

**AN ASSESSMENT**

**OF THE POTENTIAL TRAFFIC AND  
PARKING IMPACTS OF PROPOSED**

**WAREHOUSE DEVELOPMENTS**

**AT INTERLINK INDUSTRIAL ESTATE, MAMRE ROAD**

**ERSKINE PARK**

Prepared for  
**Goodman International Limited**

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### Report Document Control

<b><i>Title</i></b>	An assessment of the potential traffic and parking impacts of proposed warehouse developments at Interlink Industrial Estate, Mamre Road, Erskine Park
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## 1 INTRODUCTION

Goodman International Limited (Goodman) proposes to develop the remaining undeveloped parcels of land within what is known as Interlink Industrial Estate (IIE), Erskine Park. The location of IIE is shown in **Figure 1** overleaf. The present proposal comprises four separate light industrial/warehouse/distribution facilities, as indicated on the plan shown also in **Figure 1**. The proposed facilities will occupy four lots, namely Lots 1, 2, 5A and 5B. The four developments are proposed to have separate access points from the internal estate road and their own separate parking areas. Two of the four developments have been allocated their intended use, with the other two developments unspecified.

Interlink Industrial Estate also contains two other developments which were subject of separate approved project applications (a Woolworth liquor distribution

facility and a Kimberly Clark warehouse and distribution facility). Traffic and parking impact reports for these two developments were prepared by Traffix (October 2006 and November 2006 respectively). Information provided in the Traffix reports has been utilised in the course of preparation of the present assessment.

As part of the project application package, the present report documents an assessment of the proposed land use traffic and parking impacts for all four facilities. The work reported herein was undertaken by TEF Consulting under instruction from and commission by Goodman International Limited.

The present report forms part of and should be read in conjunction with material contained in the main body of the Environmental Assessment report prepared by Goodman International Limited.

