

## PERTH COASTAL PLANNING STRATEGY

### *Background Paper 4*

#### Urban Development

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#### Introduction

Understanding the history and context of Perth needs some review of the key strategic plans from the seminal plan for the Metropolitan Region, Perth and Fremantle (Stephenson-Hepburn Plan) 1955, through the Corridor Plan on 1970, Metroplan of 1990 to the 1997 State Planning Strategy.

Notably, planning and plans flag recurring and relevant elements that will continue to demand attention and decision-making if Perth is to continue to retain its enviable "liveability". The consolidation of existing and future urban development, the facilitation of job creation and employment growth in a new pattern of centres throughout the middle suburbs, high levels of accessibility from both public and private transport and a new system of metropolitan parks, remain recurring themes that need to be reviewed and refined.

Central to good planning is continuing improvement in the coordination and management of change through regional and structure plans and policies that incorporate clear statements of outcomes and criteria for measuring their performance.

The question of whether employment has received sufficient consideration in past planning, and the fundamental need to better understand at regional, district and local level, the critical nature of employment location and dynamics is one that needs more active attention.

#### Statutory Documents

The **Metropolitan Region Scheme (MRS)** is the statutory basis for planning in metropolitan Perth and is the focus of a large amount of supporting non-statutory work. The underpinning legislation is the *Metropolitan Region Town Planning Scheme Act 1959*, which also allows for the imposition of a land tax to fund the Metropolitan Region Improvement Fund. In simple terms, the MRS is designed to regulate and control the use of land for town planning purposes. It consists of two parts: a Scheme map and Scheme text. The map highlights a number of zones (e.g. Urban, Industrial, Rural) and reserves (e.g. Parks and Recreation, Important Regional Roads, Public Purposes) which together help shape the broad urban form of the city. Underpinning this is the Scheme text, which provides an explanation of how the Scheme works, what is allowed in each zone etc.

There are numerous Statement of Planning Policies - these are discussed in more detail in Background Paper 1.

#### Non-statutory Documents

##### Plan for the Metropolitan Region, Perth and Fremantle (Stephenson- Hepburn Plan), 1955

Published in 1955, this Plan set in motion the long-term planning which has seen Perth reach its current stage of development. The Plan, which was designed to accommodate some 1.4million people (estimated to be reached by 2005), was operative until 1970 when the role of providing a general planning framework was taken over by the Corridor Plan. The Plan is the foundation stone of the

current planning system as it gave rise to the MRS, the Western Australian Planning Commission (then known as the Metropolitan Region Planning Authority) and the Metropolitan Region Improvement Fund (MRIF).

#### The Corridor Plan, November 1970

In the face of rapidly increasing car ownership and lower than expected residential densities, this Plan tackled the prospect of endless urban sprawl by emphasising the need for ease of movement and access by aligning new urban areas along major transport corridors with development being centred around "clusters" or sub-regional centres. Interestingly, the Plan shows these corridors stretching from Yanchep in the north, through Perth and as far south as Bunbury and retains the same projected population of about 1.4 million as in the Stephenson-Hepburn Plan, but brought forward the timing of this to 1989. The Plan was adopted by the Metropolitan Region Planning Authority on 4 November 1970 and formed the basis of metropolitan planning until it was superseded by Metroplan.

#### Metroplan, December 1990

Still current, this document "is the Government's response to planning for future growth and change in the metropolitan region". In broad terms, this plan seeks to take Perth Metropolitan Region from the 1.4 million population planned for under the Corridor Plan to something in the order of two million, which Metroplan estimated will be reached around the year 2021. It was estimated that some 400,000 new dwellings would be needed to house this growing population of which 80,000, or 20 per cent, would be provided in established suburbs. Although Metroplan provides an indication of where growth should occur, it offers no specific advice on indicative population levels within these identified areas.

#### North-West Corridor Structure Plan, March 1992

In order to implement Metroplan, there was a need to provide spatial substance and depth in more discrete areas of the metropolitan region. This plan is one of a series designed to apply broader regional plans and policies, provide a basis for statutory planning and development, provide a basis for co-ordinating development and bringing planning issues before the public. The location of the Plan's study area was identified, which had sufficient land to accommodate some 140,000 extra dwellings or about 420,000 people, inclusive of those resident at the 1996 Census.

#### South-West Corridor Structure Plan, November 1993

In order to implement Metroplan, there was a need to provide spatial substance and depth in more discrete areas of the metropolitan region. The location of this Plan's study area was identified, which had sufficient land to accommodate some 142,000 people, inclusive of about 23,500 residents in 1991.

#### State Planning Strategy, December 1997

This document provides "... a land use planning strategy for Western Australia's development up to the State's bicentenary in 2029" and as such is the "... Government's planning response to the challenges and changes ..." which the future will bring. In particular the 1997 Strategy notes that one of these challenges is sustainability: the "acceptance of the principles of sustainability require that we do not squander our finite resources and we seek a balance between economic, social and environmental objectives." The Strategy sees that "a quality natural environment will increasingly be one of Western Australia's comparative advantages" and that in order to ensure we maintain this advantage "it is now timely to shift from the traditional focus of planning on the management of urban growth to the wider scope of the management of all land and its uses."

#### Draft Network City 2004

"*Network city: community planning strategy for Perth and Peel*" highlights key elements of planning for the future of Perth, Mandurah and Murray. These elements are covered in seven chapters:

- (1) Spatial plan and strategy;
- (2) Implementation: governance and process;
- (3) Planning for a liveable city;
- (4) Economy and employment;
- (5) Environment and heritage;
- (6) Transport; and
- (7) Infrastructure co-ordination.

Within each element are strategies and actions that will enable the planning objectives for Perth and Peel to be achieved over the years 2004 to 2030.

The community plan evolved from the Dialogue process - *Network city: community planning strategy for Perth and Peel* - outlining a change in direction for Perth, not only in how the city develops, but also in how planning is done. The difference this time has been to plan through participative decision-making at a local and regional level.

The draft 30-year strategy, recently underwent a three month community consultation and feedback phase. This input is being incorporated into the final Network City Strategy, which should be released some time this year. The Perth Coastal Planning Strategy will need to incorporate and refine any recommendations in the Network City Strategy.

Current activity centres that need further consideration include Fremantle, Cottesloe, Scarborough and Hillarys. These areas are experiencing considerable pressure due to increased residential densities and associated with this comes the need to deal with increased building heights. These pressures are ongoing and the continued use and development along the coastal strip will see an increase in these pressures over the next 10 - 30 years.

This paper considers the predicted residential, commercial and industrial growth expected to occur along the Perth metropolitan coast.

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## *Residential Development*

The Metropolitan Development Program (MDP) collects information relating to projected lot release and dwelling creation in the Perth Metropolitan Region. Annually, an Urban Land Release Plan is published. This document, and a number of other information sources<sup>1</sup>, form part of a wider program to track projected development activity and expected infrastructure requirements across the State. Each MDP provides information about projected land development for the next five years. The timeframe for the most recently published MDP is 2004/05 to 2008/09<sup>2</sup>.

Projected lot and dwelling creation over the next five years is derived from an annual Developers' Intentions Survey (DIS) of developers wishing to create residential lots in the MDP region, analysis of approvals data collected by the WAPC in consultation with key stakeholders from the private sector, State and local government. From this analysis, new project areas are defined while others remain in the program from previous years. It is within these areas that most of the significant development in the MDP region is expected to occur. Project areas are defined for developments producing more than five lots. In the most recent MDP there were over 600 project areas.

Much of the data is aggregated to the sector level. There are seven sectors in the MDP region:

- North West
- South West
- South East
- East
- Middle
- Inner
- Peel<sup>3</sup>

The Urban Land Release Plan also breaks down projected lot activity by Local Government Area. The 11 coastal local government areas comprising this strategy span across the North West, Middle, Inner and South West sectors.

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<sup>1</sup> The WAPC also tracks subdivision activity through the publication of quarterly State Lot Activity Bulletins. These highlight, on a regular basis, areas where lot creation is significant. To this end each update provides case studies of development 'hotspots' in both metropolitan and regional local government areas and localities. Another significant tool for monitoring land supply and demand is the land development pipeline. The pipeline tracks lot creation at various stages of the subdivision process. At the completion of each quarter the WAPC produces a summary of the number of lots at each stage. This analysis makes it possible to assess lot supply against demand to highlight potential land bottlenecks or surplus. Both the Lot Activity Bulletin and the Land Development Pipeline are important sources of data that enable the WAPC to fulfil its role as a lead planning agency to guide land development and infrastructure provision.

<sup>2</sup> Work to develop the next MDP 2005/06 to 2009/10 is currently underway. Components of the report will be published in the second half of 2005.

<sup>3</sup> The Peel Sector contains only the City of Mandurah and the Shire of Murray

## Recent Lot Activity

As highlighted by Table 1 most final approvals were issued in the North West, South West and Middle sectors between 1999/2000 and 2003/04.

Sector	1999/2000	2000/01	2001/02	2002/03	2003/04	Total
Inner	1 174	1 037	748	721	738	4 418
Middle	2 396	2 137	1 951	2 220	2 466	11 170
North-West	2 270	1 726	2 541	3 305	3 209	13 051
Eastern	1 426	1 113	1 298	1 345	1 905	7 087
South-East	1 569	732	1 121	1 295	1 381	6 098
South-West	1 537	1 015	1 590	2 770	3 656	10 568
Peel	867	568	973	1 348	1 981	5 737
<b>Total</b>	<b>11 239</b>	<b>8 328</b>	<b>10 222</b>	<b>13 004</b>	<b>15 336</b>	<b>58 129</b>

**Table 1: Recent Residential Final Approvals - MDP Sectors (1999/2000 to 2003/04)**

Source: WAPC, Metropolitan Development Program, 2004.

In 2003/04 there was a total of 10 069 final approvals in coastal LGAs and 31 869 between 2000 and 2004. Development in coastal LGAs accounts for 65% of development in coastal sectors (see Table 2a and 2b). Over 95% of final approvals issued in the North West sector were issued within the City of Wanneroo, particularly in the suburbs of Butler, Clarkson, Yanchep and Quinns Rocks. A further 3300 final approvals were issued in the City of Cockburn and the City of Rockingham during 2003/04.

The number of final approvals issued in the City of Wanneroo, the City of Rockingham and the City of Cockburn has risen sharply over the last few years due a number of large-scale green field developments, many of which are within ten kilometres of the coast. Development has been fuelled by favourable property market conditions, such as low interest rates, which have strongly influenced demand. This high demand has presented attractive opportunities to developers. These figures highlight the historic importance of development near the coast across the Perth Metropolitan Region in recent times. However, it should be noted that the number of approvals in established coastal suburbs in the inner and middle sectors have not been nearly as large.

Sector	LGA	2000	2001	2002	2003	2004	TOTAL
North West	JOONDALUP	456	419	539	240	216	1870
	WANNEROO (C)	1638	1564	2452	2991	3916	12561
Inner	STIRLING (C)	693	586	834	1290	980	4383
Inner	CAMBRIDGE (T)	53	43	46	53	39	234
	COTTESLOE (T)	41	25	34	37	22	159
	FREMANTLE (C)	104	102	102	180	128	616
	MOSMAN PARK (T)	59	81	27	18	45	230
	NEDLANDS (C)	43	19	78	13	16	169
South West	COCKBURN (C)	531	389	853	1193	1479	4445
	KWINANA (T)	49	122	133	276	411	991
	ROCKINGHAM (C)	458	801	954	1824	2174	6211
	<b>TOTAL</b>	<b>4125</b>	<b>4151</b>	<b>6052</b>	<b>8115</b>	<b>9426</b>	<b>31869</b>

**Table 2a: Recent Residential Final Approvals - Coastal Local Government Areas<sup>1</sup> (2000-2004)**

Source: WAPC, approvals database, 2005.

