JOHNSON PROPERTY GROUP

TRINITY POINT MARINA PROPOSAL
BERTH DEMAND STUDY

REVISED FINAL

Issue No. 4
NOVEMBER 2008

Patterson Britton
& Partners Pty Ltd
consulting engineers

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EXECUTIVE SUMMARY

Johnson Property Group *(JPG)* have prepared a development proposal for the Trinity Point site near Bluff Point, Morisset Park, Lake Macquarie *(refer **Figure 1**)*. Lake Macquarie is one of Australia's largest coastal saltwater lake, located approximately 20km south of Newcastle and approximately 125km north of Sydney.

The Trinity Point development proposal is currently in a conceptual stage and broadly consists of the following components:

- residential and tourism accommodation;
- a marina with floating pontoon style wet berths and a dry-stack vessel storage;
- a combined marina/tourism village;
- foreshore jetties;
- a marine workshop;
- car parking; and,
- a helipad.

The site is within the Lake Macquarie City Council Local Government Area *(LGA)*, however the proposal is to be assessed under Part 3A of the EP&A Act as a 'major project', and as such will be referred to the Department of Planning *(DoP)* for concept plan approval. The overall tourism project is currently in the conceptual development phase, and has been submitted as a 'concept plan' application under the Part 3A process.

The aim of this study is to assess the current and future demand for marina berths on Lake Macquarie. The main outcomes of the demand study are recommendations for the Trinity Point Marina with regard to:

- the number of marina berths;
- the number of dry-stack storage berths;
- the ratio of sail to power craft; and
- the berth size distribution.

This report will inform the proponents in refining the marina component and will form part of the submission for the application under the Part 3A process.

This report outlines the investigations and findings of the demand study and is structured as follows:

- **Section 1**: Introduction
- **Section 2**: Lake Macquarie Existing Facilities and Surrounds
- **Section 3**: Existing Marina Berth Demand and Historical Trends
- **Section 4**: Future Demand Projections
- **Section 5**: Dry-Stack Storage
- **Section 6**: Other Marina Requirements

- **Section 6**: Other Marina Requirements
- **Section 7**: Summary

Given the limited existing information currently available, the demand for marina berth facilities in Lake Macquarie has been determined from first principles based on statistical data relating to historical and projected future boat ownership and population growth. The raw boating data was sourced from NSW Maritime and BIA and population data was sourced from the Bureau of Statistics. The methodology used in analysing the demand is discussed in further detail in **Sections 3** and **4**.

The demand study has looked at a number of scenarios to predict the existing and future berth demand on Lake Macquarie. Based on the range of values determined (*refer* ***Table 4.8***) , the adopted berth demand for 2006 and 2011 is 200 and 280 respectively. The number of berths therefore recommended for the Trinity Point Marina is 200 to 250 with provision for future expansion to 300 berths by say 2016 if this demand is evident.

The proposed berth size distribution for the Trinity Point Marina is as follows:

Berth Size	% Size Distribution
8m	*6%*
10m	*9%*
12m	*40%*
14m	*35%*
16m	*7%*
18m	*2%*
20m	*1%*
Total	***100%***

The recommended power to sail vessel ratio for the Trinity Point Marina is 60:40.

The recommended dry stack storage capacity for Trinity Point Marina is 100 vessels initially with a view to expanding to 200 vessels within 5 years.

It is noted that this demand study has been developed in a methodical and robust manner adopting conservatism throughout. One of the main conservatisms is the fact that the demand from the Sydney market has not been quantitatively accounted for due to the complexities of this aspect of demand.

1 INTRODUCTION

1.1 BACKGROUND

Johnson Property Group *(JPG)* have prepared a development proposal for the Trinity Point site near Bluff Point, Morisset Park, Lake Macquarie *(refer **Figure 1**)*. Lake Macquarie is one of Australia's largest coastal saltwater lake, located approximately 20km south of Newcastle and approximately 125km north of Sydney.

The Trinity Point development proposal is currently in a conceptual stage and broadly consists of the following components:

- residential and tourism accommodation;
- a marina with floating pontoon style wet berths and a dry-stack vessel storage;
- a combined marina/tourism village;
- foreshore jetties;
- a marine workshop;
- car parking; and,
- a helipad.

The site is within the Lake Macquarie City Council Local Government Area *(LGA)*, however the proposal is to be assessed under Part 3A of the EP&A Act as a 'major project', and as such will be referred to the Department of Planning *(DoP)* for concept plan approval. The overall tourism project is currently in the conceptual development phase, and has been submitted as a 'concept plan' application under the Part 3A process.

1.2 PURPOSE OF THIS INVESTIGATION

The aim of this study is to assess the current and future demand for marina berths on Lake Macquarie. The main outcomes of the demand study are recommendations for the Trinity Point Marina with regard to:

- the number of marina berths;
- the number of dry-stack storage berths;
- the ratio of sail to power craft; and
- the berth size distribution.

This report will inform the proponents in refining the marina component and will form part of the submission for the application under the Part 3A process.

1.3 STRUCTURE OF THIS REPORT

This report outlines the investigations and findings of the demand study and is structured as follows:

- **Executive Summary**
- **Section 1**: Introduction - including background, purpose of this report, structure of this report and relevant previous investigations.
- **Section 2**: Lake Macquarie Existing Facilities and Surrounds – outlining existing marina, swing mooring and dry storage facilities on the lake, and providing a geographical context of Lake Macquarie relative to other nearby waterways.
- **Section 3**: Existing Marina Berth Demand and Historical Trends – outlining various statistical data illustrating the existing marina berth demand and how this has varied historically. Existing and historical trends in berth size distribution and power and sail vessel mix ratios are also discussed.
- **Section 4**: Future Demand Projections – on the basis of the existing demand established in the previous section and future population projections, estimates of future demand are made. Berth size distribution projections and the ratio of sail to power craft are also made.
- **Section 5**: Dry-Stack Storage – providing an overview of international and local trends in dry-stack storage, and estimating current and future demand for Lake Macquarie.
- **Section 6**: Other Marina Requirements – outlining the associated facilities that would be required or desirable in development of the Trinity Point Marina.
- **Section 7**: Summary – providing a summary of the findings of the demand study.

1.4 PREVIOUS INVESTIGATIONS AND AVAILABLE DATA

There is limited existing information currently available regarding the demand for marina berth facilities in the Lake Macquarie, Hunter or Central Coast regions.

Demand for marinas on the NSW, Central and Hunter coasts has been considered to varying degrees or referred to in previous studies as follows:

- *Lake Macquarie Marina Sites Study* – Public Works Department *(September 1986)*
- *Shell Cove Boatharbour Marina* – Australian Marina Management Pty Ltd *(2004)*
- *Ulladulla Boat Harbour Project* – Australian Marina Management Pty Ltd *(2006)*
- *Recreational Boating Demand Study* – Public Works *(Horwarth & Horwarth 1986)*
- *Lake Macquarie Mooring Management Plan* – NSW Waterways Authority *(2003)*
- *Trinity Point Marina and Jetties, Coastal Processes Study* – Patterson Britton *(2007)*

Survey data from the Boating Industry Association *(BIA)* was also used in this investigation. This included anecdotal evidence of a 'Demand Study' having been undertaken for Marmong Point Marina to accompany a planned expansion of facilities, however that document was not available for this investigation.

Given the limited existing information currently available, the demand for marina berth facilities in Lake Macquarie needs to be determined from first principles based on statistical data relating to historical and projected future boat ownership and population growth. The raw boating data is sourced from NSW Maritime and BIA and population data is sourced from the Bureau of Statistics. The methodology used in analysing the demand is discussed in further detail in **Sections 3** and **4**.

2 LAKE MACQUARIE EXISTING FACILITIES AND SURROUNDS

The following section provides a general description of Lake Macquarie and the surrounding waterways, and an overview of the existing berthing and mooring facilities within the lake. This provides the physical and commercial context in which the Trinity Point Marina would be positioned.

2.1 LAKE MACQUARIE – GENERAL DESCRIPTION AND CONTEXT TO OTHER WATERWAYS

2.1.1 Lake Macquarie

Lake Macquarie is one of Australia's largest coastal saltwater lakes, located approximately 20km south of Newcastle. The Lake extends about 22 kilometres from Cockle Bay in the north to Chain Valley Bay in the south, with a maximum width of about 10 kilometres. The lake is connected to the ocean through a narrow entrance channel located approximately midway along the lake extent at Swansea. A low level bridge with an opening double lifting span crosses Swansea Channel.

The lake has an average depth of around 8m. The entrance at Swansea has a minimum depth of approximately 2m. The lake is a major resource for water based recreation in the Lower Hunter region, as well as catering for a large influx of holiday makers particularly during the summer season. The Lake is also becoming a very popular 'sea change' retirement destination for people from Sydney.