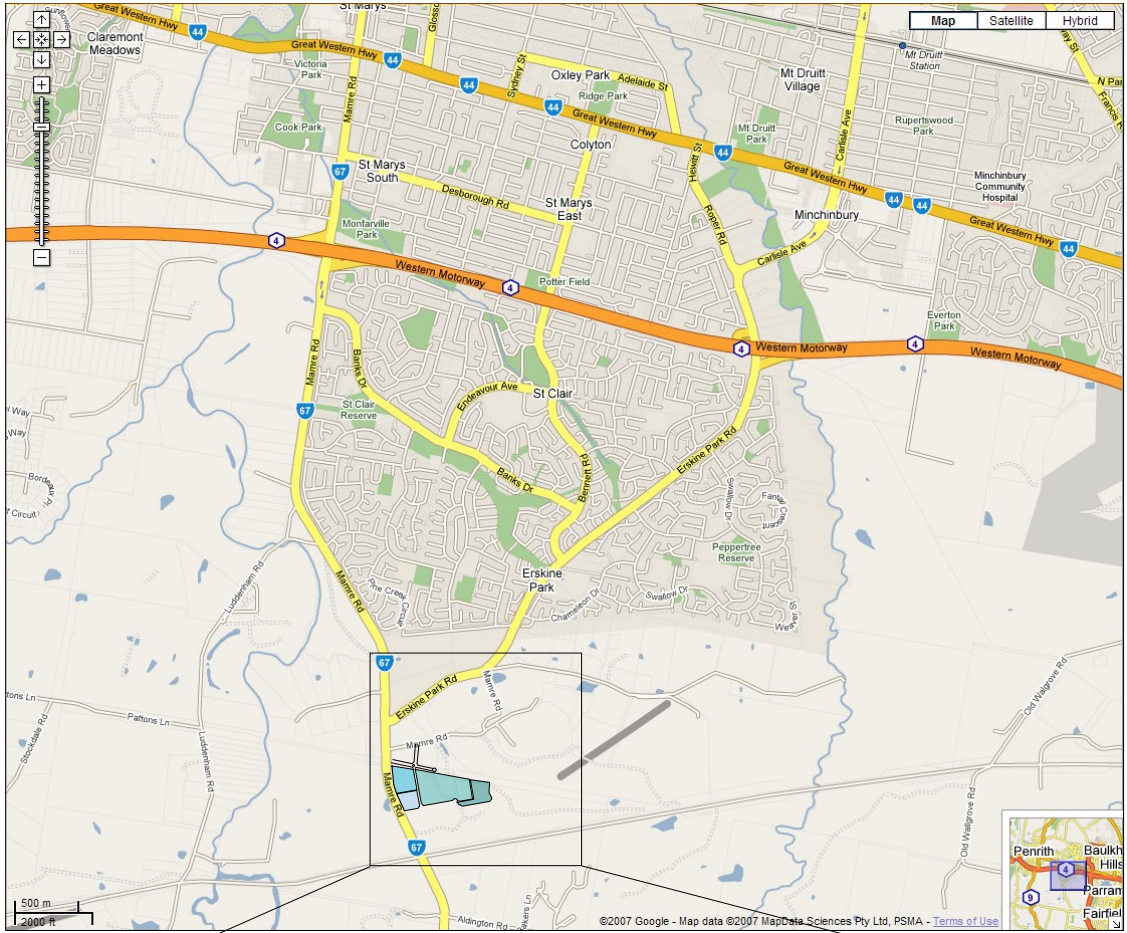


Figure 1. Site location

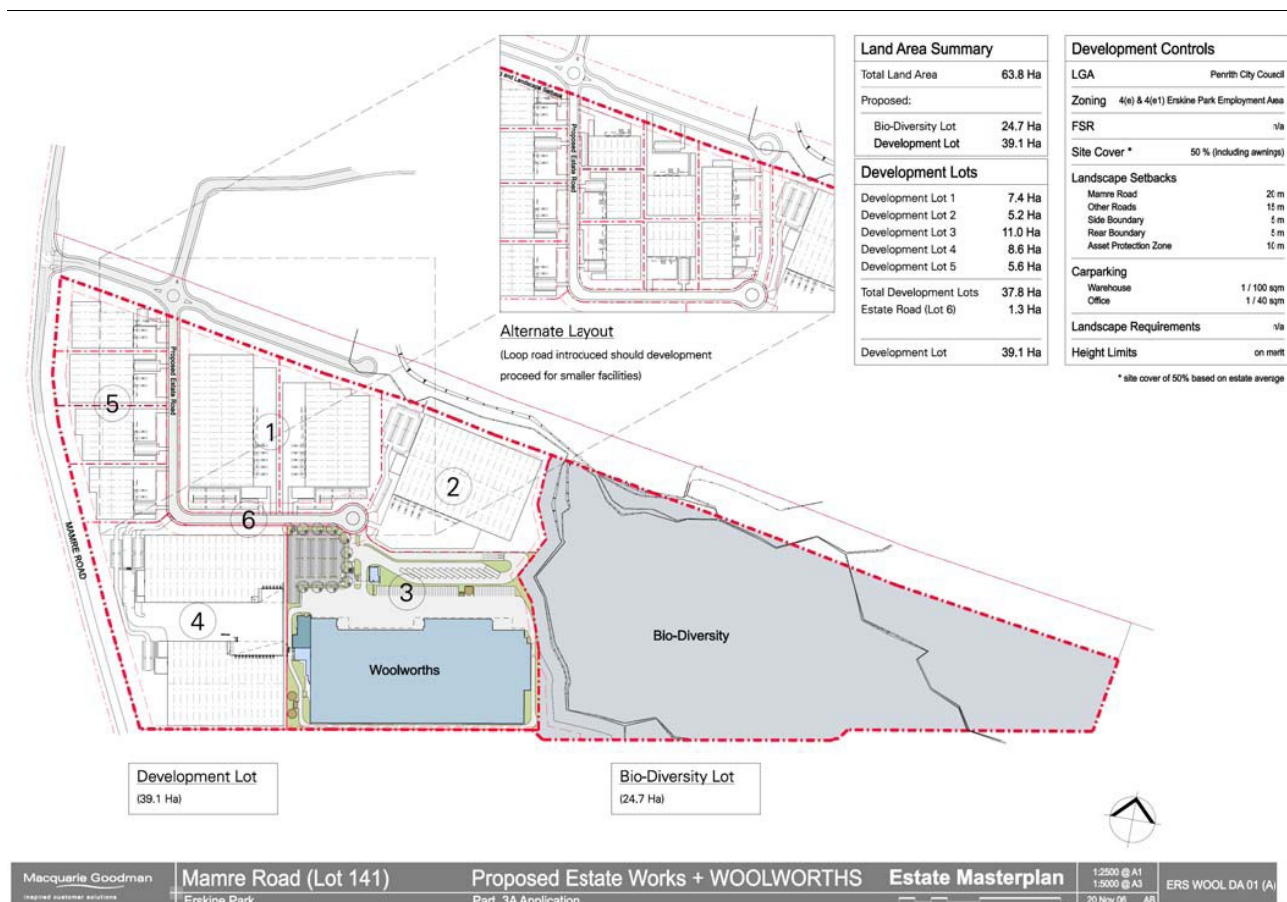
## 2 EXISTING CONDITIONS

### 2.1 Development site

The development site is located within the Interlink Industrial Estate (IIE), which in turn forms part of the Erskine Park Employment Area (EPEA). It is situated some 12 km south-east of Penrith. Land uses in the vicinity of the site are mostly industrial, including factories and warehouses, with some primary producers on Mamre Road. The rural and extractive industry areas surrounding the site are undergoing transformation to mainly industrial

uses.

The IIE layout and land uses (industrial) have been approved in March 2007, including development of Lot 3 as Woolworth Liquor Distribution Centre. Kimberly-Clark distribution facility on Lot 4 was approved separately, also in March 2007. **Figure 2** shows the IIE layout plan as approved.



**Figure 2. Interlink Industrial Estate layout plan – as approved.**

### 2.2 Traffic and parking

Access to the IIE is proposed from a new road which will form a southern approach to a roundabout in James Erskine Drive (Western Access Road in EPEA DCP). This roundabout is located some 200 m east of the intersection

of James Erskine Drive with Mamre Road. This intersection is signalised. It has two through lanes and turning bays/slip lanes for each turning movement. Mamre Road has an arterial function and is a classified Main Road



designed to accommodate articulated vehicles.

There is no parking on Mamre Road or any of the roads within the industrial estate.

Observations of traffic and parking conditions at and near the site were made on Friday 22 June 2007. The survey indicated that traffic operated smoothly in James Erskine Drive and Quarry Road and that the traffic volumes were

after the development of the EPEA and therefore cannot be used as a basis for traffic impact analysis.

There are a number of planned improvements for the road network and intersections, some of which have already been implemented as part of strategic planning for this area. The implications of these will be discussed further in this report.