<sup>1</sup> LGAs included in this analysis are those that abut the coast, excluding Mandurah.

SECTOR <sup>1</sup>	SUBURB	TOTAL FA <sup>2</sup> COASTAL SUBURBS	TOTAL FA 2003/04 <sup>3</sup>	% COASTAL LGA <sup>4</sup>
North West	Joondalup	266	3209	100%
	Wanneroo	2943		
Middle	Stirling	1221	2466	49%
Inner	Cambridge	31	738	43%
	Cottesloe	41		
	Fremantle	193		
	Mosman Park	48		
	Nedlands	11		
South West	Cockburn	1175	3656	100%
	Kwinana	317		
	Rockingham	2164		
	<b>TOTAL</b>	<b>8410</b>	<b>10069</b>	

**Table 2b: Coastal Local Government Final Approvals as % of Total Sector Final Approvals<sup>1</sup> (2003/04).**

Source: WAPC, approvals database, 2005.

<sup>1</sup> Sectors correspond to those used in the Metropolitan Development Program (MDP).

<sup>2</sup> Final approvals issued in 2003/04 only.

<sup>3</sup> Final approvals for whole sector.

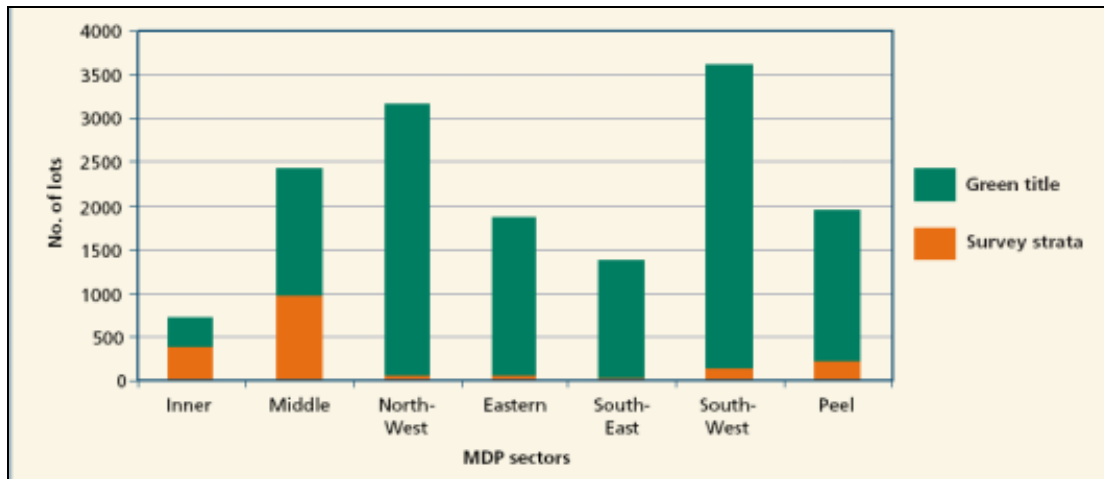
<sup>4</sup> Final approvals issued in coastal LGAs as a percentage of sector total.

## Lot Size

Approximately 80% of the final approvals issued in the last five years in the City of Rockingham, City of Cockburn and City of Wanneroo were to create lots ranging from 450-1000m<sup>2</sup>. It seems demand for these lot sizes remains particularly strong. This fact is highlighted by the success of large-scale subdivisions in the North West sector, such as Brighton. However, the proportion of smaller lots given final approval has grown in the City of Joondalup as infill projects increase over time due to less land being available for green field subdivision. There is a different trend in the inner and middle sectors where the proportion of final approvals to create smaller lots (less than 450m<sup>2</sup>) is considerably higher and the proportion has increased over time. This is reflective of policies, such as 'Network City', which aims to encourage higher densities in some existing, built-up coastal areas.

## Approval Type

As already mentioned, the dominant subdivision type in the North West and South West sectors is green field subdivision on large areas of previously vacant land. However, in the middle and inner sectors there was a much higher proportion of survey strata and built strata final approvals (see Figure 1). This is most observable in the western section of the City of Stirling and the City of Fremantle (see Fig 2). Both these locations are within 10 kilometres of the coast. This supports the changing lot size in these sectors over the last five years and is due to these sectors being established with fewer opportunities for large-scale development. Analysis of prices, which will be provided later in this paper, shows that prices for brown field, smaller lot coastal development in the inner and middle sectors remain high compared other sectors. This is, perhaps, reflective of the perceived locational advantages of the coast given that prices have remained high even though lot sizes are decreasing.



**Figure 1: Recent Residential Final Approvals - Coastal Local Government Areas<sup>1</sup> (2003/04)**

Source: WAPC, Metropolitan Development Program, 2004

- 1 A lot and associated common property as shown on a registered survey-strata plan prepared in accordance with section 4(1b) of the *Strata Titles Act 1985*. This excludes built-strata approvals.
- 2 A lot owned in fee simple issued with a certificate of title under the *Transfer of Land Act 1893* other than a strata lot or a survey-strata lot.

As highlighted in Table 3, most of the projected development activity, in terms of lots along the coast, is expected to occur in the South West (18,220 lots) and the North West (15,569 lots) sectors. This is also the case in regard to expected dwelling creation. Most of the development in these sectors is expected to come from larger (more than five lot subdivisions) green field development (see Figure 3).

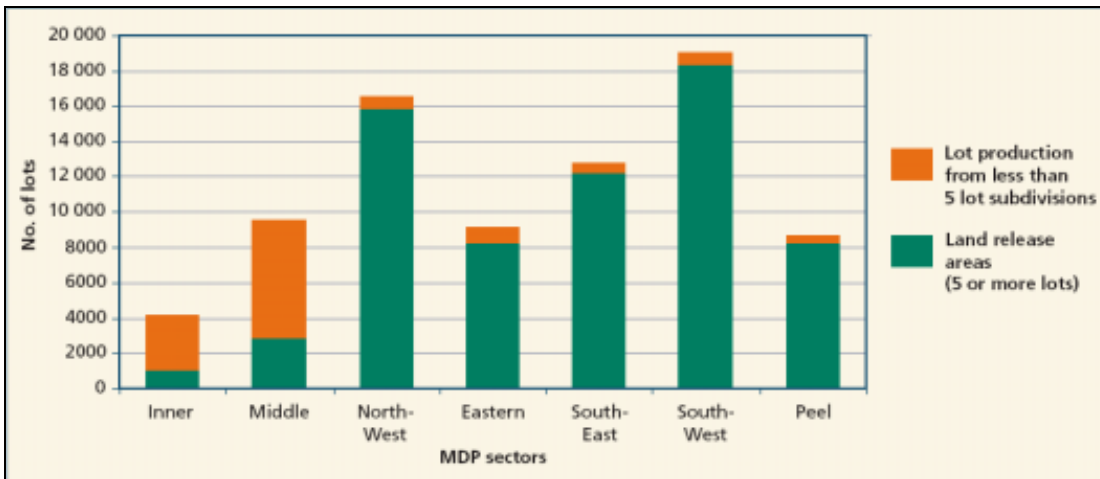
### Future Development

Sector	2004/05	2005/06	2006/07	2007/08	2008/09	Unspecified year	Small land release areas (subdivisions less than 5 lots)	Total
Inner	262	369	183	150	63	219	3 050	4 296
Middle	992	658	109	148	89	861	6 700	9 557
North-West	3 356	3 126	2 264	2 539	2 002	2 282	650	16 219
Eastern	1 741	1 620	1 379	1 480	1 258	788	900	9 166
South-East	1 822	1 955	2 185	2 032	1 519	2 339	500	12 352
South-West	4 062	3 742	3 659	3 427	2 750	580	650	18 870
Peel	1 846	1 542	1 611	1 272	1 027	859	350	8 507
<b>Total</b>	<b>14 081</b>	<b>13 012</b>	<b>11 390</b>	<b>11 048</b>	<b>8 708</b>	<b>7 928</b>	<b>12 800</b>	<b>78 967</b>

**Table 3: Indicative Residential Use Lot Release<sup>1</sup> - MDP sectors (2004/05 to 2008/09)**

Source: WAPC, Metropolitan Development Program, 2004.

- 1 Data is captured as part of the Metropolitan Development Program (MDP). Information about projected residential development is calculated from the annual Developers' Intentions Survey, approvals information and comprehensive consultation with stakeholders from State and local government and the development industry.
- 2 Sectors in this instance correspond to those used in the MDP.
- 3 The data provided on small land release areas was calculated using the WAPC's approvals database, which captures information about subdivision applications across the State. This information was not collected as part of the DIS survey process.



**Figure 3: Indicative Residential Lot Release by Subdivision Type - MDP sectors (2004/05 to 2008/09)**

A further break down of the data by coastal LGA shows that City of Wanneroo (14 300 lots / 16 292 dwellings), the City of Rockingham (8660 lots / 10 170 dwellings) and City of Cockburn (6954 lots / 8827 dwellings) are expected to produce most of the new lots and dwellings over the next five years. As shown on Figure 4, a significant proportion of the large-scale residential development is expected to occur in coastal LGAs. This trend is highlighted further by the data provided in Tables 4 and 5.

Sector <sup>2</sup>	Projected Lot Creation 2004/05 to 2009/10	Projected Lot Creation Coastal LGA <sup>3</sup>	% Sector
North West	15569	15569	100%
Middle	1445	2847	51%
Inner	583	1246	47%
South West	18220	18220	100%

**Table 4: Projected Lot Creation by Coastal LGA as Percentage of Sector<sup>1</sup>.**

Source: WAPC, Metropolitan Development Program, 2005

- 1 Data excludes lot creation from < 5 lot subdivisions.
- 2 Sectors in this instance correspond to those used in the MDP.
- 3 Analysis includes only those LGAs that abut the coast.

The suburbs of Clarkson (12%), Butler (17%), Two Rocks (6.5%) and Yanchep (4%) account for 40% of the forecast lot creation in the North West Sector over the next five years. Again, this highlights the continuing attraction of coastal proximity for future residential development.

In the South West sector, the coastal suburbs of Coogee, Golden Bay and Singleton are expecting some development over the next five years. However, most of the development in this sector is expected to occur in subdivisions located more inland but many of these are still within 10 kilometres of the coast.

While most lot creation in the North West and South West sectors occurs in larger green field subdivisions (more than five lots), in the Inner and Middle Sectors many lots are created in smaller project areas (less than five lots). This is because these sectors are generally well established. Many of the development opportunities in these sectors are closely linked to zoning changes that permit subdivision of existing lots.



SECTOR	LGA	2004/05	2005/06	2006/07	2007/08	2008/09	UNSPEC YR	TOTAL
NORTH WEST	JOONDALUP	138	128	179	368	269	157	1239
NORTH WEST	WANNEROO	3218	2998	2085	2171	1733	2125	14 330
MIDDLE	STIRLING	543	279	60	148	89	326	1445
INNER	CAMBRIDGE	1	0	0	0	0	0	1
INNER	CLAREMONT	18	0	0	0	0	0	18
INNER	COTTESLOE	0	0	0	0	0	7	7
INNER	FREMANTLE	5	96	103	96	27	65	392
INNER	MOSMAN PARK	0	28	0	0	0	0	28
INNER	NEDLANDS	78	59	0	0	0	0	137
SOUTH WEST	ROCKINGHAM	1710	1591	1618	1757	1625	359	8660
SOUTH WEST	KWINANA	771	495	440	510	390	0	2606
MIDDLE	COCKBURN	1581	1656	1601	1160	735	221	6954
	TOTAL	8063	7330	6086	6210	4868	3260	35 817

**Table 5: Projected Residential Development<sup>1</sup> - Coastal Local Government Areas (2004/05 to 2008/09)**

Source: WAPC, Metropolitan Development Program, 2005

- 1 Data is captured as part of the Metropolitan Development Program (MDP). Information about projected residential development is calculated from the annual Developers' Intentions Survey, approvals information and comprehensive consultation with stakeholders from State and local government and the development industry.
- 2 Sectors in this instance correspond to those used in the MDP.
- 3 The inclusion of LGAs in this analysis is based on proximity to the coast. The nominal distance measure used was 10km.