Some of Lake Macquarie's features include the following:

- relatively non-tidal, flat waters virtually year round;
- 170km of foreshore;
- four times the size of Sydney Harbour;
- no commercial shipping or fishing;
- popular for yacht racing and regattas; and
- there is ocean access from the lake for vessels drawing up to around 2 metres, due to depth limitations within Swansea Channel. This matter is discussed in detail in the *Coastal Processes Study (PatBrit 2007)* and is also discussed further in **Section 4.3** of this report. Limited navigability of Swansea Channel has resulted in limited access for larger boats into and out of Lake Macquarie, discouraging large boat owners requiring off-shore access.

The large size of Lake Macquarie means it can be frequented by boat users from a large catchment area. Within this catchment are the population centres of Newcastle, the Lake Macquarie region itself, the towns and cities of the Hunter Valley *(in particular, those within the Lower Hunter Local Government Area's),* and the Central Coast. Excluded are the Broken Bay, Hawkesbury and Pittwater areas which primarily service Northern Sydney

areas and are considered too far from Lake Macquarie to affect berth demand. This was verified by anecdotal evidence in a recent survey undertaken for the Boating Industry Association which suggested a small percentage of vessels at marinas are from the Hunter Region, Sydney, and Newcastle, but in most cases the majority of vessels using the marinas were from local suburbs of Lake Macquarie.

The population centres within the catchment of Lake Macquarie are also able to utilise a variety of alternative waterways, including Port Stephens and Newcastle Harbour to the north, and the Tuggerah Lake System and Brisbane Water Systems to the south. The following sections provide an overview of these alternative boating destinations, as well comparing the context of Lake Macquarie to the wider region.

2.1.2 Newcastle Harbour

Newcastle Harbour is located at the mouth of the Hunter River *(refer **Figure 1**)*. It is dominated by commercial shipping including significant coal export facilities. Newcastle Harbour does not have a large expanse of open water for sailing or recreational boating activities, however it does have easy access to off-shore sailing.

One marina *(Newcastle Cruising Yacht Club)* is located within the harbour, and generally services the demand for off-shore sailing and cruising boats as well as commercial fishing. There are few swing moorings within the harbour. In general, Newcastle Harbour differs to Lake Macquarie since it has limited public recreational facilities *(such as jetties)*, and limited calm water recreational boating opportunities.

2.1.3 Port Stephens

Port Stephens is located north of both Lake Macquarie and Newcastle Harbour and is a major boating destination and tourist venue *(refer Figure 1)*. It is characterised by deep open water access and has large numbers of power vessels for off-shore game fishing, tourism *(whale watching / dolphin cruises)* and commercial fishing. Port Stephens is the premium game fishing port for the state of NSW and stages the annual NSW inter-club game fishing tournament in which over 240 boats compete.

Port Stephens has four major marinas, which currently experience an occupancy rate of 100% over the Christmas / new year holiday period. The Soldiers Point marina has recently increased its number of berths by 30 spaces and still reports 100% occupancy in 2006/07 holiday season. The largest marina in Port Stephens is D'Albora Marina at Nelson Bay. This marina has commenced an expansion due to strong ongoing demand from boat owners around NSW. In particular, the expansion has been designed to cater for larger vessels, which are suffering an acute short supply of berths across NSW waterways. The expansion adds 32 berths with sizes ranging from 12 to 35 metres. The average length of the new berths will be 17.6 metres, a 43% increase on the average size of existing 164 berths with an average berth size of 12.3 metres and a maximum size of 30 metres. The project takes the total number of berths to 196.

2.1.4 Tuggerah Lake System

The Tuggerah Lake system is located south of Lake Macquarie near the population centres of Wyong and The Entrance, with many smaller population centres surrounding this lake system *(refer **Figure 1**)*. The Tuggerah Lake system differs from Lake Macquarie in that it is very shallow with no ocean access. It is primarily used for smaller recreational craft which are either privately moored or launched at boat ramps. There are no significant marinas in the Tuggerah Lake system. The Wyong and The Entrance population can therefore generally only use the Tuggerah Lake system for trailer boat fishing.

Given the depth restrictions of the Tuggerah Lake system, those within the population surrounding the lake wishing to own larger power or sailing vessels or ocean-going vessels, would be required to moor or berth within Lake Macquarie to the north or the Brisbane Water systems to the south.

2.1.5 Brisbane Water System

The Brisbane Water system is located south of both the Tuggerah Lake system and Lake Macquarie *(refer **Figure 1**)*. It is located near the larger population centres of Gosford and Woy Woy as well as many smaller population centres surrounding the waterway.

Brisbane Waters shares some similar features to Lake Macquarie in that it has ocean access that can be difficult to navigate *(due to fast moving tides through a narrow access)*. It is significantly smaller than Lake Macquarie, however has access to the Hawkesbury River system to the south. As such, it is expected that more power than sailing vessels would use Brisbane Waters compared to Lake Macquarie. There are four marinas in the Brisbane Water system, and the combined Gosford and Wyong population is similar to that of the combined Newcastle and Lake Macquarie areas.

2.2 EXISTING LAKE MACQUARIE BERTHING AND MOORING FACILITIES

2.2.1 Marinas

There are six marinas located on Lake Macquarie with permanent berthing and mooring facilities *(refer **Figure 2**)*. These include:

- *Royal Motor Yacht Club (RMYC)*, Toronto (*refer **Photos 1** and **2***). Facilities include 51 berths and 10 swing moorings. Presently, the club offers limited ancillary boating services, with boat repairs by contract only. Anecdotally, the club is looking to expand its number of berths by around 20 in around 5 years, however details of this are not clear. The club reportedly has a waiting list of around 4 vessels, typically 9 to 12m in length.

Photo 1 – RMYC, Toronto

Photo 2 – RMYC, Toronto

- *Marmong Point Marina,* Marmong Point (*refer **Photo 3***). Facilities include 160 berths, 13 swing moorings and up to 50 dry storage places. Marmong Point Marina is the largest marina on Lake Macquarie and offers extensive detailing and repair facilities, slipway, travel lift and fuel facilities. The marina is presently seeking by way of a Part 3A application to increase its number of wet berths by 80 and covered stack storages by 60 places. It is understood this would be a staged release of berths over five to eight years. Anecdotally, the marina's policy of requesting a financial deposit for those on waiting lists has resulted in the waiting lists disappearing.

Photo 3 – Marmong Point Marina, Marmong Point

- *Wyee Point Marina,* Wyee Point (*refer **Photo 4***). Facilities include 36 berths, 4 swing moorings and up to 10 dry storage places. Presently, the club offers little in ancillary boating services. Anecdotally, the marina is seeking approval to increase the total number of wet berths to around 50.

Photo 4 – Wyee Point Marina, Wyee Point

- *Pelican Marina,* Pelican (*refer **Photo 5***). Facilities include 17 wet berths only. A number of the berths are occupied by patrons with units in the Pelican Marina complex. Anecdotally, space and draught limitations *(near the bank)* are known to have discouraged waiting lists, however expansion to the north may be pursued *(although no plans at this stage)* to accommodate an additional five or six larger vessels.

Photo 5 – Pelican Marina, Pelican

- *Lake Macquarie Yacht Club (LMYC),* Belmont (*refer **Photos 6** and **7***). Facilities include 76 berths, 18 swing moorings and up to 21 dry storage places. Presently, the club offers some repair facilities plus slipway and hard stand crane. Anecdotally, the club is looking to expand its number of berths by around 28, however details of this are not clear. The club reportedly has a waiting list of around 27 vessels *(14 yachts, 13 power)*.

Photo 6 – LMYC, Belmont

Photo 7 – LMYC, Belmont

- *Marks Point Marina,* Marks Point (*refer **Photo 8***). Facilities include 62 berths and 26 swing moorings. Marks Point Marina offers extensive repair facilities, slipway and fuel facilities. The marina has no known planned extensions at this time, and has a waiting list of around 13 vessels, ranging in size from 6m to 15m in length.

Photo 8 – Marks Point Marina, Marks Point

All marinas have guest amenities / bathrooms, and power and water to the berths. Only Pelican Marina offers sewage pump-out facilities. Further details of existing marina facilities within Lake Macquarie are provided in **Appendix A**.

2.2.2 Moorings

Details of moorings within Lake Macquarie may be found in the Lake Macquarie Mooring Management Plan *(2003)*. At the time of publication, it was reported that there were 2175 swing moorings located at 42 sites within the Lake. More recent information provided by NSW Maritime from January 2007 indicates there are around 2357 private moorings and

240 commercial moorings. Six sites were reported as having priority waiting lists, whereby demand exceeded supply. **Appendix B** contains an extract from this document and shows the locations of swing moorings around Lake Macquarie.

In the vicinity of the proposed Trinity Point Marina project, the following commentary from the Lake Macquarie Mooring Management Plan *(2003)* is provided:

- ***Wyee Bay*** – extends northward to Bluff Point, and the area referred to as Morisset Park. It is identified as an area of extensive skiing and aquaplaning, holiday-maker and houseboat usage. Presently, this area has a number of small groups of moorings, and has been identified as an area to be maintained without moorings for its environmental and scenic value.

- ***Bardens Bay*** – extends north from Bluff Point to Brightwaters Point. It is identified as a fishing area with skiing and aquaplaning activities. At the time of publication (2003), a small group of moorings was to be permitted on the southern side of the bay where the Trinity Point marina is proposed, with the majority on the western and northern shores, permissible as the area is mostly private waterfront properties.

