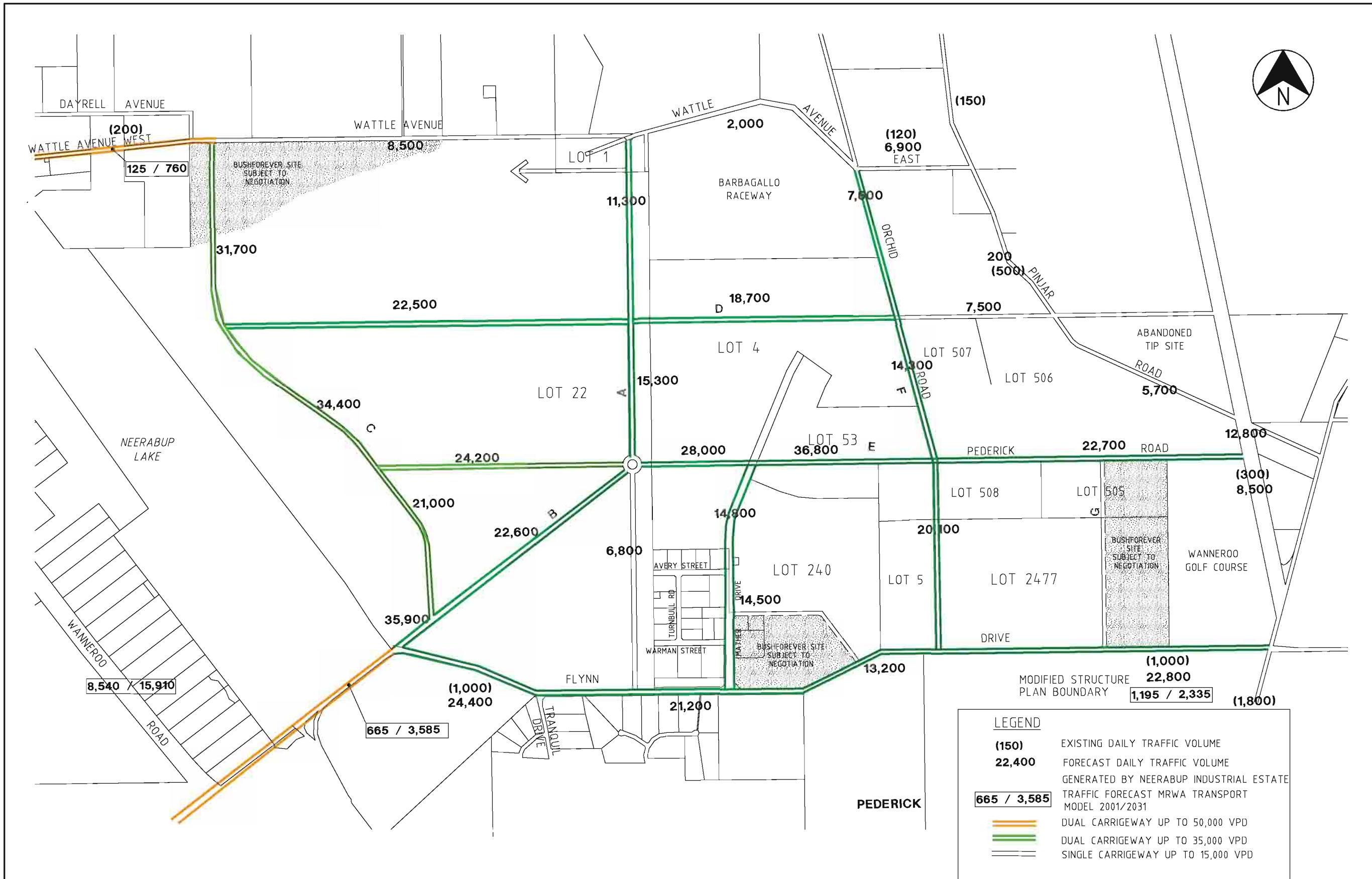
Figures 1 and **2** show the proposed road hierarchy and road reserve requirements outlined below. It should be noted that the outlined road reserves would be supplemented by local widening at intersections, the extent of which would be determined at detailed design.