Most of the green field subdivision projected to occur in the Middle sector is concentrated in the City of Stirling (1119 lots over the next five years). In the Inner Sector most development is expected in the City of Fremantle, in suburbs such as South Fremantle, Beaconsfield, Hilton and White Gum Valley. There are also some project areas in Cottesloe, Swanbourne and Wembley but these are not expected to yield more than 30 lots.

As already discussed a higher proportion of development in these areas is either "built" or "survey" strata. Over 50% of final approvals in the Inner Sector are to create survey strata lots and 40% in the Middle Sector, particularly in the City of Stirling (Figure 2). Many of these are located within 10 kilometres of the coast in suburbs like Scarborough and Doubleview.

If this trend continues there is likely to be significantly more infill growth in these sectors in the coming years. A core component of the proposed Network City strategy was to promote increased densities in established areas particularly in the Inner and Middle sectors, to accommodate more housing in order to 'use land resources efficiently and make fuller use of existing urban land by supporting additional residential development within existing urban areas...'

Established suburbs in coastal LGAs in the North-West Sector and the South-West Sector and suburbs close to the coast in the Middle and Inner Sector, are likely to be impacted by this policy.

### **Median Sales Price (Houses)**

As shown in Figure 5, the highest median house prices in 2004 within the Perth Metropolitan Region were centred in the Inner and Middle Sectors, particularly in the coastal suburbs of Peppermint

Grove and Cottesloe, which had a median sale price in excess of \$1 million. The adjoining suburbs of Mosman Park, Swanbourne and City Beach had median sale prices ranging between \$700-900 000. The localities of Subiaco, Shenton Park and Dalkeith also have relatively high median sale prices but these may be just outside the area of interest for this study.

Medians decrease outside these sectors and there appears to be a spatial correlation between lower median sale prices and distance from the coast. Median sale price remains fairly constant along the northern coastal strip ranging consistently between \$300-500 000 in 2004.

There is more variability in the Southwest Sector where median house price ranges, for the most part, between \$100-300 000. There are some pockets of higher prices in localities like Baldivis and Jandakot.

#### **Average Annual Residential Sales Growth 2004**

Average Annual Growth: Perth Metropolitan Region = 10.9% Consumer Price Index = 2.9%

A large number of localities in the Northwest Sector experienced above average annual growth rates of between 10-20% during the last twelve months. A number of suburbs abutting the coast have experienced over 20% growth, for example Kallaroo (23%), Yanchep (20%) and Two Rocks (25%) (Table 6 and Figure 6).

In the southwest sector a larger number of suburbs experienced significantly higher than average growth rates (>20%) over the last 12 months. Notable among this group is Rockingham (29%), Leda (25%), Golden Bay (24%) and Singleton (22%). The Southwest Sector has experienced the most consistent overall growth of any coastal sector during the last year. While significant growth has occurred across the sector, it appears to be concentrated in a number of coastal localities centred on Rockingham.

Sales growth in the Inner and Middle Sectors has been variable over the last year. The most notable growth in sales prices occurred in Mosman Park (20%), Trigg (32%) and Bicton (31%). However, many of the older, established suburbs experienced smaller than average levels of growth (less than 10%) while others, particularly those localities in the northern section of the Middle Sector experienced median sales price growth of between 10-15%.

#### **Average Annual Residential Sales Growth - Last 10 years**

Average Annual Growth: Perth Metropolitan Region = 5.8% Consumer Price Index = 2.3%

In terms of the ten-year trend in median price growth, many coastal suburbs have experienced average annual growth rates of between 10-15% (Figure 7). This is higher than the Perth metropolitan average (5.8%) and indicates high levels of ongoing demand for houses located close to the coast. This trend occurs in each coastal sector but is most significant in the northwest, particularly in Quinns Rocks and Hillarys, and in the Southwest sector around Rockingham (Table 6).

#### **Average Annual Prevailing Lot Sales Growth - Last 10 years**

As highlighted in Table 7 average annual lot price over the last ten years has increased fairly consistently throughout all coastal suburbs (between 10-15% p.a.). However, the growth appears to have been most concentrated in the South West sector. Similarly, median lot prices since 1994 also increased most substantially in the coastal suburbs within the South West sector. By comparison,

the average annual growth in lot prices in the North West sector's coastal suburbs has been relatively subdued over the last ten years.

Sector <sup>4</sup>	Suburb	Median 2004	Average Annual Growth <sup>5</sup> (Last 10 Years)	Annual Growth (2004)
North West	Butler	\$262,750	N/A	16%
North West	Hillarys	\$480,000	16%	19%
North West	Iluka	\$485,500	13%	11%
North West	Kallaroo	\$395,500	17%	24%
North West	Marmion	\$463,750	12%	6%
North West	Mindarie	\$395,000	14%	17%
North West	Mullaloo	\$380,000	14%	13%
North West	Ocean Reef	\$419,000	12%	13%
North West	Quinns Rocks	\$253,000	14%	14%
North West	Sorrento	\$545,000	14%	10%
North West	Two Rocks	\$229,500	19%	26%
North West	Watermans Bay	\$577,500	15%	-11%
North West	Yanchep	\$240,000	14%	20%
Inner	City Beach	\$900,000	10%	10%
Inner	Cottesloe	\$975,000	11%	16%
Inner	Fremantle	\$435,000	11%	11%
Inner	North Fremantle	\$557,500	12%	15%
Inner	Scarborough	\$400,000	12%	11%
Inner	South Fremantle	\$525,000	15%	17%
Inner	Swanbourne	\$735,000	12%	7%
Middle	Coogee	\$476,000	13%	25%
Middle	Hamilton Hill	\$251,000	14%	14%
Middle	Munster	\$268,750	10%	9%
Middle	North Beach	\$466,000	12%	10%
Middle	Trigg	\$607,500	16%	33%
South West	Golden Bay	\$247,000	18%	25%
South West	Port Kennedy	\$235,500	13%	15%
South West	Rockingham	\$235,000	16%	29%
South West	Safety Bay	\$230,000	14%	13%
South West	Singleton	\$269,000	16%	22%
South West	Waikiki	\$197,000	11%	17%
South West	Warnbro	\$199,950	13%	19%

**Table 6: Median residential sale price (2004) and average annual sales price growth<sup>1</sup> (1994 - 2004)<sup>2</sup> Coastal suburbs by sector<sup>3</sup>**

Source: Real Estate Institute of Western Australia (2005)

1 Average Annual Growth was been calculated using a compound growth calculation.

2 Data is available on the REIWA website: [www.reiwa.wa.gov.au](http://www.reiwa.wa.gov.au).

3 The inclusion of suburbs in this analysis is based on proximity to the coast. The nominal distance measure used was 10km.

4 Sectors are those used in the Metropolitan Development Program (MDP). The report is available from the WAPC website: [www.wapc.wa.gov.au](http://www.wapc.wa.gov.au).

5 Refers to both residential house and land sales.

Sector <sup>3</sup>	Suburb	Average Median Lot Values 1990 <sup>4</sup>	Average Median Lot Values 1995	Average Median Lot Values 2000	Average Median Lot Values 2005	Average Annual Growth (last 15 years)	Average Annual Growth (last 10 years)
North West	Two Rocks	\$37,000	\$42,000	\$70,000	\$160,000	\$0	0%
North West	Yanchep	\$42,000	\$76,000	\$108,000	\$200,000	\$0	10%
North West	Eglington	N/A	N/A	N/A	N/A	N/A	N/A
North West	Alkimos	N/A	N/A	N/A	N/A	N/A	N/A
North West	Jindalee	N/A	N/A	N/A	122,000	N/A	N/A
North West	Butler	N/A	N/A	N/A	150,000	N/A	N/A
North West	Quinns Rocks	\$48,000	\$72,000	\$132,000	\$176,000	9%	9%
North West	Mindaree	\$62,000	\$104,000	\$146,000	\$214,000	9%	7%
North West	Burns	\$36,000	\$102,000	\$148,000	\$330,000	16%	12%
North West	Iluka	\$62,000	\$120,000	\$184,000	\$193,000	8%	5%
North West	Ocean Reef	\$67,000	\$144,000	\$202,000	\$360,000	12%	10%
North West	Mullaloo	\$72,000	\$150,000	\$230,000	\$398,000	12%	10%
North West	Kallaroo	\$92,000	\$172,000	\$260,000	\$426,000	11%	9%
North West	Hillarys	\$100,000	\$178,000	\$278,000	\$454,000	11%	10%
North West	Sorrento	\$109,000	\$180,000	\$300,000	\$600,000	12%	13%
North West	Marmion	\$126,000	\$190,000	\$384,000	\$796,000	13%	15%
North West	Waterman's Bay	\$148,000	\$256,000	\$416,000	\$838,000	12%	13%
Inner	City Beach	\$180,000	\$324,000	\$940,000	\$1,020,000	12%	12%
Inner	Swanbourne	\$240,000	\$404,000	\$1,010,000	\$1,230,000	12%	12%
Inner	Cottesloe	\$274,000	\$430,000	\$1,080,000	\$1,410,000	12%	13%
Inner	North Fremantle	\$140,000	\$196,000	\$460,000	\$840,000	13%	16%
Inner	Fremantle	\$150,000	\$230,000	\$510,000	\$790,000	12%	13%
Inner	South Fremantle	\$139,000	\$174,000	\$440,000	\$756,000	12%	16%
Middle	Hamilton Hill	\$64,000	\$104,000	\$152,000	\$450,000	14%	16%
Middle	Coogee	\$58,000	\$116,000	\$172,000	\$500,000	15%	16%
Middle	Munster	\$57,000	\$116,000	\$162,000	\$440,000	15%	14%
Middle	Henderson	\$44,000	\$86,000	\$122,000	\$286,000	13%	13%
Middle	North Beach	\$158,000	\$268,000	\$528,000	\$930,000	13%	13%
Middle	Trigg	\$170,000	\$282,000	\$550,000	\$1,160,000	14%	15%
Middle	Scarborough	\$174,000	\$520,000	\$840,000	\$1,020,000	13%	7%
South West	Naval Base	\$39,000	\$74,000	\$110,000	\$278,000	14%	14%
South West	Kwinana	\$39,000	\$74,000	\$110,000	\$278,000	14%	14%
South West	East Rockingham	\$34,000	\$68,000	\$104,000	\$270,000	15%	15%
South West	Rockingham	\$46,000	\$230,000	\$350,000	\$510,000	17%	8%
South West	Shoalwater	\$44,000	\$182,000	\$246,000	\$450,000	17%	9%
South West	Safety Bay	\$44,000	\$172,000	\$228,000	\$424,000	16%	9%
South West	Waikiki	\$42,000	\$136,000	\$164,000	\$402,000	16%	11%
South West	Warnbro	\$41,000	\$130,000	\$156,000	\$390,000	16%	12%
South West	Port Kennedy	N/A	\$92,000	\$132,000	\$266,000	N/A	11%
South West	Secret Harbour	N/A	\$80,000	\$78,000	\$238,000	N/A	12%
South West	Golden Bay	\$36,000	\$62,000	\$72,000	\$227,000	13%	14%
South West	Singleton	\$35,000	\$60,000	\$67,000	\$226,000	13%	14%

**Table 7: Estimated Allotment (or lot values) (1990-2005) and Average Annual Lot Price Growth<sup>1</sup> (1990-2005) - Coastal Suburbs by Sector<sup>2</sup>**

Source: DPI Valuations Branch (2005)

- 1 Average Annual Growth was been calculated using a compound growth calculation.
- 2 The inclusion of suburbs in this analysis is based on proximity to the coast. Nominal distance measure = 10km.
- 3 Sectors are those used in the Metropolitan Development Program (MDP). The report is available from the WAPC website: [www.wapc.wa.gov.au](http://www.wapc.wa.gov.au).
- 4 In this instance, Average Lot Value calculated by proportioning or weighting the values of frontal lots (those closest to the coastline) and values of rear lots or the next lots inland. The values for rear lots contributed 80% to the average while the frontal value accounted for 20%.