### 3 PROPOSED DEVELOPMENT

The proposed development comprises separate light industrial / warehouse / distribution facilities on four lots as described below.

#### Lot 1

**Land use** warehousing and distribution

#### *Spec Unit 1*

Site Area 63,310 m<sup>2</sup>

Warehouses 35,000 m<sup>2</sup>

Office 1,200 m<sup>2</sup>

#### *Spec Unit 1 - Expansion*

Site Area 28,787 m<sup>2</sup>

Warehouses 15,000 m<sup>2</sup>

Parking Provision (Stages 1 and 2) 220 spaces

#### Lot 2

**Land use** warehousing and distribution / manufacturing (packaging products)

#### *UBEECO*

Site Area 31,600 m<sup>2</sup>

Warehouses 10,000 m<sup>2</sup>

Office 800 m<sup>2</sup>

Parking Provision 150 spaces

#### Lot 5A

**Land use** warehousing and distribution

#### *Allied Pickford*

Site Area 33,928 m<sup>2</sup>

Warehouses 9,000 m<sup>2</sup>

Office 850 m<sup>2</sup>

Parking Provision 77 spaces

#### Lot 5B

**Land use** warehousing and distribution / light industry

#### *Spec Unit 2*

Site Area 22,264 m<sup>2</sup>

Warehouses 9,950 m<sup>2</sup>

Office 500 m<sup>2</sup>

Parking Provision 90 spaces

## 4 TRAFFIC AND PARKING IMPACTS

### 4.1 Traffic impacts

Assessment of any potential traffic impacts of the proposed development requires firstly that the traffic generated by the development be estimated. Typical traffic generation rates for various types of land uses may be found in RTA (2002) Guide to Traffic Generating Developments. Specifically in relation to the proposed uses RTA (2002) contains traffic generation and parking provision rates for factories and warehouses. It is noted that the RTA (2002) rates are based on a series of surveys carried out in a variety of factories and warehouses in 1979 and 1980 (more than 25 years ago). It is possible that the employee density has changed since then due to automation of manufacturing and warehousing processes. Therefore when the actual use of a facility is known it is best to estimate its parking demand and traffic generation based on the specific information about the mode of operation of that facility.