The Lake Macquarie Mooring Management Plan also reports that given the significant boating population that lives within the vicinity of the lake, the demand for moorings is high. The document reports an 11% growth in the demand for moorings over the ten year period preceding 2003.

Growth in the number of swing moorings has exceeded 2.5% per annum since 2003. Future growth in the number of swing moorings on Lake Macquarie is therefore likely to continue. Some mooring areas are now closed with no further applications accepted, or new moorings only available to owners of absolute waterfront properties. It is therefore likely that saturation point will be reached at some point, as progressively individual mooring areas reach their limits and are closed. As this occurs, there will be an increased demand for marinas. This is because marinas are considerably more efficient at boat storage and take up a far smaller area than swing moorings.

2.2.3 Dry Storage

Dry storage around Lake Macquarie is limited. Presently, dry storage is limited to smaller craft (*such as dinghy's or small sailing classes)*. Some dry storage is available at the major marinas identified in **Section 2.2.1**. **Appendix A** provides survey information on the number of storage places currently available, which total approximately 81 hard stand positions.

At present there is no 'dry-stack' (rack and stack) vessel storage facility around Lake Macquarie.

2.2.4 Other Maritime Facilities

In addition to permanent marinas and swing moorings, Lake Macquarie has a limited number of private jetties, and around 29 public jetties. Some of the public jetties have sewage pump-out facilities. There are also numerous boat ramps for launching trailer craft.

Other marinas of less significance with only temporary berthing facilities include:

- Lifestyle Marine, Toronto – with approximately 24 berths. These berths are not available to public, although customers are able to rent berths for a short period after purchase of a new vessel from Lifestyle Marine, until alternative arrangements are made; and
- Wangi RSL and Wangi Workers Club – both with temporary overnight berthing facilities, but no long term berthing available.

As such, these 'other' facilities have not been included in the berth assessments.

3 EXISTING MARINA BERTH DEMAND AND HISTORICAL TRENDS

This section outlines the existing and historical marina berth demand in Lake Macquarie through discussion of the following statistical data:

- Lake Macquarie – Existing Berthing and Mooring Facilities
- Vessel Registrations and Berth Size Trends in Lake Macquarie and NSW
- Growth in Swing Moorings – NSW, Hunter Region and Lake Macquarie
- Growth in Boat Licences in the Hunter Region, Lake Macquarie and NSW
- Berth Demand per head of population in the Hunter Region, Lake Macquarie and NSW
- Comparative Regional Berth Demand - Brisbane Waters and Port Stephens
- Existing Vessel Mix – Power and Sail
- Existing Population Statistics

For each category, trends in demand for berths within Lake Macquarie, the Hunter Region and NSW are provided based on the statistical or survey information obtained. This information is used in **Section 4**, along with population statistics to determine future demand projections for marina berths within Lake Macquarie, in particular, for the Trinity Point Marina project.

3.1 LAKE MACQUARIE – EXISTING BERTHING AND MOORING FACILITIES

Section 2.2 outlined the existing marina and swing mooring facilities within Lake Macquarie. The total facilities currently available within Lake Macquarie are summarised below:

- Wet berths 402
- Hard stand storage 81
- Dry-stack storage 0*
- Average Occupancy 95%
- Swing moorings at marinas 71
- Total private swing moorings *(Jan 2007)* 2357
- Anecdotal no. proposed berth expansions 142
- Anecdotal marina berth waiting lists 44
- Swing mooring waiting list 27

*

The *Lake Macquarie Marina Sites Study* – Public Works Department *(September 1986)* indicated that in 1986, approximately 270 wet berths and 140 dry berths were available, distributed across four commercial and four club marinas. Occupancy levels were reported to be between 95% and 100%. The number of wet marina berths has therefore grown by an average of 2% per annum over the past 20 years.

Although there is currently a total of approximately 80 dry storage berths within Lake Macquarie, these are not dry-stack (*rack and stack*) vessel storage facilities and are generally limited to small class sailing vessels.

3.2 VESSEL REGISTRATIONS AND BERTH SIZE TRENDS

3.2.1 Lake Macquarie

The following data has been extracted from NSW Maritime data and shows recreational vessel registrations by size distribution for the Lake Macquarie and Newcastle Local Government Areas *(LGA's)* for the period 2003 to 2006.

Table 3-1 – Lake Macquarie and Newcastle LGA's Recreational Vessel Registrations by Size Distribution, 2003 to 2006

Vessel Sizes	2003		2005		2006	
	No.	% of Total	No.	% of Total	No.	% of Total
< 3m	388	2.37	406	2.28	415	2.25
3 - 3.99m	4,395	26.90	4,582	25.71	4,689	25.46
4 - 4.99m	6,136	37.55	6,530	36.64	6,785	36.84
5 - 5.99m	3,103	18.99	3,382	18.97	3,488	18.94
6 - 7.99m	1,326	8.11	1,624	9.11	1,681	9.13
8 - 9.99m	587	3.59	715	4.01	719	3.90
10 - 11.99m	297	1.82	412	2.31	439	2.38
12 - 13.99m	72	0.44	124	0.70	147	0.80
14 - 15.99m	25	0.15	30	0.17	33	0.18
16 - 17.99m	9	0.06	14	0.08	16	0.09
18 - 19.99m	1	0.01	4	0.02	4	0.02
20m & >	1	0.01	0	0.00	1	0.01
	16,340	100.00	17,823	100.00	18,417	100.00

Source: NSW Maritime

Table 3-1 shows that the proportion of boats larger than 8m registered in the Lake Macquarie and Newcastle Regions has increased from 6.08 % to 7.38% since 2003, and the proportion of boats larger than 12m has increased from 0.67% to 1.1%, indicating a trend towards ownership of larger vessels. This trend is also evidenced at the upper end of the berth size spectrum by the increase in vessels between 18m and 20m from 1 in 2003 to 4 in 2006.

It is noted that registered vessels in the Newcastle LGA accounted for approximately 12.7% of the total number of registered vessels for all three years, with the vast majority *(87.3%)* coming from the Lake Macquarie LGA.

Anecdotal survey data from the existing Lake Macquarie marinas indicated that waiting lists and berth demand was strongest for larger vessels, however little capacity existed to berth vessels in excess of 14m in length.

3.2.2 NSW – Vessel Registrations and Berth Size Trends

Comparative data is provided below for NSW for 1983 to 2006. This data has also been extracted from NSW Maritime data.

Table 3-2 – NSW Recreational Vessel Registrations by Size Distribution, 1983 to 2006

Vessel Sizes	NSW 1983		NSW 2003		NSW 2006	
	No.	% of Total	No.	% of Total	No.	% of Total
0 - 3.99m	25,636	27.27	65,688	34.38	64,045	30.58
4 - 5.99m	63,760	67.84	100,863	52.79	115,032	54.94
6 - 7.99m	3,321	3.53	13,006	6.81	16,832	8.04
8 - 9.99m	663	0.71	5,476	2.86	6,151	2.94
10 - 11.99m	365	0.39	3,657	1.91	4,227	2.01
12 - 13.99m	137	0.15	1,530	0.80	1,899	0.91
14 - 15.99m	62	0.07	556	0.29	744	0.36
16 - 17.99m	29	0.03	177	0.09	240	0.12
18 - 19.99m	14	0.01	84	0.04	123	0.06
20m & >	5	0.00	52	0.03	89	0.04
	93,992	100.00	191,089	100.00	209,382	100.00

Source: NSW Maritime

Table 3-2 shows that the proportion of boats larger than 8m registered in NSW has increased from 1.36% in 1983 to 6.02 % in 2003 and to 6.44% in 2006 for the entire state. This shows a significant state-wide trend towards ownership of larger vessels.

In the period between 1983 and 2003, the increase in vessels less than 8.0 m was 86,460 units, or 93.7%, whilst vessels greater than 8.0 m increased by 10,257 units, or 804.5%. Similarly, in the period between 2003 and 2006, the increase in vessels less than 8.0 m was 16,352 units, or 9.1%, whilst vessels greater than 8.0 m increased by 1,941 units, or 16.8%. These statistics evidence a state-wide trend towards ownership of larger vessel sizes. The slowing in growth in larger vessels may be attributable to the lack of appropriate berthing facilities to cater for these larger vessels.

Comparison of **Table 3-1** and **Table 3-2** shows that there is a strong demand for vessels over 8m within the Lake Macquarie and Newcastle regions, with registrations slightly exceeding NSW registrations for vessels of similar size. However for larger vessels, the Lake Macquarie and Newcastle regions are below the stage average, with 0.30% of vessels greater than 14m compared to 0.58% for the entire state during 2006. This may be attributable to the lack of facilities to berth larger vessels, as well as the restriction at Swansea Channel to off-shore access for larger boats.

3.2.3 NSW and Lake Macquarie – Growth in Vessel Registrations

Statistics sourced from NSW Maritime *(previously NSW Waterways Authority)* show the following patterns of growth in recreational vessel registrations for the State including personal watercraft *(PWCs)*.