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## **Management Responses**

### **Statement of Planning Policy 3 - Urban Growth and Settlement (Draft)**

This policy sets out the principles and considerations which apply to planning for urban growth and settlements in Western Australia. It is a broad sector policy under *Statement of Planning Policy No.1: State Planning Framework*. The policy will be implemented by more detailed policies on particular matters relating to planning for urban settlements that require additional guidance.

The overall aim of the policy is to facilitate sustainable patterns of urban growth and settlement by setting out the requirements of sustainable settlements and communities and the broad policy in accommodating urban growth and change. This policy should be taken into account in preparing regional and local planning strategies, and planning schemes and amendments, and given weight in statutory decision making in relation to urban growth and settlement.

There is continued pressure for development in coastal locations particularly for tourism projects, holiday homes and for people seeking a lifestyle change from city living. Often proposals for such development are deficient in employment and other services, and are also heavily car dependent. Coastal development needs to be carefully planned to ensure beaches, dunes, estuaries and coastal wetlands are protected, the risk of storm damage and shoreline erosion is carefully managed and urban development is located where it is feasible to provide essential infrastructure, employment, services and public transport.

The Commission's *Statement of Planning Policy No.2.6 State Coastal Planning Policy* sets out the principles for coastal planning and management and encourages concentration of urban development in and around existing settlements particularly those with established infrastructure and services.

See Background Paper 2 for more detail on SPP No. 2.6 (State Coastal Planning Policy)

### **Liveable Neighbourhood Policy**

The WAPC prepared the "Liveable Neighbourhoods" policy (2002) to implement the objectives of the State Planning Strategy that aim to guide the sustainable development of WA. It operates as a development control policy, or code, to facilitate the development of sustainable communities. The policy replaces issues-based policies with an integrated planning and assessment policy for the preparation of structure plans and subdivision layouts for the future development of Perth and regional centres.

The principal aims of "Liveable Neighbourhoods" are as follows:

- provide for walkable neighbourhoods to reduce car dependence
- service and facility access are designed for all users including those with disabilities
- provide for access generally by way of an interconnected network of streets, facilitating safe, efficient and pleasant walking, cycling and driving
- facilitate new developments, which support the efficiency of public transport systems
- facilitate mixed-use urban development, which provides for a wide range of living, employment and leisure opportunities
- provide for a variety of lot sizes and housing types for cater for diverse housing needs of the community at a density that can ultimately support the provision of local services
- avoidance of key environmental areas and the incorporation of significant cultural and environmental features of a site into the design of an area

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## **Commercial Development**

### **Changing Land Uses Within 500 metres of the Coast**

The changing nature of land uses along the 500 metres coastal strip in the Perth Metropolitan Region (PMR) was analysed using information collected from DPI's Land Use and Employment Surveys. The surveys encompass land zoned for commercial, industrial, public purpose, recreation and public open space under the Metropolitan Region Scheme and Local Town Planning Schemes. Commercial and industrial surveys are conducted about every four years while public purpose, recreation and public open space are conducted as required.

For the purposes of this study, two time periods were used to examine the change - 1990-1993 and 2001-2003, giving around 10 to 12 years of change. All survey types are encompassed within these two time periods providing a comprehensive snapshot of land uses. Data is presented by Planning Land Use Category (PLUC) and specific land uses. Information collected in the surveys and analysed in this report includes count of activities and establishments, floorspace area and employment. An activity is a discrete land use while an establishment is a trade name operating as an enterprise or a land use description if no trade name exists.

The full set of summary data tables by coastal local authority are in the Appendix at the end of this section.

### **Survey Results**

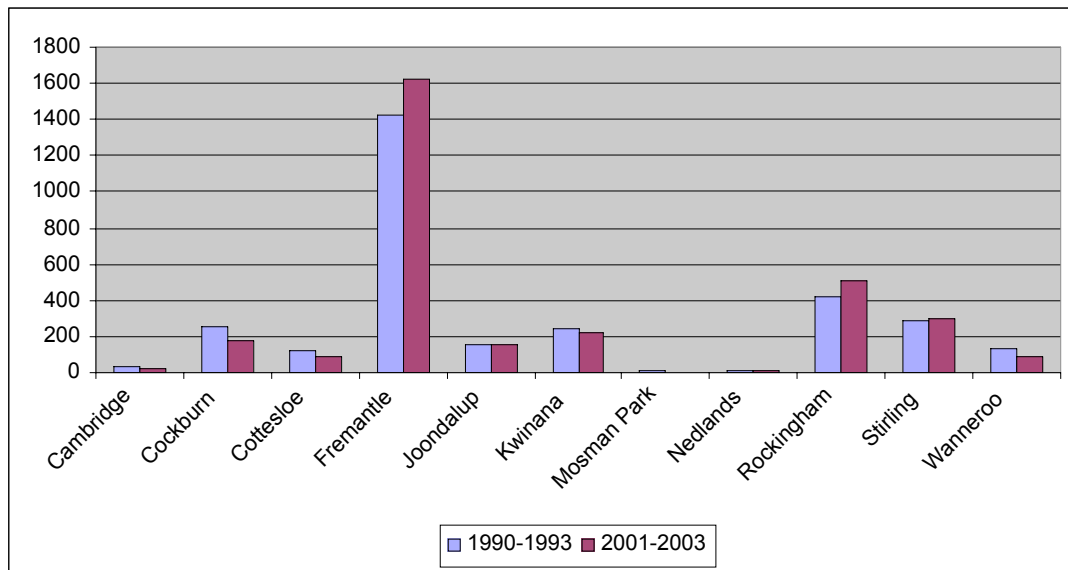
Overall, there has been a small increase in activity along the metropolitan coast, however, it is the nature and location of activity which deserves examination. Over 2001-2003, 3181 activities were identified within the 500 metre coastal buffer representing a 3.8 per cent increase in the total number of activities from 1990-1993, but some land uses experienced significant increases while others retreated. See Table 1 in the Appendix.

The coastal nodes have as expected, the highest number of activities. Fremantle contains the highest concentration of activities of all coastal local authorities within the 500 metre buffer. Over 1600 activities are located in Fremantle, with the next highest being Rockingham with 504 activities followed by Stirling with 296 activities.

Activities are separated into occupying and vacant. The biggest increase in occupying activities was recorded in the Residential PLUC which includes private housing and commercial accommodation. Increased residential development and specifically private housing in recent years is reflected in the survey data with these land use activities increasing from 313 in 1990/1993 to 498 in 2001/2003 - an increase of 59.1 per cent. Fremantle has the highest number of recorded Residential uses increasing from 172 to 215 over the survey period. Most of Fremantle's increased residential activity has been in private residential housing within surveyed areas. Rockingham also recorded significant increases in this use followed by Stirling.

Other increasing activities were in the Health/Welfare/Community Services and Office/Business PLUCs.

As Residential uses have increased, industrial uses such as Manufacturing/Processing/Fabrication and Service Industry as well as Utilities/Communications have moved out. This is especially evident in Cockburn and Fremantle.



**Figure 1: Count of Activities by Coastal Local Authority**

Source: Land Use and Employment Surveys

The count of activities also includes the number of vacant premises and vacant lots. While the total number of occupying activities has increased, this has been offset by the increase in vacant premises, especially in Fremantle. Along the coastal strip, vacant lot numbers have decreased over the study period, from 349 to 295 lots. Cockburn has experienced the largest increase in the number of vacant lots as premises have been demolished after business enterprises closed down or relocated elsewhere due to the impending redevelopment of Robbs industrial area and Coogee Beach areas. In contrast, Fremantle recorded the largest decrease in the number of vacant lots from 51 to 12 over the survey period.

### Establishments

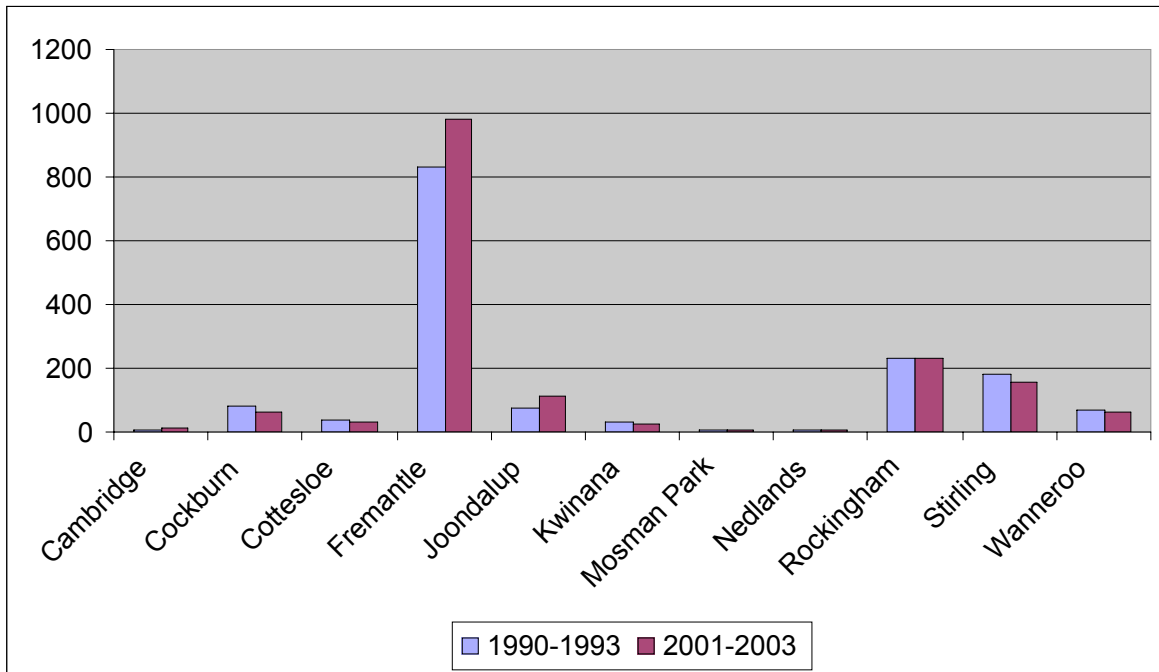
Throughout the metropolitan coastal strip establishment numbers have increased over the 10-12 year period from 1554 to 1685, an average of about 11 new establishments per year. The increase was concentrated in Fremantle which saw numbers increase from 833 to 982 representing an additional 149 establishments. The only other significant increase was recorded in Joondalup which saw an extra 39 establishments, from 74 to 113. Most other local authorities experienced a decline in total numbers of establishments. See Table 2 in the Appendix.

### Employment

Table 3 in the Appendix shows that employment along the coastal strip has increased from 12 201 over 1990-1993 to 12 581 over 2001-2003, an increase of 380 persons or about 32 persons per year. The nature of employment has changed over this time with a shift away from most different types of PLUCs to see a concentration towards Shop/Retail, Office/Business and Entertainment/Recreation/Cultural uses.