For the two Lots where the future tenants are known information about their modes of operation was requested from their management. Such information was received, analysed and may be summarised as follows.

Allied Pickfords proposes to have hours of operation from 6:00 am to 10:00 pm (although flexibility is sought to operate 24 hours). It is proposed to have three shifts as follows.

1. 6:00 am to 2:00 pm with 10 employees,
2. 9:00 am to 5:00 pm with 55 employees, and
3. 2:00 pm to 10:00 pm with 10 employees.

Most of the employees are expected to arrive and leave the site by car, with car pooling and drop-offs resulting in the number of car movements being less than the number of employees arriving and departing. For the purposes of the present report a car use ratio (number of cars / number of people) was assumed to be 0.85, that is 85 cars parked for 100 persons present on site. This ratio is consistent with that observed by TEF Consulting at other similar developments and with the ratio adopted by Traffix (October 2006 and November 2006). The expected number of trucks visiting the site is 25 per day, which would result in a total of 50 trips per day (in and out trips are counted separately).

UBEECO Packaging Solutions is proposing to relocate its existing facility in Smithfield to the new site (Lot 2 at IIE). The current hours of operation at the existing UBEECO facility are from 5:30 am to 5:00 pm, six days a week. There are 70 to 80 workers in the morning shift (5:30 am to 2:30 pm) and some 20 people working during normal business hours of 9:00 am to 5:00 pm. It is expected that initially the operations at the new site will be the same as those at the existing facility. The proposed facility, however, allows room for expansion. UBEECO expectations are that the maximum growth of its operations in future would require introduction of a second shift with some 40 to 50 workers from 12:00 noon to 7:00 pm (again, flexibility is sought to allow 24 hour operations). These expected shift arrangements will result in an overlap of shifts, where some 130 to 150 employees can be expected to be on site from 12:00 noon to 5:00 pm. UBEECO expects to have approximately 24 articulated vehicle movements per day, 8 truck movements, and approximately 50 miscellaneous movements, including couriers.

Traffic generation for the proposed warehouse / distribution facility on Lot 1 has been estimated based on the results of the RTA surveys at similar developments, specifically based on survey results contained in RTA (1980) which formed the basis for the recommended traffic generation rates contained in RTA (2002). It is noted, however, that RTA (1980) describes survey results obtained in a variety of warehouses, including those of considerably smaller size than the one proposed. For the purposes of the present report these were excluded from consideration and only warehouses of similar sizes were considered. Employee and heavy vehicle movement patterns were averaged from the detailed results of the RTA (1980) surveys and used as a basis for calculation of the likely traffic generation at the proposed facility. The resulting traffic generation is regarded to be conservatively high given that one of the sites had considerably greater than typical traffic generation due to a retail component. Also, it must be taken into account that RTA surveys were carried out in 1979, that is more than 28 years ago, before the more recent trend for larger warehouse facilities enjoying a much greater level of automation and hence lower staff density per square metre of floor area. This is particularly

applicable for the current proposal on Lot 1. It is noted that during the process of strategic planning for the EPEA, RTA and Council agreed on the likely traffic generation rate for the whole of the EPEA, which would translate into 15 trips per hectare for the lots comprising IIE. For Lot 1, application of this rate results in 141 trips.

Traffic generation for a proposed warehouse / light

industry development on Lot 5B is considered to be similar to the proposed UBEECO both in terms of size and in terms of land use. The estimated traffic generation for Lot 5B was calculated from the UBEECO traffic patterns by applying a factor of (Lot 5B GFA / Lot 2 GFA).

The outcomes of the calculations described above are presented in **Table 4.1**.