Individual statistics for the Lake Macquarie and Newcastle LGAs are not available for all the periods shown. The wider Hunter Region is shown for comparison.

Table 3-3 – NSW and Lake Macquarie Recreational Vessel Registration

Year	Total NSW	*Total NSW growth (%) p.a.*	Lake Macquarie / Newcastle	Hunter Region
1995/96	154,450			
1996/97	157,000	*1.65%*		
1997/98	161,000	*2.55%*		
1998/99	164,500	*2.17%*		
1999/2000	170,000	*3.24%*		
2000/01	179,800	*5.76%*		
2001/02	184,200	*2.45%*		
2002/03	191,089	*3.74%*	16,340	
2003/04	196,234	*2.69%*		45,510
2004/05	203,258	*3.58%*	17,823	47,572
2005/06	209,382	*3.01%*	18,417	49,576
Growth Per Annum	*1996 - 2006*	*3.1%*		
	2003 - 2006	*3.1%*	*4.0%*	
	2004 - 2006	*3.3%*		*4.37%*

In the 10 years from 1996 to 2006 NSW recreational vessel registrations have shown an average annual growth[1] of some 3.1% evidencing the State's long term growth in demand for boat ownership.

For the two-year period 2004-2006 the overall NSW State growth in boat ownership has been 3.3% per annum. By comparison the Hunter Region has had an average per annum growth of 4.37% over the same two years. Growth in the Lake Macquarie and Newcastle LGAs has averaged 4.0% per annum for the three years from 2003 evidencing a growth above the State average but marginally lower than the Hunter Region as a whole.

3.3 GROWTH IN SWING MOORINGS – NSW, HUNTER REGION AND LAKE MACQUARIE

The following statistics from NSW Maritime are presented to show the growth in demand for swing moorings in the State of NSW and in the Hunter Region.

[1] Average annual growth is determined using simple interest principles i.e. dividing the total % increase by the number of years over which the change has occurred.

Table 3-4 – Growth in NSW and Hunter Region Vessel Moorings

Year	Total NSW - Private	Total NSW - Commercial	Hunter Region - Private	Hunter Region - Commercial
1995/96	13,700	4,100		
1996/97	13,650	4,200		
1997/98	13,650	4,400		
1998/99	13,600	4,600		
1999/2000	13,900	4,500		
2000/01	13,900	4,500		
2001/02	14,150	4,400		
2002/03	14,200	4,400		
2003/04	15,000	4,500	3,020	209
2004/05	15,250	4,550	3,104	203
2005/06	15,450	4,700	3,186	207
Average Growth Per Annum	*1.21%*	*1.38%*	*2.71%*	*-0.48%*

NSW Maritime have advised that total mooring sites in the State have remained relatively stable. This is partially due to restrictive policy in some areas and also in some areas due to increased berthing and modernisation of marinas. Hunter Region commercial swing moorings have also remained constant *(a reduction of only 2 over the 2 year period)*.

Of the total increase in private moorings in NSW during 2005/06 *(200 moorings)*, the Hunter Region represents 41% of this increase. The growth in demand for moorings in the Hunter Region is amongst the highest in NSW.

The *Lake Macquarie Marina Sites Study* – Public Works Department *(September 1986)* reported that in 1986 there were 1676 private swing moorings in Lake Macquarie. The total number of private swing moorings in 2006 was approximately 2300. The number of swing moorings has therefore grown by an average of 1.6% per annum over the past 20 years *(excluding commercial moorings)*. The *Lake Macquarie Mooring Management Plan (2003)* reported an 11% growth in the demand for moorings within Lake Macquarie over the ten year period preceding 2003, which represents a similar but slightly reduced annual growth rate. Growth in the number of swing moorings has exceeded 2.5% per annum since 2003. Future growth in the number of swing moorings on Lake Macquarie is therefore likely to continue. Some mooring areas are now closed with no further applications accepted, or new moorings only available to owners of absolute waterfront properties. It is therefore likely that full capacity will be reached at some point, as progressively individual mooring areas reach their limits and are closed. As this occurs, there will be an increased demand for marinas. This is because marinas are considerably more efficient at boat storage and take up a far smaller area than swing moorings.

3.4 GROWTH IN BOAT LICENCES

3.4.1 NSW

Statistics from NSW Maritime, as set out below, show the trends in demand for recreational boat licences in NSW. The figures shown from 1996 to 2002 include licences issued to Victorian residents. In 2002, the State of Victoria introduced compulsory recreational boat licensing which brought about a progressive reduction in the number of NSW recreational licences issued to Victorian residents. The following summary also shows the growth in NSW recreational boat licences from 2002 to 2006 after adjustment for the number of licences issued to Victorian residents.

Table 3-5 – NSW Growth in Boat Licences

Year	NSW Total Licenses	*Growth per Annum*	Victorian Residents	NSW Licences	*NSW Growth per Annum*
1995/96	321,500				
1996/97	349,000	*8.55%*			
1997/98	355,000	*1.72%*			
1998/99	372,000	*4.79%*			
1999/2000	405,000	*8.87%*			
2000/2001	422,800	*4.40%*			
2001/2002	445,250	*5.31%*	66,000*	379,250	
2002/2003			57,804	391,745	*3.29%*
2003/2004			44,740	402,133	*2.65%*
2004/2005			26,095	415,624	*3.35%*
2005/2006			17,304	427,854	*2.94%*

**Estimated at 30/06/02*

Annual growth in licences for the 6 years to June 2002 for NSW *(including Victorian residents)* was 5.6%. The average growth rate in boat licences in NSW *(excluding Victorian residents)* since 2002, has been consistently around 3% per annum underlining the continuing demand for recreational boating activity.

The ratio of NSW boat registrations per 1,000 boat licences is provided in the following table:

Table 3-6 – NSW Ratio of Boat Registrations per 1,000 Boat Licences

Year	Registrations	Licences	Registered vessels per 1,000 Licences
1995/96	154,450	321,500	480.40
2001/2002	184,200	379,250	485.70
2004/2005	203,258	415,624	489.04
2005/2006	209,382	427,854	489.38

The ratio of boat registrations per 1,000 boat licences in NSW has shown positive growth for the past eleven years evidencing the continuing demand for ownership of recreational vessels.

3.4.2 Hunter Region

Regional demand for boat licences is shown from statistical data from NSW Maritime as set out below. Boat licence statistics for the Lake Macquarie and Newcastle LGAs were not available.

Table 3-7 – Hunter Region Growth in Boat Licences

Year	Hunter Region Licenses	*Growth per Annum*
2003/2004	93,360	
2004/2005	96,450	*3.31%*
2005/2006	99,572	*3.24%*

Comparison of **Table 3-5** and **Table 3-7** indicates that the annual percentage growth in demand for recreational boat licences in the Hunter Region has been approximately the same as the average annual growth for the State since 2004.

The ratio of Hunter Region boat registrations per 1,000 boat licences is provided in the following table:

Table 3-8 – Hunter Region Ratio of Boat Registrations per 1,000 Boat Licences

Year	Registrations	Licences	Registered Vessels per 1,000 Licences
2003/2004	45,510	93,360	487.47
2004/2005	47,572	96,450	493.23
2005/2006	49,576	99,572	497.89

Table 3-8 shows positive growth in the demand for ownership of recreational vessels in the Hunter Region, based upon vessel registrations per 1,000 licences. Comparison to **Table 3-6** shows that the positive annual growth in the Hunter Region is slightly above the State annual growth rate.

3.5 BERTH DEMAND PER HEAD OF POPULATION

3.5.1 Hunter Region

The Recreational Boating Demand Study *(Horwarth & Horwarth 1986)* showed that in 1985, the Mid North Coast Region, which included The Hunter and Great Lakes regions, had an existing marina demand of 0.64 marina berths per 1,000 head of population.

A study conducted in 1991 by NSW Government Property Services Group showed that the Hunter Region had a supply of 519 marina berths with an average annual occupancy of 74.5%, equating to a demand of 387 berths.

In 1996, a survey by Australian Marina Management Pty Ltd showed that the Hunter Region had increased its supply of marina berths to 673, with an average annual occupancy of 90%, equating to a demand of 607 berths. An update of this survey in 2003 showed that the Region had increased its berth supply to 790 berths with an average annual occupancy of 89%, equating to a demand of 700 berths.

The survey has been updated again in June 2005 and June 2006 and the following summary shows both the supply and demand for marina berths per 1,000 population in the Hunter Region from 1991 to 2006:

Table 3-9 – Hunter Region Growth in Berth Demand per Head of Population

Year	Regional Population	No. Berths Available	Supply per 1,000 Population	No. Berths occupied	Demand per 1,000 Population
1991	513,700	519	1.01	387	0.75
1996	540,500	673	1.25	607	1.12
2003	596,700	790	1.32	700	1.17
2005	604,700	890	1.47	790	1.31
2006	612,300	940	1.54	865	1.41

Since the 1986 study, the demand ratio for marina berths in the Hunter Region has progressively risen from 0.64 berths per 1,000 of population in 1985 to a demand of 1.41 berths per 1,000 of population in 2006.