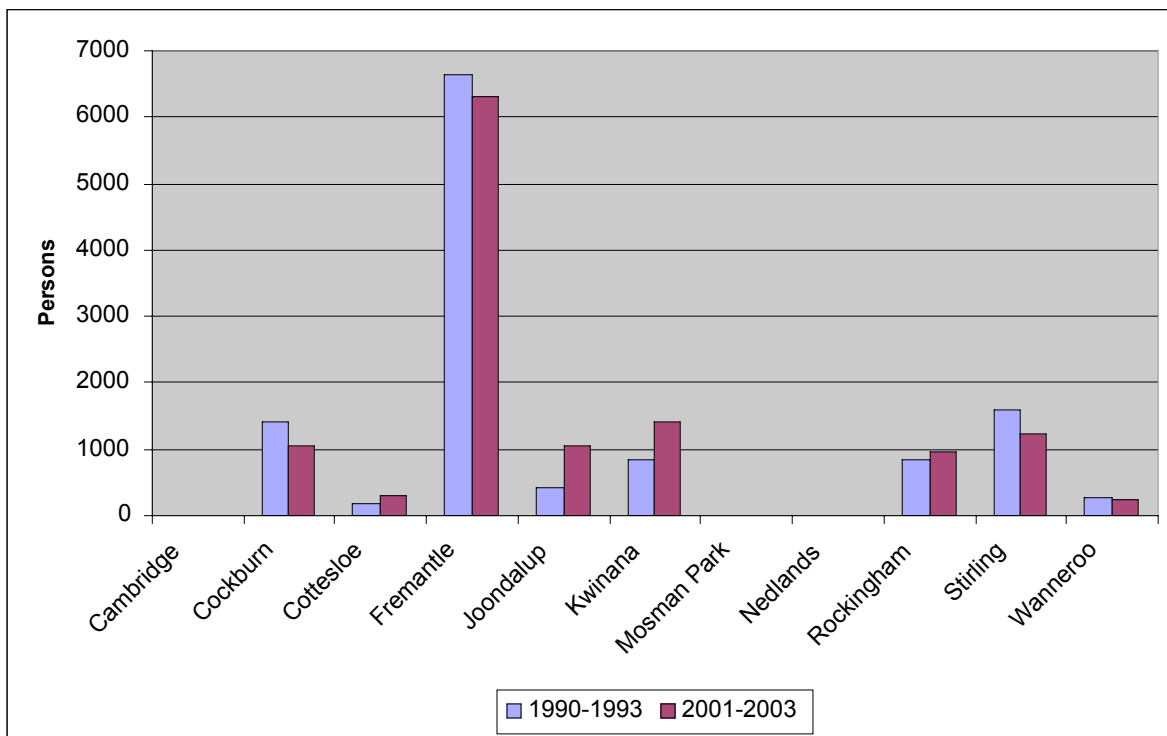
The biggest employment growth has been in these three PLUCs to the detriment of Manufacturing/Processing/Fabrication, Health/Welfare/Community Services and Utilities/Communications.

Half of all the employment within the 500 metres coastal buffer falls within the City of Fremantle but the overall winners in employment growth were Kwinana, Rockingham, Cottesloe and Joondalup. Employment losses were experienced in Fremantle and Stirling. Fremantle's losses were largely attributed to the closure of the Arnott's biscuit factory.



**Figure 2: Number of Establishments by Coastal Local Authority**

Source: Land Use and Employment Surveys



**Figure 3: Employment by Coastal Local Authority**

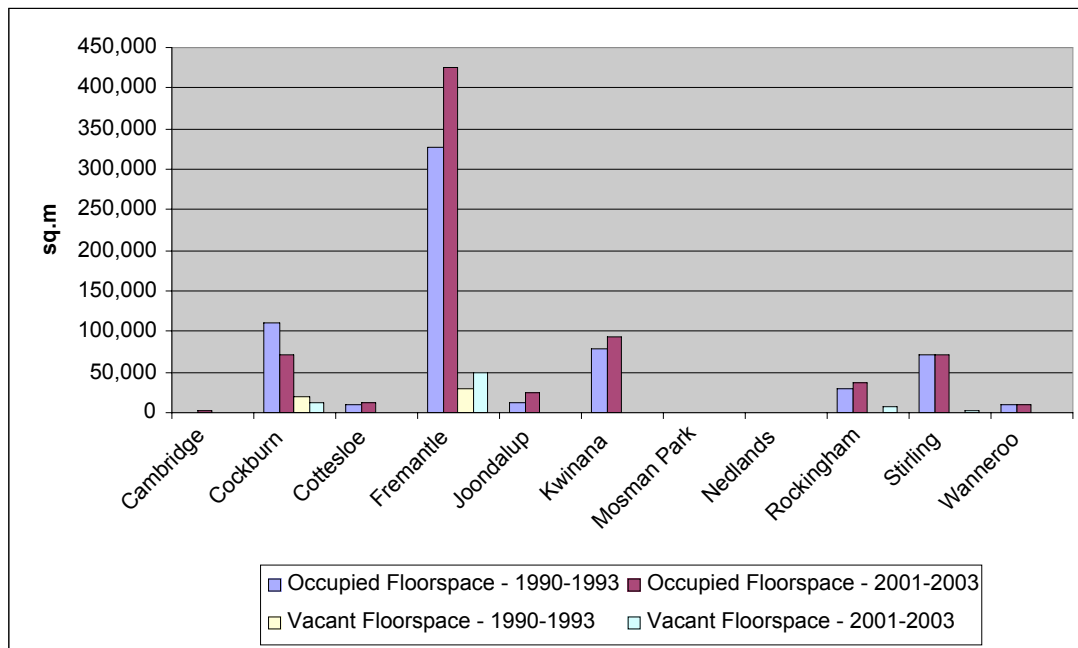
Source: Land Use and Employment Surveys



## Floorspace

Associated with the increase in activities along the coast is the increase in floorspace which rose by 17.1%. Again, the utilisation of floorspace mirrors what has been occurring with activities and employment concentrating towards Shop/Retail, Office/Business and Entertainment/Recreation/Cultural uses. Following the trend throughout the PMR, Manufacturing/Processing/Fabrication uses have declined and so has Utilities/Communications.

Cockburn was the only coastal local authority to experience a decline in floorspace over the survey period. Manufacturing/Processing/Fabrication decreased as well as Utilities/Communications uses attributable to the departure of many industrial premises in the Robbs industrial area, Coogee Beach and surrounds. See Table 4 in the Appendix.



**Figure 4: Occupied and Vacant Floorspace by Coastal Local Authority**

Source: Land Use and Employment Surveys

## Selected Land Uses

Of particular interest is the change in selected land uses along the 500 metre buffer. Restaurants/cafes/takeaways as well as private housing within surveyed areas have been identified as having an increasing presence within the coastal buffer and especially along the beachfront.

Table 1 shows the increase in establishments, employment and floorspace in restaurants/cafes/takeaways. The number of persons employed in these land uses has increased 52.9 per cent to 2286 persons while the number of establishments has increased 25.7 per cent to 269.

	Establishments	Employment			Floorspace sq.m
		Full-time	Part-time	Total	
1990-1993	214	639	856	1495	41 750
2001-2003	269	593	1693	2286	47 385
Change	55	-46	837	791	5635
% Change	25.7	-7.2	97.8	52.9	13.5

**Table 1 - Estimated Number of Restaurants/Cafes/Takeaways within the 500 metre Coastal Buffer.** Source: Land Use and Employment Surveys

The largest concentration of restaurants/cafes/takeaways is in Fremantle which has recorded nearly 50 per cent of all these establishments within the region. Although Fremantle contains the highest number of these establishments and also recorded a 35.7 per cent increase, other local authorities have recorded significant growth in these establishments too. Joondalup recorded a 123 per cent increase, from 13 to 29, and Rockingham recorded a 37 per cent increase from 30 to 41. See Table 2.

Local Authority	1990-1993	2001-2003
Cambridge	3	4
Cockburn	2	4
Cottesloe	15	10
Fremantle	98	133
Joondalup	13	29
Kwinana	0	1
Mosman Park	0	0
Nedlands	1	1
Rockingham	30	41
Stirling	40	34
Wanneroo	12	12
Total	214	269

**Table 2 - Estimated Number of Restaurants/Cafes/Takeaways within the 500 metre Coastal Buffer by Local Authority.**

Source: Land Use and Employment Surveys

Local Authority	1990-1993	2001-2003
Cambridge	0	0
Cockburn	2	2
Cottesloe	42	40
Fremantle	155	180
Joondalup	4	2
Kwinana	0	0
Mosman Park	0	0
Nedlands	0	0
Rockingham	24	82
Stirling	6	54
Wanneroo	0	1
Total	233	361

**Table 3 - Estimated Number of Private Dwellings within the 500 metre Coastal Buffer by Local Authority.**

Source: Land Use and Employment Surveys

The growth in private dwellings is concentrated in Fremantle, Rockingham and Stirling. Private residential housing has always been a part of the Fremantle CBD fabric and it shows in the survey with 180 dwellings in 2001-2003 representing a growth of 16.1%. Rockingham contains the second highest with 82 dwellings followed by Stirling with 54 dwellings.

### Implications

There has been noticeable change in land uses over the 10-12 year period within the 500 metre buffer along the metropolitan coast. There has been a shift away from industrial type premises specifically in Cockburn and Fremantle towards Shop/Retail, Office/Business and Entertainment/Recreation/Cultural land uses. Growth in these land uses also sees a rise in patrons, customers and visitors. Private housing and restaurants/cafes/takeaway establishments have been singled out in this study and are shown to be increasing their presence within the coastal buffer.

Levels of employment are on the rise due to increased business activity levels. There is also increasing numbers of dwellings and therefore residents along the coastline. The amount of vacant premises and vacant floorspace together with the vacant land indicate a potential for increasing activity in the future.

The two time periods used in this study show that the metropolitan coastline is experiencing a change in land uses and the resulting pressure from the impact of this change.

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## ***Management Responses***

### **SPP No. 9 Metropolitan Centres Policy Statement for Perth Metropolitan Region**

The principal purpose of the policy is to provide a broad regional planning framework to coordinate the location and development of retail and commercial activities in the metropolitan region. It is mainly concerned with the location, distribution and broad design criteria for the development of commercial activities at the regional and district level. Local Planning Strategies prepared by local governments will provide more detailed guidance for planning and development control at the local level.

This policy is substantially similar to the *Metropolitan Centres Policy Statement for the Perth Metropolitan Region* (1991). However, from the consultations carried out in the review of the policy and as a result of the decision of the Commission the following major changes have been made:

- the policy has been formulated as a Statement of Planning Policy to ensure that it is given due regard in preparing and amending town planning schemes;
- the hierarchy of centres has been updated to take account of the new centres that have been identified in endorsed structure plans and Local Planning Strategies;
- the interim shopping floorspace guide for Strategic Regional Centres (up to 80,000m<sup>2</sup> nla), Regional Centres (up to 50,000m<sup>2</sup> nla), District Centres (up to 15,000m<sup>2</sup> nla) and Neighbourhood Centres (up to 4,500m<sup>2</sup> nla) has been adjusted to reflect the sizes of established centres in the hierarchy;
- in line with comments received in the consultation, the policy promotes functional roles of centres in the hierarchy by indicating the appropriate retail and commercial types for the various categories of centres;
- the policy promotes the development of centres in accordance with the Amain street design principles; and
- the policy requires centre development to be undertaken with regard to the surrounding amenity, impact on other centres and commercial planning policies of other local governments.

The policy is intended to provide a guide for centre development that is flexible enough to enable commercial development to respond to market conditions and has a degree of certainty to assist in commercial investment decisions.

Through this policy, the Western Australian Planning Commission (the Commission) is also seeking to achieve a balanced distribution of employment throughout the Perth Metropolitan Region to *Metropolitan Centres Policy Statement for the Perth Metropolitan Region* facilitate a reduction in travel times, the application of best urban design practice to centres, and need for centre sizes to reflect available infrastructure and locational requirements.