Figure 3 shows the recommended cross sections.

Primary Distributors (Shown as Orange Roads)

It is considered that the sections of Wattle Avenue West and Flynn Drive to the west of the site should be designated as primary distributors as these roads are forecast to carry in the order of 50,000 vehicles per day.

It is recommended that the road reserve requirement and road pavement width for these roads should be determined by DPI in consultation with the City of Wanneroo.



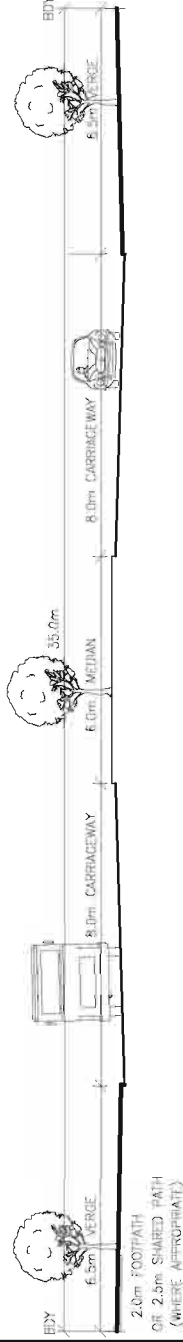
NOTE: BASE INFORMATION SUPPLIED BY TAYLOR BURRELL
DRAWING IS REVISION 9A



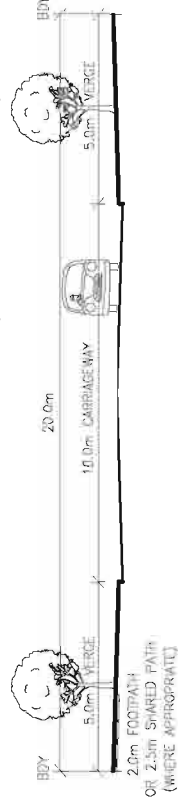
**NEERABUP INDUSTRIAL AREA
WATTLE AVENUE 'IN'
STRUCTURE PLAN**

FIGURE 2.0

1. ROADS WITH TRAFFIC VOLUMES 15,000 VPD TO 35,000 VPD



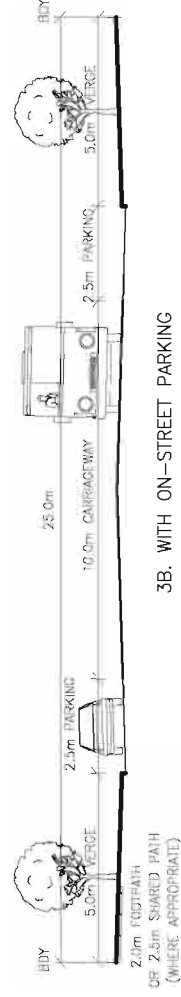
2. ROADS WITH TRAFFIC VOLUMES 5,000 VPD TO 15,000 VPD



3. ROADS WITH TRAFFIC VOLUMES LESS THAN 5,000 VPD



3A. NO ON-STREET PARKING



3B. WITH ON-STREET PARKING

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**N.I.A. STRUCTURE PLAN
RECOMMENDED CROSS SECTIONS**

FIGURE 3

Roads with Traffic Volumes up to 15,000vpd to 35,000 vpd (Shown as Green Roads)

It is recommended that roads forecast to carry between 15,000 and 35,000 vpd ultimately be 4 lane dual carriageways with road reserve width of 35m and pavement width of 22m (2 x 8m carriageways, 6m median and 2 x 6.5m verges).

Although it is not expected that there would be a significant number of pedestrians and cyclists travelling through the industrial area, 1.5m of the 6.5m verge width can be allocated to the provision of 1.5m wide on-road cycle lanes, leaving 5m verge width. Shared paths (2.5m wide) can be provided within the verge width.