Table 3-9 shows the berth demand per 1,000 population has increased from 0.75 to 1.41, at an average annual rate of around 0.04 berths per 1,000 population, over the past 15 years. The growth rate in the past 12 months is much greater, at 0.11 berths per 1,000 population.

The annual growth of population in the coastal centres within the Hunter Region has substantially exceeded the average growth for the total Hunter Region. This has driven the increased demand for boating access and facilities including marina berths. Demand has also been driven by a more affluent society requiring improved and modern marina facilities for the storage of larger vessels.

Since 1986, the introduction of new modern marina berth facilities and associated amenities has permitted some of the latent demand for larger boat ownership in the Hunter Region to be released. This has generally occurred in Port Stephens, where during the summer holiday and the game fishing seasons, marinas are fully occupied with the demand for berthing exceeding the available supply.

In contrast to the growth in marina berths in Port Stephens and Newcastle Harbour, there has been almost no growth in marina berth infrastructure in Lake Macquarie with surveys showing that most marinas in Lake Macquarie had 'waiting lists'. Many also have plans for expansion *(refer **Section 2.2.1**)*. As a result, there is likely to be a strong latent demand for modern marina berthing in Lake Macquarie.

3.5.2 Comparative Assessment of Lake Macquarie and Hunter Region

Using the data reported in the *Lake Macquarie Marina Sites Study (PWD 1986)* the approximate berth demand per 1,000 population within Lake Macquarie can be estimated *(270 berths at 95% occupancy for a population of 164,900)* as 1.56 berths per 1,000 population for Lake Macquarie LGA only. Whilst no data is available for the Hunter Region in 1986, the 1986 Lake Macquarie berth demand rate of 1.56 is considerably

greater than the 1991 Hunter Region berth demand rate of 0.75 reported in the previous section.

More recent 2006 survey data contained in **Appendix A** *(and as outlined in **Section 2.2.1**)* shows an average occupancy of 95% of the 483 available berths *(including hardstand)* within Lake Macquarie. Applying this information to the population data in the following **Section 3.5.3** *(refer **Table 3-10**)*, indicates a 2006 demand rate for Lake Macquarie LGA of 2.38 berths per 1,000 population, which is significantly greater than the berth demand ratio of the Hunter Region of 1.41 reported in the previous section.

The berth demand ratio per head of population for Lake Macquarie therefore exceeds the Hunter Region berth demand ratio by around 0.8 berths per 1,000 population for the 1986 and 2006 statistics. As noted in **Section 3.1**, recent survey information suggested the majority of vessels using the marinas were from local suburbs of Lake Macquarie.

3.5.3 Comparative Assessment of Hunter Region and NSW – 2006

The following summary shows a comparative ratio of the demand for boat ownership per 1,000 of population in various local regions as well as NSW as at June 2006:

Table 3-10 – Regional and NSW Comparative Vessel Registrations per 1,000 head of Population, 2006

Year	Lake Macquarie and Newcastle LGA's	Lake Macquarie LGA	Port Stephens LGA	Hunter Region (including Wyong LGA)	Total NSW State
Regional Population	338,500	192,250	63,970	762,740	6,868,900
Registered Vessels	18,417	16,073	3,870	49,576	209,382
Vessels per 1000 Population	54.40	83.60	60.49	65.00	30.48

Population Source: Planning NSW – NSW Population Forecasts – 2004 Release
Vessel Registrations: NSW Maritime
NSW Maritime vessel registration data for the Hunter Region includes Wyong LGA data.

The Lake Macquarie and Newcastle LGAs, with ownership of 54.4 vessels per 1,000 of population, show similar demand to Port Stephens, which is considerably higher than the NSW average of 30.48 vessels per 1,000 of population.

The statistics for Lake Macquarie LGA reveal an even stronger demand for recreational boating when separated from the Newcastle LGA data, with ownership of 83.6 vessels per 1,000 of population. Significantly, this is 29% greater than the boat ownership of 65.0 vessels per 1,000 of population for the Hunter Region. This is consistent with the berth demand ratio per head of population of Lake Macquarie exceeding that of the Hunter Region, as outlined in **Section 3.5.2**.

3.6 COMPARATIVE REGIONAL BERTH DEMAND

3.6.1 Brisbane Waters

Located south of Lake Macquarie, Brisbane Waters displays similar characteristics to Lake Macquarie as discussed in **Section 2.1.5** *(refer **Figure 1**)*. The following table shows the existing marina berth facilities on Brisbane Waters. It is noted that these facilities are all older style fixed marinas.

Table 3-11 – Brisbane Waters Marina Facilities

Marina	Location	No. Berths	Occupancy
Booker Bay Marina	Booker Bay	26	*100%*
Machans Marina	Booker Bay	22	*100%*
Empire Bay Marina	Empire Bay	8	*100%*
Killcare Marina	Killcare	22	*100%*
Total		**78**	

There is a total of 1,287 private, and 67 commercial swing moorings within the Brisbane Water System *(excluding the Tuggerah Lake System)*, giving a total on-water boat storage *(excluding private jetties)* of 1,432. The catchment area providing demand for these facilities is the Gosford and Wyong LGA's.

Populations for Gosford and Wyong LGA's forecast for 2006 were 166,020 and 150,390 respectively, giving a combined regional population of 316,410 *(Source: Planning NSW - NSW Population Forecasts - 2004 Release)*.

The berth demand ratio for the Wyong and Gosford LGA's in 2006 is 0.25 berths per 1,000 population, which is low compared to the ratio for the Hunter Region of 1.41 reported in previous sections. Based on this data, it is clear that the Gosford and Wyong area has a severe undersupply of on-water boat storage facilities.

Given the large population of the area, similar in size to the combined Newcastle and Lake Macquarie LGA's, there is likely to be a large latent demand in the Central Coast region for marina berths. It is probable that Gosford residents might utilise marina facilities in the Hawkesbury or Sydney regions, however geographically, Wyong is significantly closer to the southern end and western side of Lake Macquarie, with travel time greatly reduced by the F3 Freeway.

Furthermore, the Tuggerah Lake System, on which Wyong is located, has no marina facilities due to its shallow nature, and is not suitable for larger sailing or power vessels *(refer **Section 2.1.4**)*. As such, it is reasonable to assume that residents of Wyong would utilise Lake Macquarie, rather than Brisbane Waters *(with its lack of marina facilities and no availability of berths)*. It is also therefore logical to assume that the 'catchment' for Lake Macquarie marinas would include the Wyong LGA. Conservatively, it has been assumed that Gosford is excluded from the Lake Macquarie catchment *(and would utilise facilities further south)*, however it is likely that the construction of new marinas in the south of Lake Macquarie could also attract demand from the Gosford / Brisbane Water area.

3.6.2 Port Stephens

In recent years, Port Stephens has undergone a tourist 'boom', and now provides off-shore game fishing as well as whale and dolphin watching and other leisure activities. Growth in the Port Stephens region population and number of marina berths is provided in the table below:

Table 3-12 – Port Stephens Growth in Berth Demand per Head of Population

Year	Regional Population	No. Berths occupied	Demand per 1,000 Population
1991	41,820	133	3.18
1997	55,250	263	4.76
2005	62,000	351	5.66

Comparison of **Table 3-9** and **Table 3-12** shows that berth demand in Port Stephens is well above that of the Hunter, and this high demand has been driven by its increased coastal sector population and its increased berth supply. Similarly, comparison to **Section 3.5.2** shows that Port Stephens has a marina demand rate currently of around 5.66 berths per 1,000 population, which is significantly greater than the berth demand ratio of Lake Macquarie of 2.38.

The Port Stephens data demonstrates that considerable latent demand existed in that area. From 1991 to 2005, the demand for marina berths grew at a rate of 0.18 berths per 1,000 population per annum. This release of latent demand also indicates the likely potential for very strong latent demand for marina berths to exist within Lake Macquarie.

3.7 EXISTING VESSEL MIX – POWER AND SAIL

The following summary of the existing mix of power and sail vessels within Lake Macquarie has been prepared from a survey of marinas undertaken in December 2006.

Table 3-13 – Lake Macquarie Power and Sail Vessel Mix (wet berths)

Marina	Sailing Vessels (%)	Power Vessels (%)
Marmong Point	31%	69%
Royal Motor Yacht Club	36%	64%
Wyee Point Marina	50%	50%
Pelican Marina	10%	90%
Marks Point Marina	15%	85%
Lake Macquarie Yacht Club	90%	10%
Average *	***42%***	***58%***

** weighted average per number of berths*

It is noted that Lake Macquarie Yacht Club only permits berthing for a maximum of 8 power vessels, with approximately half of the club's berth waiting list for power boats.