	Primary / Rural	Manufacturing / Processing / Fabrication	Storage & Distribution	Service Industry	Shop / Retail	Other Retail	Office / Business	Health / Welfare & Community Services	Entertainment / Recreational & Cultural	Residential	Utilities / Communications	TOTAL OCCUPYING ACTIVITIES	Vacant Floor Area	Vacant Land Area	TOTAL
<b>1990-1993</b>															
Cambridge	0	0	0	0	3	0	0	0	17	0	7	27	0	3	30
Cockburn	10	36	53	6	6	0	32	0	19	6	41	209	22	19	250
Cottesloe	4	0	0	2	28	0	0	3	27	48	2	114	2	2	118
Fremantle	3	62	91	77	348	38	262	50	82	172	77	1262	109	51	1422
Joondalup	6	1	1	1	44	5	10	2	46	6	13	135	15	1	151
Kwinana	0	16	10	9	2	1	12	3	5	0	17	75	1	164	240
Mosman Park	0	0	0	3	1	1	0	0	2	0	0	7	4	1	12
Nedlands	0	0	0	0	1	0	0	0	5	1	1	8	0	0	8
Rockingham	8	0	2	8	126	15	43	9	46	41	25	323	8	88	419
Stirling	2	0	2	16	115	7	31	1	42	32	22	270	10	8	288
Wanneroo	3	0	3	4	27	4	10	3	34	7	19	114	1	12	127
<b>Total</b>	<b>36</b>	<b>115</b>	<b>162</b>	<b>126</b>	<b>701</b>	<b>71</b>	<b>400</b>	<b>71</b>	<b>325</b>	<b>313</b>	<b>224</b>	<b>2544</b>	<b>172</b>	<b>349</b>	<b>3065</b>
<b>2001-2003</b>															
Cambridge	0	0	1	0	4	0	1	0	9	0	5	20	0	0	20
Cockburn	5	17	18	10	8	0	25	0	17	7	24	131	16	32	179
Cottesloe	0	0	0	1	15	0	2	3	16	48	1	86	0	2	88
Fremantle	4	45	124	54	400	35	337	52	107	215	59	1432	178	12	1622
Joondalup	0	1	6	1	65	3	21	4	28	7	7	143	6	3	152
Kwinana	4	17	14	10	2	2	12	1	0	0	6	68	0	152	220
Mosman Park	0	0	0	1	0	1	0	0	1	1	0	4	0	0	4
Nedlands	0	0	0	0	1	0	0	0	3	1	1	6	0	0	6
Rockingham	3	5	5	8	122	9	44	18	16	120	8	358	62	84	504
Stirling	0	0	1	7	87	3	34	4	21	92	17	266	25	5	296
Wanneroo	1	1	0	0	28	1	8	5	15	7	14	80	5	5	90
<b>Total</b>	<b>17</b>	<b>86</b>	<b>169</b>	<b>92</b>	<b>732</b>	<b>54</b>	<b>484</b>	<b>87</b>	<b>233</b>	<b>498</b>	<b>142</b>	<b>2594</b>	<b>292</b>	<b>295</b>	<b>3181</b>
<b>Change</b>	<b>-19</b>	<b>-29</b>	<b>7</b>	<b>-34</b>	<b>31</b>	<b>-17</b>	<b>84</b>	<b>16</b>	<b>-92</b>	<b>185</b>	<b>-82</b>	<b>50</b>	<b>120</b>	<b>-54</b>	<b>116</b>
<b>% Change</b>	<b>-52.8</b>	<b>-25.2</b>	<b>4.3</b>	<b>-27.0</b>	<b>4.4</b>	<b>-23.9</b>	<b>21.0</b>	<b>22.5</b>	<b>-28.3</b>	<b>59.1</b>	<b>-36.6</b>	<b>2.0</b>	<b>69.8</b>	<b>-15.5</b>	<b>3.8</b>

**Appendix: Table 1 - Estimated Count of Activities by Planning Land Use Category by Coastal Local Authority**

Source: Land Use and Employment Surveys - Department for Planning and Infrastructure, June 2005

*Disclaimer for all Tables: The 2001/02 and 2003 Land Use and Employment Survey have been validated, however, they are subject to minor changes. The Survey data is prepared by DPI on behalf of the WAPC.*

*Both the Department and the Commission and their respective employees and agents take no responsibility for any action or inaction by any person or organisation based on the Survey data.*

<b>Local Authority</b>	<b>1990-1993</b>	<b>2001-2003</b>
Cambridge	9	10
Cockburn	80	65
Cottesloe	40	30
Fremantle	833	982
Joondalup	74	113
Kwinana	30	25
Mosman Park	5	4
Nedlands	4	4
Rockingham	230	233
Stirling	180	159
Wanneroo	69	60
<b>TOTAL</b>	<b>1554</b>	<b>1685</b>

**Appendix: Table 2 - Estimated Number of Establishments by Coastal Local Authority**

Source: Land Use and Employment Surveys - Department for Planning and Infrastructure, June 2005

	Primary / Rural	Manufacturing / Processing / Fabrication	Storage & Distribution	Service Industry	Shop / Retail	Other Retail	Office / Business	Health / Welfare & Community Services	Entertainment / Recreational & Cultural	Residential	Utilities / Communications	
<b>1990-1993</b>												
Cambridge	0	0	0	0	6	0	0	0	0	0	0	6
Cockburn	0	962	172	0	5	0	223	0	0	0	65	1427
Cottesloe	0	0	0	2	114	0	0	18	36	0	0	170
Fremantle	27	821	261	549	1494	180	2016	358	368	127	428	6629
Joondalup	0	3	0	0	180	14	34	80	103	0	0	414
Kwinana	0	270	18	34	6	1	59	3	0	0	460	851
Mosman Park	0	0	0	8	6	0	0	0	0	0	0	14
Nedlands	0	0	0	0	0	0	0	0	0	0	0	0
Rockingham	0	0	0	8	472	41	201	21	36	33	15	827
Stirling	0	0	0	41	570	30	134	2	226	565	27	1595
Wanneroo	0	0	5	6	45	8	35	2	17	150	0	268
<b>Total</b>	<b>27</b>	<b>2056</b>	<b>456</b>	<b>648</b>	<b>2898</b>	<b>274</b>	<b>2702</b>	<b>484</b>	<b>786</b>	<b>875</b>	<b>995</b>	<b>12201</b>
<b>2001-2003</b>												
Cambridge	0	0	0	0	10	0	1	0	0	0	0	11
Cockburn	0	281	40	238	25	0	466	0	11	5	0	1066
Cottesloe	0	0	0	1	176	0	6	2	117	10	0	312
Fremantle	20	253	367	225	1980	143	2520	101	543	33	113	6298
Joondalup	0	2	0	0	553	7	102	4	384	10	0	1062
Kwinana	0	1141	19	95	9	10	74	1	0	0	49	1398
Mosman Park	0	0	0	2	0	0	0	0	2	0	0	4
Nedlands	0	0	0	0	0	0	0	0	0	0	0	0
Rockingham	0	19	71	20	509	20	191	34	85	3	3	955
Stirling	0	0	5	19	535	19	135	7	93	382	27	1222
Wanneroo	0	0	0	0	88	3	59	4	6	91	2	253
<b>Total</b>	<b>20</b>	<b>1696</b>	<b>502</b>	<b>600</b>	<b>3885</b>	<b>202</b>	<b>3554</b>	<b>153</b>	<b>1241</b>	<b>534</b>	<b>194</b>	<b>12581</b>
<b>Change</b>	<b>-7</b>	<b>-360</b>	<b>46</b>	<b>-48</b>	<b>987</b>	<b>-72</b>	<b>852</b>	<b>-331</b>	<b>455</b>	<b>-341</b>	<b>-801</b>	<b>380</b>
<b>% Change</b>	<b>-25.9</b>	<b>-17.5</b>	<b>10.1</b>	<b>-7.4</b>	<b>34.1</b>	<b>-26.3</b>	<b>31.5</b>	<b>-68.4</b>	<b>57.9</b>	<b>-39.0</b>	<b>-80.5</b>	<b>3.1</b>

**Appendix: Table 3 - Estimated Number of Persons Employed by Planning Land Use Category by Coastal Local Authority**

Source: Land Use and Employment Surveys - Department for Planning and Infrastructure, June 2005

	Primary / Rural	Manufacturing / Processing / Fabrication	Storage & Distribution	Service Industry	Shop / Retail	Other Retail	Office / Business	Health / Welfare & Community Services	Entertainment / Recreational & Cultural	Residential	Utilities / Communications	Total Occupied Floorspace	Vacant Floor Area	Total
<b>1990-1993</b>														
Cambridge	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cockburn	0	49627	42698	3736	140	0	10611	0	0	120	4357	111289	20150	131439
Cottesloe	0	0	0	72	2389	0	0	0	3948	3663	0	10072	96	10168
Fremantle	2541	49352	67691	21732	40948	6634	63484	13782	25980	16462	17419	326025	28948	354973
Joondalup	0	69	63	80	5070	520	601	0	6045	0	0	12448	594	13042
Kwinana	0	19680	24348	5330	400	90	7721	187	0	0	19788	77544	200	77744
Mosman Park	0	0	0	400	120	35	0	0	0	0	0	555	0	555
Nedlands	0	0	0	0	120	0	0	0	0	0	120	240	0	240
Rockingham	0	0	120	776	16921	1721	3915	1464	2651	2070	271	29909	824	30733
Stirling	0	0	40	1572	17125	605	2970	0	15807	31124	900	70143	688	70831
Wanneroo	0	0	469	1087	3858	358	2536	40	505	1129	5	9987	88	10075
<b>TOTAL</b>	<b>2541</b>	<b>118728</b>	<b>135429</b>	<b>34785</b>	<b>87091</b>	<b>9963</b>	<b>91838</b>	<b>15473</b>	<b>54936</b>	<b>54568</b>	<b>42860</b>	<b>648212</b>	<b>51588</b>	<b>699800</b>
<b>2001-2003</b>														
Cambridge	0	0	300	0	580	0	100	0	848	0	200	2028	0	2028
Cockburn	100	30051	11294	19252	710	0	8963	0	850	630	200	72050	11109	83159
Cottesloe	0	0	0	80	1553	0	75	200	5873	3580	0	11361	0	11361
Fremantle	2470	32427	129712	29176	41047	11704	78398	27717	37574	23681	11120	425026	47989	473015
Joondalup	0	75	1215	80	9301	82	1467	611	10884	1370	86	25171	715	25886
Kwinana	0	29777	36548	5510	400	380	7308	72	0	0	14444	94439	0	94439
Mosman Park	0	0	0	320	0	115	0	0	150	0	0	585	0	585
Nedlands	0	0	0	0	120	0	0	0	480	0	0	600	0	600
Rockingham	0	453	615	848	16349	1302	5282	3534	6920	1960	155	37418	7290	44708
Stirling	0	0	162	494	15976	620	3429	550	14086	33942	1056	70315	2143	72458
Wanneroo	0	301	0	0	4162	126	1032	631	2548	1209	773	10782	469	11251
<b>TOTAL</b>	<b>2570</b>	<b>93084</b>	<b>179846</b>	<b>55760</b>	<b>90198</b>	<b>14329</b>	<b>106054</b>	<b>33315</b>	<b>80213</b>	<b>66372</b>	<b>28034</b>	<b>749775</b>	<b>69715</b>	<b>819490</b>
<b>Change</b>	<b>29</b>	<b>-25644</b>	<b>44417</b>	<b>20975</b>	<b>3107</b>	<b>4366</b>	<b>14216</b>	<b>17842</b>	<b>25277</b>	<b>11804</b>	<b>-14826</b>	<b>101563</b>	<b>18127</b>	<b>119690</b>
<b>% Change</b>	<b>1.1</b>	<b>-21.6</b>	<b>32.8</b>	<b>60.3</b>	<b>3.6</b>	<b>43.8</b>	<b>15.5</b>	<b>115.3</b>	<b>46.0</b>	<b>21.6</b>	<b>-34.6</b>	<b>15.7</b>	<b>35.1</b>	<b>17.1</b>

**Appendix: Table 4 - Estimated Floorspace (sq.m) by Planning Land Use Category by Coastal Local Authority**

Source: Land Use and Employment Surveys - Department for Planning and Infrastructure, June 2005



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## **Industrial Development**

Planning for industrial use to date has dealt with the 'local' issues however there is a need to make certain that the recommendations of various strategies and agencies interlink and support broader regional perspectives. The wishes of the community for future commercial and industrial nodes will need to be led by the impact, placement and size of current nodes. There is a need to balance this with competing needs for recreational requirements for local, district and regional commercial nodes.