It is suggested that the provision of on-road cycle lanes and shared path provision be determined at the stage of detailed sub-division design.

From discussions with DPI, it was indicated that Orchid Road may in the future carry through traffic volumes from possible future developments to the north and north-east of the Estate, including the possible redevelopment of the Barbagallo Raceway.

In this case, Road A and Orchid Road have been shown as dual carriageways north of Road D. In the interim when traffic volumes are less than 15,000 vpd, or in the event that additional traffic volumes beyond the levels shown on Figures 1 and 2 do not eventuate, the road pavement width could be 16m (2 x 5m carriageway and 6m median).

It is not proposed to provide frontage access from the individual lots to the roads predicted to carry traffic volumes between 15,000 and 35,000 vpd. The City of Wanneroo has indicated that where frontage access is not being provided, it is not desirable to provide fencing along the entire road corridor. This matter should be considered at the stage of detailed sub-division design.

Although frontage access is discouraged on the major roads, in the case of larger sites, such as the proposed Mindarie Council Recycling Plant, it is considered that it would be appropriate to provide direct access to the site via a controlled access point.

Advice from the City of Wanneroo is that intersections should not be less than 250m apart and that it is preferable to achieve 500m spacing. The intersection spacing along the roads should be determined at the stage of detailed sub-division design.

The existing building at Lot 53 already has frontage access to Pederick Road via two access points. Through discussions with the City of Wanneroo, it is suggested that, in this circumstance, a right turn lane should be provided in the 6m median at both access points and



that a left slip lane be provided at the one access point which is predominantly used for entering traffic.

Roads with Traffic Volumes between 5,000 vpd and 15,000 vpd (Shown as White Roads)

For roads forecast to carry between 5,000 vpd and 15,000 vpd, it is recommended that these roads be 2 lane carriageways with road reserve widths of 20m and pavement widths of 10m (1 x 10m carriageway and 2 x 5m verges). These roads will not have on-street parking. It is recommended that 2.5m shared paths be provided on both sides of the sections of road servicing the business park. It is recommended that the design of these roads include traffic management measures to discourage speeding, such as providing roundabouts at some of the intersections with the access roads.

Frontage access will be permitted from the individual lots at appropriate spacing.

Roads with Traffic Volumes up to 5,000 vpd

The smaller access roads (not shown on the current Structure Plan) are expected to carry traffic volumes up to a maximum of 5,000 vpd. It is recommended that these roads be 2 lane carriageways with road reserve widths of 20m to 25m with the minimum road reserve being a pavement width of 10m (1 x 10m carriageway and 2 x 5m verges). It is suggested that parking embayments of width 3m be created within the verge to provide on-street parking in appropriate locations as desired. It is recommended that the long sections of access roads include traffic management measures to discourage speeding.

Prepared By: _____
Susan Kreemer Pickford, Senior Traffic and Transport Engineer

Reviewed By: _____
Bruce Keay, Senior Engineer Development



Appendix A Memorandum from Main Roads WA 9th August 2004

MEMORANDUM

Our File : T001-04-LVP\GOVT-DC **Enquiries** : Zarko Andjic
Date : 9 August 2004 **Sect/Reg** : Traffic Modelling

To : Daniel Chatley (LANDCORP)/Susan Kreemer Pickford (SKM)
Subject : **Neerabup Industrial Estate Structure Plan**

1. As requested, we would like to provide 2001, and 2031 Standard Base Link traffic volume estimates and 2031 daily trips generated from the area bounded by Wanneroo Rd, Flynn Dr, Wattle Ave and Pinjar Rd. These traffic forecasts are extracted from the Main Roads base year networks.
2. Traffic volume estimates for the three roads from your list are:

	2001	2031
	Two way volumes veh/day	
Flynn Dr East of Wanneroo Rd	664	3585
Flynn Dr West of Pinjar Rd	1194	2336
Wanneroo Rd north of Flynn Dr	8540	15908
Wattle Ave West east of Wanneroo Dr	125	758