Power to sail vessel mix at various other marinas in NSW have been reported in other demand study investigations, chiefly the Ulladulla Boat Harbour Market Demand Assessment. The approximate mix of sailing and power vessels from that report is outlined below:

Table 3-14 – Other NSW Marina's – Power and Sail Vessel Mix

Marina	Location	Sailing Vessels (%)	Power Vessels (%)
Batemans Bay Co-op.	Batemans Bay	50%	50%
Newcastle CYC	Newcastle Harbour	50%	50%
D'Albora Nelson bay	Port Stephens	20%	80%
Anchorage	Port Stephens	20%	80%
Soldiers Point	Port Stephens	20%	80%
Port Marina	Port Macquarie	40%	60%
Coffs International	Coffs Harbour	70%	30%
Average*		***40%***	***60%***

** weighted average per number of berths*

A comparison of Lake Macquarie with the average determined in **Table 3-14** shows a similar ratio of power to sailing vessels. Lake Macquarie also has a similar vessel mix to both Newcastle and Port Macquarie marinas. In contrast, the Port Stephens marinas have a much higher percentage of power vessels. This is a reflection of the popularity of game fishing and other off-shore activities that are readily accessible from Port Stephens. Lake Macquarie has always had a strong sailing culture, both in yachting and smaller dingy craft, due to the combined flat water, consistent winds and relatively safe, unobstructed waterways.

It is noted that the ratio of power to sailing vessels for the few marinas in Brisbane Waters is 91% : 9%. It is likely that this reflects the reduced sailing possibilities, as well as a propensity for power boat owners to utilise marina berths which are in short supply.

3.8 EXISTING POPULATION STATISTICS

The following population data is provided for the Lake Macquarie area, as defined by the Lake Macquarie LGA. Population statistics are also provided for the combined Lake Macquarie and Newcastle LGA's, Wyong LGA, the Hunter Region *(including Wyong)*, and NSW.

Table 3-15 – NSW, Lake Macquarie, Newcastle, Port Stephens & Hunter Population Statistics (sourced from Bureau of Statistics)

Year	Lake Macquarie LGA	Lake Macquarie and Newcastle LGA's	Wyong LGA	Hunter including Wyong LGA's	NSW State
2001	187,800	329,900	-	724,480	6,575,220
2006	192,950	338,500	150,390	762,740	6,868,900
Growth P.A	*0.54%*	*0.52%*	-	*1.03%*	*0.88%*

In recent years, land availability within Lake Macquarie has been scarce, and this would have likely contributed to the below state average population growth rate. However if the Hunter

Region *(including Wyong)* as a whole is considered, then the growth in population has exceeded the state average.

4 FUTURE DEMAND PROJECTIONS

Section 3 outlined the statistical data illustrating the existing demand for marina berths in Lake Macquarie and NSW, and identified historic trends in this demand. On the basis of this information and forecast population growth statistics, future demand for marina berths within Lake Macquarie are now projected. This includes an assessment of the 'latent demand' for marina facilities: that is, the 'latent demand' that exists for a particular product *(in this case marina berths)* is the demand that cannot be met by existing suppliers.

4.1 POPULATION TRENDS AND PROJECTIONS

Population trends and projections can be applied to berth demand ratios as one method of predicting the future berth demand. Two sources of population forecasts for Lake Macquarie and the Hunter Region have been used in this investigation:

- Planning NSW (*now Department of Planning (DoP*)) –including historical records of population growth, as provided in **Section 3.8,** and forecast population projections.
- DoP population forecasts, in particular, the recently published Lower Hunter Regional Strategy *(LHRS)* – for planned and anticipated population growth in the Lower Hunter.

Population forecasts from Planning NSW *(now DoP)* 2002/2003 are provided below:

Table 4-1 – NSW, Lake Macquarie, Newcastle, Wyong & Hunter Population Forecasts

Year	Lake Macquarie LGA	Lake Macquarie and Newcastle LGA's	Lake Macquarie and Wyong LGA's	Hunter including Wyong LGA	NSW State
2011	197,090	345,530	363,180	797,880	7,164,700
2016	201,440	351,560	380,840	829,450	7,450,360
2021	205,770	357,810	399,410	861,930	7,734,930
2026	209,900	364,220	417,730	893,920	8,012,570
2031	213,500	370,290	433,640	922,440	8,271,930

The above data shows a slowing in the population growth for all LGA's as well as across the state, with a slower growth rate in Lake Macquarie and Newcastle compared to the Hunter Region or NSW.

More recent planning forecasts for the regions are provided in the Lower Hunter Regional Strategy *(LHRS)*. In 2006, the Lower Hunter comprised a population of 515,000, around 100,000 less than the total Hunter population of 612,300. The Lower Hunter is recognised as an area where significant population growth is likely to occur, and this growth in population is to be planned for over the next 25 years.

The LHRS recognises that population growth averaged around 1% per annum during the 1990's, increasing to around 1.20% per annum at the time of the strategy release *(2006)*. The LHRS forecasts an average growth rate for the lower Hunter of 1.09% per annum over the next 25 years, forecasting the Lower Hunter population to increase to 675,000 over this time. This growth rate

(1.09% per annum) is consistent with the Hunter *(including Wyong)* growth rate of 1.03% per annum for the past 5 years, as shown in **Table 3-15**, however, exceeds growth rates for Lake Macquarie of around 0.5% per annum *(with or without Newcastle)* over the past 5 years.

The LHRS also identifies Morisset (*located only 6km from Trinity Point*) as an emerging regional centre – one that is expected to grow and take on the role of a major centre in the future. Morisset will be one of only six new major centres (*plus Newcastle*) in the Lower Hunter with such a role.

Due to the variability in population forecasts, two population projections have been adopted. As a lower bound, the population forecasts contained in **Table 4-1** are used, and as an upper bound, application of the LHRS population growth rate of 1.09% per annum. Whilst this exceeds forecast State growth *(of approximately 0.8% per annum as derived from data in **Table 4-1**)* as well as past growth in both Newcastle and Lake Macquarie, it reflects current State Government planning forecasts for the area.

4.2 BERTH DEMAND PROJECTIONS

4.2.1 Introduction

In many areas where modern berthing facilities have been introduced, there has been an immediate and progressive demand for such. This evidences that a latent demand has existed in these areas. This was clearly demonstrated in **Section 3.6.2**, **Table 3-12** which showed that the berth demand in Port Stephens grew at a rate of 0.18 berths per 1,000 population per annum, from 3.18 in 1991 to 5.66 in 2005.

Application of the existing Hunter Region or Lake Macquarie berth demand ratios *(of 1.41 and 2.38 berths per 1,000 population respectively)* to population forecasts merely projects the current situation forward and does not recognise the latent demand for modern marina facilities.

The *Lake Macquarie Marina Sites Study (1986)* forecast demand for additional wet berths over the ensuing 20 years *(thereby through to the present day)* to be in the order of 500 to 600 berths, with a location shift to the southern half of the lake. The forecast number of berths has not been realised, and is around 100 to 200 berths greater than is presently available within Lake Macquarie. This suggests a strong latent demand for modern marina berths still exists.

The study also identified ten potential sites for new marinas in the southern half of the lake, and whilst Trinity Point was not specifically identified *(due to land ownership issues at the time)*, 'Bird Cage Point' just to the south was short-listed, recognising the potential for demand for marina berths in the area. Coupled with the LHRS forecast for Morisset to become an emerging regional centre, this further suggests a strong demand for marina facilities in the southern and western areas of the lake.

4.2.2 Berth Demand Scenarios

Three separate 'regions' or 'catchments' of Lake Macquarie have been adopted to predict the latent demand for marina berths and future berth demands within Lake Macquarie. For each catchment, a separate berth demand ratio has been adopted, commensurate with the

area and based on the statistical detail provided in **Section 3**. Each scenario and its respective catchment is described below:

- ***Scenario 1: Local Population.*** This scenario includes Lake Macquarie LGA only. Whilst the current marina berth demand rate for Lake Macquarie LGA is 2.38 berths per 1,000 population, this does not recognise the potential latent demand for marina facilities. Instead, the Port Stephens 1991 berth demand ratio of 3.18 berths per 1,000 population has been adopted, as discussed in **Section 3.6.2**. This represents the berth demand for Port Stephens before any major tourism boom, and is considered to be conservative for recognising the latent demand within Lake Macquarie. It is noted that Lake Macquarie has a higher boat ownership per 1,000 population than Port Stephens, as shown in **Section 3.5.3**.

- ***Scenario 2: Expanded Local Population.*** This area includes Lake Macquarie and Wyong LGA to the south. As demonstrated in **Section 3.6**, the Gosford and Wyong area has a severe undersupply of on-water boat storage facilities. Wyong, which is close to the southern end and western side of Lake Macquarie, would likely utilise Lake Macquarie rather than Brisbane Waters *(with its lack of marina facilities)*, to berth recreational vessels. In **Section 3.5.2**, it was shown that the marina berth demand rate for Lake Macquarie LGA was 2.38 berths per 1,000 population. Application of this known marina berth rate to the wider 'catchment' of Lake Macquarie including Wyong, provides a conservative indication of the latent demand for marina facilities within Lake Macquarie. To remain conservative, the Port Stephens 1991 berth demand ratio of 3.18 berths per 1,000 population has not been adopted, but however could be for the same reasons as identified above for the 'Local Regional Population'.