The importance of industrial developments to the WA economy can not be ignored and the present growth of Perth due to the resource boom, necessitates that industries such as those operating in the Kwinana area, produce more to support the burgeoning population. It is a trade off that requires some consideration and it has been a platform for various Governments to ensure continuing economic growth. The State Sustainability Strategy supports the drive for a sustainable future while assisting business to benefit from and contribute to sustainability through partnership programs and innovation.

### **Strategic Directions**

#### Fremantle - Rockingham Industrial Areas Regional Strategy (FRIARS) (2000)

The Fremantle - Rockingham Industrial Area was the subject of a study into strategic land use planning for the region over the next 20 - 25 years. The final report "*Fremantle - Rockingham Industrial Area Regional Strategy*" (2000), (FRIARS) was the culmination of extensive investigations into the issues and redevelopment opportunities for the Fremantle - Rockingham region. The main planning issues it addressed were:

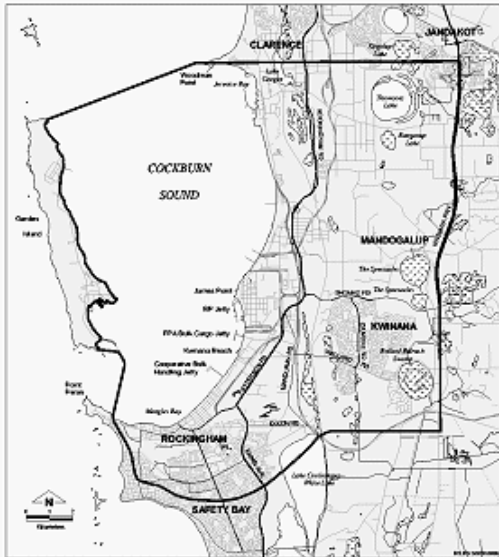
- existing and potential land use conflicts between industrial and other land uses;
- the protection of the Kwinana Industrial Area (KIA) and preservation of opportunities for heavy industry and port facilities in the region;
- the future role of the Kwinana Environmental Protection Policy (EPP) buffer as a land use planning and environmental management tool;
- protection of environmentally significant features in the region including Cockburn Sound;
- provision of employment opportunities;
- identification of land appropriate for general industrial development; and
- certainty for residents in the region by recommending a clear plan and time frame for redevelopment.

The Strategy is premised on the need to protect and optimise the KIA. It allows the Government to initiate land use changes within the buffer area by removing potential conflicts and creating opportunities to meet the demands of industry. Environmental and land use planning is to consider the importance of the KIA to the State's economy and facilitate its optimisation.

There are major implications for current coastal uses and future community desires regarding coastal recreational, tourism and commercial facilities along this entire stretch of coast. There is no direction provided in the FRIARS as to what access will remain along the coast. The preferred option (Option 4) for land use within FRIARS is for the redevelopment of Kwinana EPP buffer solely for industrial purposes. All residential developments in Naval Base, Hope Vallet and Wattleup would be acquired over time along with rural developments. This has implications as to where tourism and recreation will be requiring services in the future. Current comments suggest there is a lack of recreational beach facilities in this region.

### Cockburn Sound Management Council

The Cockburn Sound Management Council was established in August 2000 to coordinate environmental planning and management of Cockburn Sound and its catchment. The Management Council comprises 23 members who represent the community; recreation and conservation groups; industry; and Commonwealth, State and local governments. The Council was established in response to increasing pressures on Cockburn Sound, which is the most intensively used marine embayment in Western Australia.



### **Cockburn Sound Management Council: Management Area** (Source: CSMC website 2005)

The Council's first task has been to develop an Environmental Management Plan (EMP) for Cockburn Sound and its Catchment. The Final Plan was released by the Minister for the Environment early in 2005. The EMP for Cockburn Sound details a five point plan of action towards implementing the State Environmental (Cockburn Sound) Policy (SEP).

The implementation of the EMP will ensure coordination of environmental management and planning for Cockburn Sound. In particular, the EMP will develop strategies to meet the environmental objectives, criteria and targets set in the State Environmental Policy.

The plan involves optimising the use of the Kwinana area; developing the East Rockingham Industrial Park; developing Southern Harbour and the Marine Technology Park at Jervoise Bay; and in the long term, expanding into the Hope Valley-Wattleup area.

### Kwinana Industries Council

The KIC was formed in 1991, and strives to foster positive interaction between member companies and with the community. The key role of the Council is to promote the harmonious co-existence of industry, the community and the environment.

Its aims are:

- To coordinate the activities of Kwinana industries on a range of common issues,
- Provide effective liaison with the local community,
- Promote a positive image of Kwinana industries,
- Highlight contributions to the community by Kwinana industries, and
- Work toward the long-term viability of the Kwinana Industrial Area.

The Kwinana Industries Council facilitates these aims by:

- focusing on developing and employing leading edge technology,
- giving workplace health and safety top priority,
- taking a committed, responsible and proactive approach to environmental protection, and forging a two-way partnership with the local community.

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### ***Current Industrial Activities***

The attraction of the Cockburn Sound foreshore for industry lies in the shipping facilities, road and rail transport, energy, cooling water and proximity of synergistic industries (DoE 2005).

Heavy industry is of considerable importance to the State economy, with the Kwinana Industrial Area alone estimated to produce goods worth at least \$3 billion / year.

Heavy industry is centred on the suburbs of East Rockingham, Kwinana Beach and Naval Base including an oil refinery, chemical production, an alumina refinery, power generation, a titanium dioxide plant, cement production and a nickel refinery. An international ship building precinct (construction repair and maintenance of steel and aluminium-hulled vessels) is also based at Henderson, at Jervoise Bay Northern Harbour. The ship building industry is now recognised as a world leader in construction of high speed lightweight vessels and other marine craft.

A wastewater treatment plant, which services a large portion of Perth's southern metropolitan area, is located in the Woodman Point area.

There are five industrial outfalls presently discharging into Cockburn Sound: Western Power, BP Refinery, Tiwest Joint Venture, Wesfarmers CSBP, and Millenium Chemicals. In addition, the Water Corporation has recently upgraded the Woodman Point Wastewater Treatment Plant to advanced secondary treatment, reducing total discharge of nitrogen and faecal micro-organisms to the Sepia Depression, south of Cockburn Sound.

#### **Tiwest Joint Venture** *(Source: Tiwest website 2005)*

Tiwest Joint Venture is one of the world's most successful titanium minerals production and processing companies. Operating at four sites in Western Australia, the company has established a major titanium minerals industry by mining heavy mineral sands, separating titanium minerals and zircon; producing synthetic rutile and manufacturing titanium dioxide pigment in one integrated business.



At Kwinana, 30 kilometres south of Perth, the synthetic rutile is processed to titanium dioxide pigment - and the company's products are stored or shipped to overseas markets. The plant produces more than 82,000 tons of titanium dioxide pigment a year with a process based on chloride technology adopted by many companies during the 1980s and 1990s, to improve pigment quality and reduce effluent rates. The reaction produces titanium tetrachloride, which is purified by fractional condensation and distillation. Remaining gases are systematically treated by incineration and scrubbing.

As recycled water at the plant becomes salty, it is discharged - under strict environmental controls - into Cockburn Sound.

One of the newer features of the Kwinana facility is a cogeneration plant. A gas turbine generates electricity and the exhaust gases, which would in the past have been vented into the atmosphere, are used to raise steam for use in the pigment plant. The plant generates all of Tiwest's power requirements, plus surplus electricity for the South West interconnecting grid.

Used as a base for most high quality paints, the company's most important product - titanium dioxide - gives modern colours richness, which was difficult to achieve before the development of modern pigments. At the same time, titanium dioxide protects materials from the weather, wear and ageing. As a sunscreen, it protects people from the harmful rays of the sun.

#### **Wesfarmers CSBP Ltd** (Source: CSBP website 2005)

CSBP Limited is one of Australia's major suppliers of chemicals, fertilisers and related services to the mining, minerals processing, industrial and agricultural sectors. CSBP operates a major industrial complex at Kwinana in Western Australia and other complementary facilities in regional areas and employs more than 500 people.

CSBP Chemicals' core products include: ammonia; ammonium nitrate; sodium cyanide; chlorine, caustic soda and sulphuric acid. CSBP Fertilisers manufactures, imports and distributes an extensive range of phosphate, nitrogen and potassium fertilisers, in blended, compound and liquid form. A network of agricultural advisers make on-farm visits each year to advise farmers on soil fertility, farm productivity and fertiliser use.

One of Australia's most respected soil and plant testing laboratories, providing services to more than 2,000 farmers use each year, is also operated by CSBP. Information from this service helps farmers to identify nutrient deficiencies and plant fertiliser programs to maximise farm productivity.

#### **Cockburn Cement** (Source: Cockburn Cement website 2005)

Cockburn Cement is the leading supplier of quicklime and cement to Western Australia's mining, agriculture and construction industries. The Kwinana facility located 40 km south of Perth has a total lime production capacity in excess of one million tonnes: Cockburn is by far the largest lime producer in Australia.

Cockburn's specialised cement products are used in civil infrastructure, commercial building projects and residential housing. Uses include stabilised backfill, pre-mixed concrete, concrete products, mortars, renders and grouts.



This demand has been created by Perth's growth into a major population centre, which has required cement for housing and buildings, along with the development of major infrastructure such as roads, railways and bridges to service an expanding city.

Similarly Cockburn Cement has become the largest producer of lime in Australia because of the emergence of major global resource industries such as alumina, gold and mineral sands, which require this product for their processing operations.

As such, Cockburn Cement's operations are vital to the continuing economic growth of Western Australia with following industries relying on Cockburn Cement's products:

- the housing industry
- major commercial and industrial buildings
- public infrastructure, especially freeways and railways
- oil and gas industry infrastructure
- water treatment plants
- the extensive WA mineral processing industry

#### **Fremantle Port** (Source: FPA website 2005)

The Port of Fremantle is Western Australia's major general-cargo port. It is a sheltered, all weather port situated on the west coast some 20 kilometres from Perth. The Inner Harbour, designed by Irish-born engineer, C.Y. O'Connor and opened on 4 May 1897, is located at the mouth of the Swan River adjacent to the City of Fremantle. The Outer Harbour, 20 kilometres further south on the shores of Cockburn Sound was opened on 11 January 1955. Its deepwater bulk port facilities were developed to service the Kwinana Industrial Area, which expanded rapidly in the 1960s and 70s.

#### Infrastructure and Trade

The Inner Harbour provides modern deep-water facilities for handling container trade, break bulk vessels, livestock exports and motor vehicle imports. It also accommodates cruise ships and visiting naval vessels.

The Outer Harbour is one of Australia's major bulk cargo ports, handling grain, petroleum, liquid petroleum gas, alumina, mineral sands, fertilisers, sulphur and other bulk commodities. Fremantle Ports operates the Kwinana Bulk Jetty and Kwinana Bulk Terminal at Kwinana. Alcoa, BP and Co-operative Bulk Handling also operate cargo-handling facilities in the Outer Harbour. The Inner and Outer Harbours are linked by rail to the interstate and intrastate rail networks.