3. We advise caution be taken when interpreting traffic forecast figures on roads/links that carry mainly localised traffic such as Flynn Drive and Wattle Avenue West. The MRWA Traffic Model is for estimating regional traffic volumes on regional and major local roads, and it should not be used for estimating local traffic on local roads.
4. Modelled traffic forecasts for 2031 are unadjusted and this should be taken into account for analysis purposes. We do not have 2001 observed traffic counts for Flynn Drive and Wattle Avenue West. The 1998/1999 Annual Average Weekday Traffic Flow extracted from Main Roads publication (Perth Metropolitan Area 1 July 1992 – 30 June 1999) shows 12,460 veh/day on Wanneroo Rd north of Flynn Dr.
5. The 2031 daily traffic generated from the area bounded by Wanneroo Rd, Flynn Dr, Wattle Ave and Pinjar Rd is 6773 (in and out combined). The generated traffic is loaded onto the network from zones 85, 91 and 89. Enclosed is also our model zone boundary definition overlaid on StreetSmart map to assist you with this project.
6. The traffic forecasts are obtained from the MRWA’s Transport Model using 24 hour AAWT (Annual Average Weekday Traffic). We have used the ‘trend case’ land use forecast as provided by the DPI. Following the conversation with Daniel Chatley of Landcorp it appears that 2031 land use data from our model differs significantly from what is proposed by Neerabup Industrial Estate Structure Plan. According to this plan the area will be generating over 50,000 veh/day by 2031. This should be taken into account when interpreting the above traffic volume estimates.

7. Please see footnote for Terms & Conditions¹
8. I trust that this information is satisfactory, however should you have any queries please do not hesitate to contact me on 9323 4173 at your convenience.

Zarko Andjic
Transport Modelling Section¹
Main Roads WA

¹ MRWA Traffic Modelling Data as supplied to approved clients is confidential and is not to be made available to unauthorised persons or organisations. This data should not be used for any purpose other than the stated purpose for which it was requested from MRWA. The MRWA Traffic Model is for estimating regional traffic volumes on regional and major local roads, and it should not be used for estimating local traffic on local roads. The MRWA Traffic Model includes local roads but this is to provide connectivity in the model. MRWA Traffic Modelling Data should be interpreted by an experienced/qualified person who understands transport modelling and the limitations of the data. This data should not be used in making decisions relating to the commercial or residential developments.

APPENDIX 7
Western Power Correspondence

Our Ref: CR/24/3(37)V1
Contact: Eddie van Rijnswoud
Telephone: 9326 6522



Western Power

1 September 2004

Daniel Chatley
Project Manager
LandCorp
Level 3, Westfarmers House
40 The Esplanade
PERTH WA 6000

Dear Daniel

Power Supply To The Neerabup Industrial Area (NIA)

Further to the meeting held on 24 August 2004 between yourself and our Mr Eddie van Rijnswoud, I would like to confirm that Western Power intends to construct a 132kV double circuit transmission line between its gas turbine generation site at Pinjar and the existing zone substation located at Clarkson Avenue, Wanneroo. It is also our intention to construct a 132kV/22kV zone substation somewhere in the NIA.

Ideally, the new Neerabup zone substation should be located adjacent to the abovementioned new 132kV transmission line so as to avoid the requirement for transmission line entries. Approximately 1.2 hectares of land will be required for this.

Planning data currently to hand indicates that the Pinjar to Wanneroo 132kV transmission line is required to be in service by December 2006 and the Neerabup zone substation is required to be in service by December 2008. This means that the site for the zone substation is to be acquired by Western Power by the end of 2005.

In the mean time the NIA can continue to be supplied by existing 22kV feeders.

Should you require to discuss this matter further, please do not hesitate to call Eddie van Rijnswoud on 9326 6522.

Yours sincerely

RUDY TEH
ENVIRONMENT AND LAND MANAGER
NETWORKS

Western Power Corporation

363 Wellington Street, Perth, Western Australia 6000 GPO Box 1921 Perth 6842

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