- ***Scenario 3: Total Regional Population.*** This area includes the total Hunter Region population, and also includes the Wyong LGA, for the same reasons identified above and outlined in **Section 3.6**. Likewise, in **Section 3.5**, it was shown that the Hunter Region had a demand of 1.41 berths per 1,000 of population in 2006. Application of this known marina berth rate to the wider 'catchment' of Lake Macquarie including Wyong, provides a conservative indication of the latent demand for marina facilities within Lake Macquarie.

In each instance, the adopted berth demand rate is considered conservative for the reasons given. An upper bound berth demand rate has not been adopted, however it could be argued in many instances that a much higher rate, such as that presently experienced in Port Stephens *(refer **Section 3.6.2**)* could be adopted.

For each scenario, upper and lower bound population projections *(refer **Section 4.1**)* will be used to determine upper and lower bound demand estimates.

Section 3.5 demonstrated that the Hunter Region berth demand increased at an average annual rate of around 0.04 berths per 1,000 population over the past 15 years. Once the latent demand for marinas has been released, berth rates tend to increase considerably, as demonstrated in **Section 3.5.3**, which showed growth in the berth demand at Port Stephens of 0.18 berths per 1,000 population per annum over a similar period. A conservative

growth rate of 0.04 berths per 1,000 population has been adopted for all three regional area predictions, in keeping with historic trends.

Finally, the summary of survey data of Lake Macquarie marinas in **Section 3.1** showed that the number of boats currently on waiting lists at marinas was 44, whilst the anecdotal number of proposed berth expansions was 142. To account for this, it has been assumed that the proposed number of anecdotal berth expansions less boats on waiting lists, would impact on predicted berth demand in approximately 4 years *(2010)*, once berth expansions are complete. Unaware of any development applications being submitted this anticipated 'additional' capacity has been subtracted from the number of existing regional berths in Lake Macquarie to predict future berth demand. As a further conservative assumption, 50% of the existing marina berths on Brisbane Waters *(that is, 39 berths)* are assumed to be used by Wyong residents, and therefore have been added to the total number of existing berths within the Lake Macquarie 'catchment', when considering Scenarios 2 and 3 *(for a wider catchment area including Wyong)*. Likewise, for Scenario 3, existing marina berths in Port Stephens and Newcastle Harbour were included in the total region berth numbers.

4.2.3 Scenario 1: Berth Demand Based on Local (Lake Macquarie) Population Projection

The following table predicts the demand for marina berths based on the lower bound population projections and the conservative berth demand ratio of 3.18 berths per head of population.

Table 4-2 – Berth Demand Predictions Based on Local Population (Lower Bound Population Projections)

Year	Lake Macquarie Population	Demand per 1,000 Population	Lake Macquarie Berth Demand	Less Existing Lake Macquarie	Projected New Berth Demand
2006	192,950	3.18	614	402	**212**
2011	197,090	3.38	666	500	**166**
2016	201,440	3.58	721	500	**221**
2021	205,770	3.78	778	500	**278**
2026	209,900	3.98	835	500	**335**
2031	213,500	4.18	892	500	**392**

The following table predicts the demand for marina berths based on the upper bound population projections, with the same berth demand ratio per 1,000 of population.

Table 4-3 – Berth Demand Predictions Based on Local Population (Upper Bound Population Projections)

Year	Lake Macquarie Population	Demand per 1,000 Population	Lake Macquarie Berth Demand	Less Existing Lake Macquarie	Projected New Berth Demand
2006	192,950	3.18	614	402	**212**
2011	203,698	3.38	688	500	**188**
2016	215,044	3.58	770	500	**270**
2021	227,022	3.78	858	500	**358**
2026	239,667	3.98	954	500	**454**
2031	253,017	4.18	1058	500	**558**

4.2.4 Scenario 2: Berth Demand Based on Expanded Local (Lake Macquarie and Wyong) Population Projection

The following table predicts the demand for marina berths based on the lower bound population projections for Lake Macquarie and Wyong, and utilising the conservative existing berth demand ratio for Lake Macquarie of 2.38 berths per 1,000 of population.

Table 4-4 – Berth Demand Predictions Based on Expanded Local Population (Lower Bound Population Projections)

Year	Lake Macquarie and Wyong Population	Demand per 1,000 Population	Lake Macquarie Berth Demand	Less Existing Lake Macquarie *	Projected New Berth Demand
2006	343,340	2.38	817	441	**376**
2011	363,180	2.58	937	539	**398**
2016	380,840	2.78	1059	539	**520**
2021	399,410	2.98	1190	539	**651**
2026	417,730	3.18	1328	539	**789**
2031	433,640	3.38	1466	539	**927**

** includes 50% of existing Brisbane Water marina berths*

The following table predicts the demand for marina berths based on the upper bound population projections, with the same berth demand ratio per 1,000 of population.

Table 4-5 – Berth Demand Predictions Based on Expanded Local Population (Upper Bound Population Projections)

Year	Lake Macquarie and Wyong Population	Demand per 1,000 Population	Lake Macquarie Berth Demand	Less Existing Lake Macquarie *	Projected New Berth Demand
2006	343,340	2.38	817	441	**376**
2011	362,464	2.58	935	539	**396**
2016	382,654	2.78	1064	539	**525**
2021	403,968	2.98	1204	539	**665**
2026	426,470	3.18	1356	539	**817**
2031	450,225	3.38	1522	539	**983**

** includes 50% of existing Brisbane Water marina berths*

4.2.5 Scenario 3: Berth Demand Based on Total Regional (Hunter plus Wyong) Population Projection

The following table predicts the demand for marina berths based on the lower bound population projections for total Hunter Region including Wyong, and utilising the conservative existing berth demand ratio for the Hunter Region of 1.41 berths per 1,000 of population.

Table 4-6 – Berth Demand Predictions Based on Total Regional Population (Lower Bound Population Projections)

Year	Hunter Region + Wyong Population	Demand per 1,000 Population	Hunter Region + Wyong Berth Demand	Less Existing Lake Macquarie & Hunter Region *	Projected New Berth Demand
2006	**762,740**	1.41	1075	904	**171**
2011	**797,880**	1.61	1285	1002	**283**
2016	**829,450**	1.81	1501	1002	**499**
2021	**861,930**	2.01	1732	1002	**730**
2026	**893,920**	2.21	1976	1002	**974**
2031	**922,440**	2.41	2223	1002	**1221**

** includes existing marina berths in Port Stephens and Newcastle Harbour plus 50% of existing Brisbane Water marina berths*

The following table predicts the demand for marina berths based on the upper bound population projections, with the same berth demand ratio per 1,000 of population.

Table 4-7 – Berth Demand Predictions Based on Total Regional (Upper Bound Population Projections)

Year	Hunter Region + Wyong Population	Demand per 1,000 Population	Hunter Region + Wyong Berth Demand	Less Existing Lake Macquarie & Hunter Region *	Projected New Berth Demand
2006	**762,740**	1.41	1075	904	**171**
2011	**805,225**	1.61	1296	1002	**294**
2016	**850,077**	1.81	1539	1002	**537**
2021	**897,428**	2.01	1804	1002	**802**
2026	**947,415**	2.21	2094	1002	**1092**
2031	**1,000,188**	2.41	2410	1002	**1408**

** includes existing marina berths in Port Stephens and Newcastle Harbour plus 50% of existing Brisbane Water marina berths*

4.2.6 Berth Demand Conclusions

Based on the demand projections outlined in the previous sections, it is apparent that Lake Macquarie has lagged behind other waterways in the supply of marina berthing facilities, and as such a strong latent demand for modern berthing facilities exists.

A summary of the forecast demand for berths determined as part of this assessment is provided in the table below:

Table 4-8 – Summary of Berth Demand Predictions

Year	Scenario 1		Scenario 2		Scenario 3	
Population Projections	***Lower Limit***	***Upper Limit***	***Lower Limit***	***Upper Limit***	***Lower Limit***	***Upper Limit***
2006	212	212	376	376	171	171
2011	**166**	**188**	**398**	**396**	**283**	**294**
2016	221	270	520	525	499	537
2021	278	358	651	665	730	802
2026	335	454	789	817	974	1092
2031	392	558	927	983	1221	1408

The range of predictions demonstrates that at present, a latent demand for around 171 to 376 marina berths exists. After the introduction of additional berths for anecdotal proposed expansions to marinas within Lake Macquarie, the demand for berths in 2011, at about the time the Trinity Point Marina project will be commercially operational, is forecast to be between 166 to 398 berths.

The predictions do not account for future saturation of swing mooring opportunities within Lake Macquarie, nor faster growth in demand for marina berths as has been evidenced elsewhere in the Hunter Region, specifically Port Stephens. This fast growth would likely lead to further expansions of other marina facilities, therefore the total predicted berth demand for Scenario 3 *(the Hunter Region including Wyong)* is likely to be overstated in the above table.

The predicted berth demands for Lake Macquarie are unlikely to be met through any expansion of marina facilities in the nearby areas. The Tuggerah Lake system has depth constraints and the Brisbane Water system already has a severe shortage of marina berths. The demand from the southern end of Lake Macquarie is therefore expected to be high, as it is typical for demand to be greatest from local and nearby communities, particularly western Lake Macquarie and Wyong.