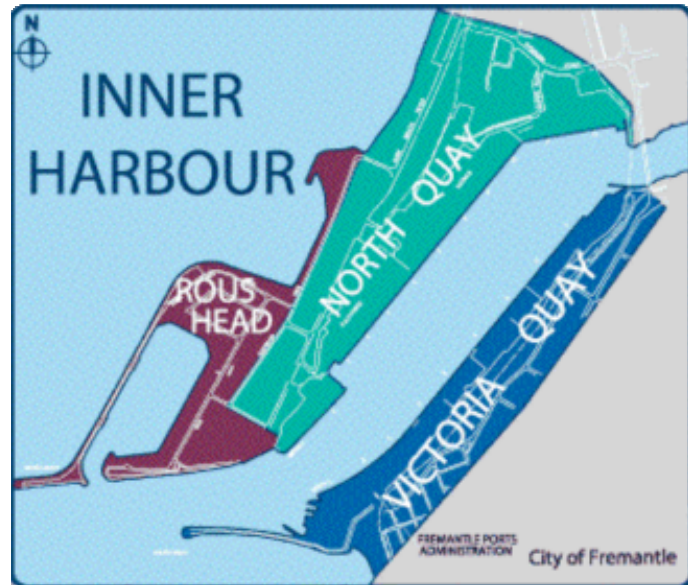
Of Australia's five major capital city ports, Fremantle is the closest to Singapore, which is just four and a half days' journey. It is also well positioned for trade with the Middle East, Africa and Europe. Fremantle is very often a first and last port of call for shipping operating between Australia and overseas destinations, making Fremantle a strategic port for trans-shipment of cargoes as well as direct services.

#### Port Management and Service Providers

Fremantle Ports, which is responsible for an area of land and water covering 383 square kilometres, is a Western Australian Government trading enterprise and, as strategic port manager, it is responsible for ensuring that port services and facilities are provided in a reliable, competitive and efficient manner.

Fremantle Ports' is responsible for a land area of 155 hectares within the Inner Harbour, and 57 hectares of the Outer Harbour and an area of water covering 383 square kilometres.

The Inner Harbour includes three locations, Victoria Quay, North Quay and the Rous Head Industrial Park. North Quay has the largest area of approximately 86 hectares, with Victoria Quay having 26.2 hectares and the Rous Head Industrial Park 43.2 hectares. Flexibility in the use of Port land is an important factor in the Port's competitiveness.



The Port is a combination of Fremantle Ports and privately operated facilities and services.

Fremantle Ports provides and maintains shipping channels, navigation aids, common user cargo wharves, cargo wharves at leased terminals, the passenger terminal, road and rail transport infrastructure within the port area, moles and seawalls, and other port infrastructure such as buildings, water, power and public amenities. Other services provided directly by Fremantle Ports include overall port planning and co-ordination, ship scheduling and berthing allocation, port communications, mooring, security services, emergency response, hazardous cargo services and quarantine and waste disposal services. Fremantle Ports also provides customer information and advice, trade facilitation, and property services and is responsible for pilot transport.

Services provided by the private sector include stevedoring, towage, pilotage, line boats, bunkers and ships providers. The two container stevedoring companies, P&O and Patrick, operate under leases with Fremantle Ports.

Fremantle Ports also cooperates with the Commonwealth Government in facilitating customs, quarantine and Australian Maritime Safety Authority activities in the port area.

Fremantle's Inner Harbour is expected to reach its potential capacity within the next 12 or 13 years and will then continue to operate at capacity. Additional container berths and associated infrastructure in the Outer Harbour will be needed then to handle the overflow trade. It is planned that the new container facilities will be built in stages. That project is outlined in more detail in the PCPS Summary Paper.

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## ***Management Responses***

### **State Industrial Buffer Statement of Planning Policy (SPP) 4.1 (Draft)**

This policy supports the principles on which the *State Planning Strategy* is based - managing the impacts of growth by seeking a balance with the environment around us, the community we live in and the wealth we enjoy. The approach also provides for environmental, social and economic aspects to be considered when determining buffer areas around industry and essential infrastructure.

The best solution is for industry to contain amenity and health impacts and risk on-site. However, some industries by their nature generate a range of emissions that cannot be fully contained on-site. This could diminish the amenity and affect the health of people residing in adjoining areas and possibly expose them to increased levels of risk.

Generally, emissions decrease and the impacts reduce with increasing distance from the source. If the emissions cannot be contained on-site, then there is a need for a buffer to separate industrial areas and other sensitive land uses from the potentially offensive industrial use.

A 'buffer area' is the area within which sensitive land uses are prohibited or special measures are necessary to ameliorate the impacts of industry or essential infrastructure. Sensitive land uses include residential development, hotels, motels and hostels, caravan parks, hospitals and nursing homes, schools and other educational establishments, shopping centres, and some public buildings.

Compatible land uses should be encouraged in buffer areas. In areas furthest from the source of emissions and risk, sensitive land uses may be permitted subject to conditions that ameliorate the impacts of emissions and risk.

Buffer areas are not an alternative to control at the source and high standards of environmental management by industry and infrastructure providers. Buffer areas should be considered as an additional measure to assist in the minimisation of off-site impacts from industry on sensitive and other land uses.

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## Other Users

### Fishing in Cockburn Sound (Source: DoE 2005)

Over 130 species of fish and 14 large crustacean and mollusc species have been found in various habitats in Cockburn Sound (Dybdahl, 1979). The major commercial and recreational species include:

- *Open and deep water* - Snapper, pilchards, bonito, whiting, squid, cuttlefish, butterfish, sampson fish, skipjack and crabs (Penn, 1977).
- *Shallow water with sandy seabed* - Whiting, juvenile king prawns, anchovies, blue sprat, whitebait.
- *Seagrass meadows* - Leatherjackets, wrasse, crabs, herring, garfish.
- *Jetties and groynes* - Herring, yellowtail, scad, trevally, samson fish, mussels.

Considerable overlap of species occurs between the various habitats.

The Sound is an important fish nursery (particularly the sheltered seagrass areas) and feeding habitat for many of the important commercial and recreational species listed above. It is an ecosystem that needs to be protected and carefully managed.

### Commercial Fisheries

There are four commercial fisheries that operate within Cockburn Sound (fisheries block 9600) and a further two commercial fisheries that operate partly within the Sound.

A restricted entry regime was introduced for Cockburn Sound in 1985. Management of major fishing activities is now by way of formal management plans declared in 1995 under the *Fish Resources Management Act 1994*. Minor fishing activities are managed through a combination of regulations (*Fish Resources Management Regulations 1995*); orders under the Act; and conditions attached to fishing boat and commercial fishing licences.

Management is achieved via controls on access (number of fishers, seasons, closed areas), catch size, and type of fishing gear. For example, there is a temporary closure for line fishing for snapper during the spawning season.

Due to increasing levels of competition between commercial and recreational crabbers, a voluntary resource sharing agreement was recently reached by the fishing industry, Recfishwest, and Department of Fisheries (Fisheries WA, 2000b). The agreement will reduce the number of crab traps used by professional fishers from 1,600 to 800 over three years, or will achieve a share of the catch of five-eighths commercial and three-eighths recreational.

### Recreational Fishing

Cockburn Sound is very popular for recreational boat fishing. A 1996/97 survey of coastal waters from Augusta to Kalbarri found that the Sound is second in importance only to the Hillarys area, with over 12 000 boating trips recorded annually.

The main fish species caught in Cockburn Sound by boatbased recreational fishers are: Australian herring (13 tonnes), squid (58,000 animals, weight not known), King George whiting (9 tonnes), whiting other than King George (7 tonnes), skipjack trevally (5 tonnes), tailor (3 tonnes) and garfish (2 tonnes).



Cockburn Sound is also particularly popular with recreational crabbers, who caught an estimated 19 tonnes in 1996/97. The boat-based recreational catch was approximately 5% of the commercial catch for the same period (347 tonnes).

Recreational boat-based fishing effort is fairly widespread throughout the Sound, although fishing for pink snapper tends to occur near the channel markers south of Parmelia Bank, including Woodman Channel, Three Fathom Bank and the main FP entrance channel. Recreational crabbers tend to fish in shallower waters than their commercial counterparts.

### Aquaculture

Aquaculture is the farming of aquatic organisms including fish, molluscs, crustaceans, and aquatic plants, with some sort of intervention to enhance production, such as regular stocking, feeding or protection from predators.

Mussel farming is currently the only aquaculture activity in Cockburn Sound. Mussel production in the Sound commenced in 1988 to overcome the declining catches of the wild capture fishery and to provide a more consistent quality and source of product. Currently mussels are produced annually from two lease areas: Southern Flats and Kwinana Grain Jetty.

### **Commercial Shipping Routes**

Cockburn Sound comprises the main part of the Outer Harbour of the Port of Fremantle, and the navigation channel dredged through Parmelia and Success Banks is the only means of access to Cockburn Sound for larger cargo and naval vessels. There were approximately 967 ship arrivals recorded by Fremantle Ports for Cockburn Sound in 2000, of which 232 were naval vessels.

There are five main commercial shipping jetties within Cockburn Sound: the Alumina Refinery Jetty, the Kwinana Bulk Terminal, the BP Oil Refinery Jetty, the Kwinana Bulk Jetty and the Kwinana Grain Jetty. In the 1999/2000 year, the Fremantle Ports handled a total of 23.4 million tonnes of commodities.

The level of shipping and boat traffic in Cockburn Sound will increase dramatically in future years. The estimated 44 270 recreational boats launched at public ramps each year are predicted to increase by 43% to 63 280 boat launches by 2011. Commercial shipping is increasing at a rate of approximately 5% per year, although this could increase significantly if the proposed James Point Port proceeds.

Within Northern Harbour Jervoise Bay there is potential for conflict between large commercial vessels (up to 100 m in length) which have been constructed, repaired or serviced within the harbour and small recreational boats launched from the boat ramp located in the northwest of the harbour.

A 1999 survey of introduced marine species in Perth's coastal waters found at least 18 exotic species. Of concern, two known marine pests - the European fan worm and the Asian date mussel - were recorded in Cockburn Sound. These two pests are prolific growers and can out-compete native species, affecting biodiversity. However, this does not seem to be occurring in the Sound at present.

The construction of breakwaters for harbour developments can modify coastal processes and may cause direct loss of seagrass meadows and shallow sand habitats.

## Nature-Based Tourism

Cockburn Sound with its easily accessible, sheltered waters, diversity of marine and coastal habitats and close proximity to Perth provides a range of opportunities for people to enjoy the marine environment. The adjacent Regional Parks of Woodman Point, Beeliar and Rockingham Lakes complement this setting by providing a diversity of coastal environs for nature study and appreciation activities, such as bird watching. Each year the area is increasingly attracting local, interstate and international visitors.

Currently the dolphin tours are the only nature-based tourism operator licensed by the Department of Conservation and Land Management, which applies strict conditions regarding the interaction with dolphins. The dolphins in Cockburn Sound have built up a relationship based on trust with the tour operator over the past 14 years, and interact out of curiosity and not as a result of food rewards. The current tour operator in Cockburn Sound has been recognised with both State and National Ecotourism awards.

The operator runs one trip of dolphin watching and swimming with the dolphins per day for nine and half months (spring to autumn), but has the potential to run all year. The tours cover the entire area of the Sound, depending on the location of the dolphins. There are eight groups totalling 180 individuals within Cockburn Sound.



*(Source: Tourism WA website)*

The Department of Fisheries also has initiated a major Charter Fishing and Ecotourism initiative which may result in additional tour operations in Cockburn Sound.