**Table 4.1. Estimated traffic generation of the proposed developments.**

	SPEC UNIT 1 + EXPANSION (LOT 1)						UBEECO PACKAGING SOLUTIONS (LOT 2)						ALLIED PICKFORDS (LOT 5A)						SPEC UNIT 2 (LOT 5B)						TOTAL HOURLY TWO WAY TRIPS		
	STAFF		OTHER		TOTAL		STAFF		OTHER		TOTAL		STAFF		OTHER		TOTAL		STAFF		OTHER		TOTAL				
	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT			
5:00 - 5:30			-	-	-	-	68			-	-	68	0			-	-	-	-	65			-	-	65	0	150
5:30 - 6:00			-	-	-	-				4	0	4	0	9			-	-	9	0			4	0	4	0	
6:00 - 6:30	31		-	-	31	0				4	4	4	4			1	0	1	0			4	4	4	4	69	
6:30 - 7:00			3	0	3	0				4	4	4	4			1	1	1	1			4	4	4	4		
7:00 - 7:30	77	8	7	10	84	18				4	4	4	4			1	1	1	1			4	4	4	4	233	
7:30 - 8:00	58	17	15	4	74	21				4	4	4	4			1	1	1	1			4	4	4	4		
8:00 - 8:30	62	21	19	6	80	28				4	4	4	4			1	1	1	1			4	4	4	4	301	
8:30 - 9:00	41	18	15	4	56	22	17			4	4	21	4	47		1	1	48	1	16		4	4	20	4		
9:00 - 9:30	7	23	15	9	22	32				4	4	4	4			1	1	1	1			4	4	4	4	117	
9:30 - 10:00	10	7	5	9	15	16				2	4	2	4			1	1	1	1			2	4	2	4		
10:00 - 10:30	10	18	12	8	22	27				2	2	2	2			1	1	1	1			2	2	2	2		
10:30 - 11:00	15	11	10	8	25	20	42.5			2	2	44.5	2			1	1	1	1	41		2	2	43	2	197	
11:00 - 11:30	8	29	12	9	20	38				2	2	2	2			1	1	1	1			2	2	2	2	137	
11:30 - 12:00	20	19	16	6	35	25				2	2	2	2			1	1	1	1			2	2	2	2		
12:00 - 12:30	9	18	13	6	22	24				1	2	1	2			1	1	1	1			1	2	1	2	99	
12:30 - 13:00	13	10	11	6	24	15				1	1	1	1			1	1	1	1			1	1	1	1		
13:00 - 13:30			3	3	3	3				1	1	1	1			1	1	1	1			1	1	1	1		
13:30 - 14:00			3	3	3	3				1	1	1	1	9		1	1	10	1			1	1	1	1	33	
14:00 - 14:30	31		3	3	34	3				1	1	1	1		9	1	1	1	10			1	1	1	1	229	
14:30 - 15:00		31	3	3	3	34	68			1	1	1	1	69		1	1	1	1	65		1	1	1	1	66	
15:00 - 15:30			3	3	3	3				1	1	1	1			1	1	1	1			1	1	1	1	24	
15:30 - 16:00			3	3	3	3				1	1	1	1			1	1	1	1			1	1	1	1		
16:00 - 16:30	77		3	3	3	80				1	1	1	1			1	1	1	1			1	1	1	1	160	
16:30 - 17:00	58		3	3	3	61				1	1	1	1			1	1	1	1			1	1	1	1		
17:00 - 17:30	62		3	3	3	65	17			1	1	1	18	47		1	1	1	48	16		1	1	1	17	206	
17:30 - 18:00	41		3	3	3	44				1	1	1	1			1	1	1	1			1	1	1	1		
18:00 - 18:30			3	3	3	3				1	1	1	1			1	1	1	1			1	1	1	1		
18:30 - 19:00			3	3	3	3				1	1	1	1			1	1	1	1			1	1	1	1	24	
19:00 - 19:30			3	3	3	3	42.5	0	1	0	43.5					1	1	1	1	41	0	1	0	42	101		
19:30 - 20:00			3	3	3	3	-	-	-	-	-	-	-			1	1	1	1	-	-	-	-	-	-		
20:00 - 20:30			3	3	3	3	-	-	-	-	-	-	-			1	1	1	1	-	-	-	-	-	-	16	
20:30 - 21:00			3	3	3	3	-	-	-	-	-	-	-			1	1	1	1	-	-	-	-	-	-		
21:00 - 21:30			3	3	3	3	-	-	-	-	-	-	-			1	1	1	1	-	-	-	-	-	-	16	
21:30 - 22:00			3	3	3	3	-	-	-	-	-	-	-			1	1	1	1	-	-	-	-	-	-		
22:00 - 22:30			3	3	3	3	-	-	-	-	-	-	-	9	0	1	0	9.5	-	-	-	-	-	-	-	50	
22:30 - 23:00		31	0	3	0	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
<b>TOTAL</b>	<b>392</b>	<b>469</b>	<b>208</b>	<b>142</b>	<b>601</b>	<b>611</b>	<b>128</b>	<b>128</b>	<b>56</b>	<b>56</b>	<b>184</b>	<b>184</b>	<b>64</b>	<b>64</b>	<b>32</b>	<b>32</b>	<b>96</b>	<b>96</b>	<b>122</b>	<b>122</b>	<b>56</b>	<b>56</b>	<b>178</b>	<b>178</b>	<b>2161</b>		

As may be seen from the results contained in **Table 4.1**, the maximum traffic generation during the typical morning peak period on the road network ranges between 233 and 301 trips (267 on average). During the afternoon peak period, the likely traffic generation was calculated between 160 and 206 trips (183 on average). These results have been compared with the traffic generation calculated based on a rate of 15 vehicle trips per hectare adopted for EPEA as agreed between Council and RTA. The operation of the road network (including planned improvements) has been assessed for strategic planning purposes by the authorities based on the full development of EPEA using the above

trip rate. Necessary improvements have been proposed which resulted in the network and its components modelled to operate satisfactorily after the EPEA development. The meaning of this for the present proposal is that there will be no negative effect on the operation of the road network and no further infrastructure improvements will be required if the traffic generation from IIE remains within that based on the RTA/Council's approved trip rate. The results of traffic generation calculations based on the EPEA adopted rates are shown in **Table 4.2**.

**Table 4.2. Traffic generation based on Council / RTA adopted rates.**

	<b>SITE AREA, Ha</b>	<b>TOTAL TRIPS</b>
SPEC UNIT 1 + EXPANSION (LOT 1)	9.4	141
UBEECO PACKAGING SOLUTIONS (LOT 2)	3.2	48
ALLIED PICKFORDS (LOT 5A)	3.4	51
SPEC UNIT 2 (LOT 5B)	2.2	33
<b>TOTAL CURRENT PROPOSAL</b>	<b>18.2</b>	<b>273</b>

A comparison of the results in **Tables 4.1** and **4.2** indicates that the proposed development will generate traffic within the approved level of 273 trips per hour (267 and 183 trips per hour on average for the morning and afternoon 2-hour peak periods respectively).

It is also prudent to compare the traffic generation for the whole of the Interlink Industrial Estate based on the approved rate of 15 trips/ha and that based on calculations detailed earlier in this report and also carried out by Traffix for Woolworths and Kimberly-Clarke facilities. This comparison is included below in **Table 4.3**.

**Table 4.3. Comparison of traffic generation rates: current assessment versus strategic planning rates**

<b>BASED ON TRAFFIX &amp; TEF ESTIMATES</b>	<b>TOTAL TRIPS</b>
WOOLWORTHS	36
KIMBERLY CLARK	20
PROPOSED DEVELOPMENTS (LOTS 1, 2, 5A & B)	301
<b>TOTAL INTERLINK INDUSTRIAL ESTATE</b>	<b>357</b>

<b>BASED ON SITE AREA AND COUNCIL/ RTA AGREED RATE</b>	
<b>TOTAL INTERLINK INDUSTRIAL ESTATE</b>	<b>587</b>

The above comparison shows that collectively all individual developments within the Interlink Industrial Estate are likely to generate considerably less traffic than envisaged in the course of the strategic planning process

for EPEA. Consequently, the proposed development will have no negative effect on the road network and the proposal may be supported on traffic grounds.

## 4.2 Parking

The requirements for the parking provision are set out in Penrith City Council's Development Control Plan for Car Parking and Erskine Park Employment Area. Both DCPs have the same requirements with regard to parking provision. Parking provision rates contained in the DCPs are greater than those recommended by RTA (2002). In particular, parking rates for warehouses are three times greater than those of the RTA. These rates are considered to be unrealistic, particularly for larger warehouses which typically have a lesser employee density than the smaller

facilities. Parking provision for known tenants on Lots 2 and 5A has been proposed based on the information received from them as described in **Section 4.1** of the present report, allowing for shift overlaps and courier/visitor/contractor demand. For the remaining lots, parking was provided based on discussions with likely (albeit not confirmed) tenants. The proposed parking provision, together with requirements of Council's DCPs and RTA (2002) Guide are shown in **Table 4.4**.

**Table 4.4. Proposed parking provision .**

Land Use	Parking generation rate		Net Floor Area	Gross Floor Area	Total		Provided
	DCP (2006)	RTA Guide (2002)			DCP (2006)	RTA Guide (2002)	
<b><i>SPEC UNIT 1 (LOT 1)</i></b>							
Warehouse	1 space/100m <sup>2</sup>	1 space/300m <sup>2</sup>	35114 <sup>2</sup>	36200	351.1	120.7	
<b><i>SPEC UNIT 1 EXPANSION (LOT 1)</i></b>							
Warehouse	1 space/100m <sup>2</sup>	1 space/300m <sup>2</sup>	14550 <sup>2</sup>	15000	145.5	50.0	
				<b>TOTAL</b>	<b>497</b>	<b>171</b>	<b>220</b>
<b><i>UBEECO (LOT 2)</i></b>							
Warehouse / manufacturing	1 space/70 - 100m <sup>2</sup>	1 space/100 - 300m <sup>2</sup>	10460 <sup>1</sup>	10800	123.1	54.0	
				<b>TOTAL</b>	<b>124</b>	<b>54</b>	<b>150</b>
<b><i>ALLIED PICKFORDS (LOT 5A)</i></b>							
Warehouse	1 space/100m <sup>2</sup>	1 space/300m <sup>2</sup>	9555 <sup>2</sup>	9850	95.5	32.8	
				<b>TOTAL</b>	<b>96</b>	<b>33</b>	<b>77</b>
<b><i>SPEC UNIT 2 (LOT 5B)</i></b>							
Warehouse / light industry	1 space/70 - 100m <sup>2</sup>	1 space/100 - 300m <sup>2</sup>	10137 <sup>2</sup>	10450	119.3	52.3	
				<b>TOTAL</b>	<b>120</b>	<b>53</b>	<b>90</b>

Notes:

1 - based on the architectural plans

2 - estimated based on Lot 2 NFA/GFA ratio

The above proposed parking provision for each unit fully satisfies and exceeds the RTA (2002) requirements while being sufficiently close to fulfilling the DCP requirements as well, except Lot 1 where DCP requirements are significantly higher. It is noted, however, that the development on Lot 1 is proposed in two stages. It is therefore possible and indeed recommended that the actual parking demand for the main facility on Lot 1 (before extension) be monitored and the parking provision requirements for Lot 1 extension be revisited based on the

actual data.

The design details of the car parking arrangements of the proposed development have been checked against the relevant Australian Standard (AS/NZS 2890.1:2004). It was found that the car parking area complies with this Standard in terms of aisle and space dimensions.

It is concluded that the proposed development satisfactorily addresses the parking requirements and may thus be supported on parking grounds.

### 4.3 Access and loading area design

The design details of the access driveways and loading areas have been checked against the relevant Australian Standard (AS 2890.2-2002). Overall it was found that the loading areas comply with this Standard in terms of aisle and loading dock dimensions. Manoeuvring of vehicles has been checked using AutoTrack software (Savoy Computing 2005), a specialist tool for vehicle swept path analysis. A number of improvements have been recommended to enable safe and efficient manoeuvring of B-Doubles, Articulated Vehicles (AV) and Heavy Rigid Vehicles (HRV) within the site. These are included in an Appendix of the present report. Loading docks are

designed to provide for AVs, which are expected to be the typical largest vehicles delivering goods.

B-Doubles are permitted to use Mamre Road. B-Doubles are expected to make only occasional deliveries, where the second trailer will be detached while manoeuvring within the designed loading areas.

Overall, the proposed development satisfactorily addresses the Council's and Australian Standard provisions and, after the proposed improvements, may be supported in terms of access and loading area design.

## 5 CONCLUSIONS

1. The proposed developments at Interlink Industrial Estate, Erskine Park would consist of four separate warehouse and warehouse/light industrial units.
  2. The proposed number of parking spaces is greater than that calculated based on the RTA requirements and is regarded as adequate. It is recommended that parking requirements for Lot 1 extension be confirmed after the main facility on Lot 1 is operational.
  3. The proposed development will generate traffic within the levels adopted in the course of strategic planning of the Erskine Park Employment Area and specifically for the Interlink Industrial Estate. There will be no negative effect on the road network due to the current proposal.
  4. The proposed development is supportable on traffic and parking grounds.
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**Appendix**  
**Manoeuvres of heavy vehicles**