The predictions also do not account for a substantial latent demand may also be released from the Sydney market when this facility is completed. Marina berths and moorings in Sydney are becoming increasingly difficult and expensive to obtain, forcing many of the boating fraternity to look further a field for such facilities. The d'Albora Marina in Port Stephens, for example, is primarily filled with vessels whose owners are based in Sydney and who drive the 3 hour journey to spend weekend or holiday time on their boat. Being positioned at the southern end of Lake Macquarie, the proximity of the Trinity Point site to Sydney (*some 1.5 hours*) will make this an attractive alternative for the Sydney market.

In order to meet the immediate demand for berths within Lake Macquarie, as well as the anticipated demand for marina berths in future years, it is conservatively concluded that a modern floating marina facility with a range of 200 to 250 berths would be appropriate at present with potential expansion to 300 vessels some 10 years in the future (*around 2016 when demand is estimated at between 221 and 537 berths)* if the demand is evident at this time.

4.3 BERTH SIZE DISTRIBUTION PROJECTIONS

4.3.1 Maximum Vessel Size

The navigability of the Swansea Channel will have a direct impact on the size of vessel able to access the Trinity Point Marina from the ocean. As discussed in *Trinity Point Maritime Structures, Coastal Processes Study* (*PatBrit, 2007*), Swansea Channel is a very dynamic sediment transport environment with regularly changing bathymetric characteristics. The navigability of the channel is dictated to a large degree by dredging activities. At present there is debate as to whose responsibility the dredging of the channel is. There are a number of local and state government agencies involved in the Channel including:

- Lake Macquarie City Council (*LMCC),* the Local Government Authority;
- Department of Natural Resources (*DNR*);
- Department of Lands (*LANDS*), responsible for management of the sea-bed as it is Crown Land;
- NSW Maritime, responsible for navigation; and
- Roads and Traffic Authority (*RTA*), responsible for Swansea Bridge.

The Lake Macquarie improvement project completed in 2006 was a $1.5 million job to dredge 44,000m^3 of sand from the channel to improve navigation. The project was paid for by LMCC *(through raising an environmental rate levy*) and the State Government. However, future funding arrangements are yet to be resolved.. In this regard, a 'trigger' level depth has been proposed *(Accessing Lake Macquarie - Strategy for Swansea Channel, WBM 2003 on behalf of the office of the Lake Macquarie and Catchment Coordinator)*, at which point the process to undertake dredging would be automatically initiated. This strategy document is under review by LANDS.

Whilst this governmental issue is unresolved it is considered appropriate to assume conservative water depths for the purposes of determining the maximum size vessel that can enter the Lake through the Channel. The two critical locations for water depth are the bar or the 'coal-seam' at the ocean entrance to the channel and the 'drop-over' (*the transition from the relative shallows of the Channel to the main Lake, occurring at the western extent of the Channel*). The available water depths and maximum vessel draught that could be accommodated at these two locations were theoretically determined in the *Coastal Processes Study* (*PatBrit, 2007).* As a result of these calculations, it was determined that a theoretical maximum vessel draught of 1.8m could regularly navigate the channel, equating typically to 8m yachts and 18m power vessels.

Advice regarding the maximum vessel draught that could safely navigate the channel was also sought from:

- Boat Owners Association of NSW;
- NSW Maritime *(Boating Safety Officer)*; and
- Lake Macquarie Coastal Patrol *(who operate Swansea bridges).*

In summary these sources advised that generally the maximum vessel draught currently navigating the channel safely is 2m with an absolute maximum draught of 2.4m getting through under optimum conditions. The 2m draught corresponds to vessel sizes of 20m for power vessels and 9m for yachts. The 2.4m draught corresponds to vessel sizes of 25m for power vessels and 12m for yachts.

Other indications of an appropriate maximum design vessel for the Trinity Point Marina include:

- Existing maximum vessel size berthed in existing marinas on the Lake;
- Existing maximum vessel size moored on existing swing mooring on the Lake.

These indicators suggest that a limited number of vessels up to 25m in length are currently moored on the lake.

It is therefore recommended that the maximum berth size for the Trinity Point marina be set at 20m with an area that could potentially accommodate larger vessels *(up to 25m)* not precluded in the design *(e.g. the outer ends of the marina walkways or the inside face of the eastern breakwater)*.

4.3.2 Proposed Berth Size Distribution

Surveys of existing marinas within Lake Macquarie indicate a trend towards the ownership of larger vessels. Other demand studies for proposed marinas, such as the *Shell Cove Boatharbour Marina* (2004) and the *Ulladulla Boat Harbour Project* (2006) also evidence a trend towards the ownership of larger vessels.

The appropriate berth size distribution for the Trinity Point Marina has been developed taking into consideration:

- maximum vessel size due to existing constraints ie., Swansea Channel;
- existing berth size distribution in existing marinas on Lake Macquarie;
- historical trends in berth size distribution as evidence from boat registration statistics *(refer **Section 3.2**);* and
- forecast future trends over the next 25 years.

A maximum vessel size for the Trinity Point Marina of 20m has been adopted *(as discussed in **Section 4.3.1**)*, setting the upper limit to the berth size distribution.

The existing weighted average berth size distribution in existing marinas on Lake Macquarie is set out in the table below:

Table 4-9 – Existing Lake Macquarie Berth Sizes

Berth Size	% Size Distribution
8m	*15%*
10m	*58%*
12m	*22%*
14m	*3%*
16m	*1%*
18m	*1%*
20m	*0%*
Total	***100%***

Historical trends in berth size distribution as evidenced by boat registration statistics in Lake Macquarie and Newcastle LGA's indicate that vessels in the 8m to 10 m range are becoming less popular, whilst the 10m to 14m range has seen some growth *(refer **Table 3-1**)*. Vessels over 14m have also seen some minor growth. These historical trends are constrained to some extent by the lack of availability of suitable berthing facilities, hindering potential growth of larger vessel ownership. Forecast future trends, based on experience in other areas where lack of availability has been addressed, indicate that there will continue to be an increase in the growth in ownership of vessels over 14m.

Based on the above considerations, the following berth size distribution for the Trinity Point Marina is recommended:

Table 4-10 – Recommended Berth Sizes

Berth Size	% Size Distribution
8m	*6%*
10m	*9%*
12m	*40%*
14m	*35%*
16m	*7%*
18m	*2%*
20m	*1%*
Total	***100%***

The recommended berth size distribution largely reflects the existing situation within Lake Macquarie, and recognises the continuing limitations that Swansea Channel poses to larger ocean-going vessels.

The above recommended berth size distribution will provide flexibility for the future operation of the marina, with smaller vessels berthing in larger spaces in the short term while growth in the larger vessel market occurs. The marina design should also allow for a small number of larger vessels including visiting boats.

4.4 POWER AND SAIL VESSEL MIX PROJECTIONS

As identified in **Section 3.7**, the mix of power to sailing vessels within Lake Macquarie is approximately equal to that of other regional marinas in the state, with about 60% power vessels to 40% sailing vessels. The lower percentage of sailing vessels is partly due to the popularity of swing moorings as a more economical alternative to marinas for mooring of sailing vessels. As

future growth of swing moorings slows, however, due to lack of further suitable locations, the percentage of sailing vessels using marinas may rise. For the purposes of the marina design, it is recommended that the existing mix of power to sailing vessels of 60:40 be adopted.

It is likely that initially, the strongest demand for berths would be derived by owners of power vessels, who are more easily able to gain off-shore access. However the strong sailing culture of Lake Macquarie due to its ideal sailing conditions would ensure in the longer term the demand for marina berths from sailing vessels remains strong.

4.5 MARINA BERTH DEPTHS

As outlined in **Section 4.3** the proposed berth size distribution for the Trinity Point Marina ranges from 8m to 20m with the potential for a small number of slightly larger vessels (*say up to 25m*). The required water depths for this range of vessel size (*as discussed in the Trinity Point Maritime Structures, Coastal Processes Study* (*PatBrit, 2007*)), range from 2.1m (*for an 8m power vessels*) to 3.9m (*for a 25m yacht*). The available water depths at the proposed Trinity Point Marina site range from 2.1m to 5.8m. This provides adequate water depths for the berthing of the proposed vessels as set out in the recommended berth size distribution in **Table 4-10**.

5 DRY-STACK STORAGE

5.1 INTRODUCTION

Australian Marina Management Pty Ltd (2004) prepared a demand study for the Shell Cove Boatharbour Marina project providing a general overview of worldwide and Australian trends in dry-stack storage as well as existing and anticipated demands. This was updated in *Australian Marina Management Pty Ltd (2006)* for the Ulladulla Boat Harbour project. These demand studies investigated the demand for dry-stack storage facilities linked to the adjoining marina; provided estimates of land space requirements, costs and expenditures; and determined whether dry-stack storage facilities offered the best use of the available waterfront land. Sections of these previous investigations are reproduced below and developed for the Trinity Point Marina Project.

5.1.1 Trends in Dry-Stack Storage

Throughout the world, in medium to highly populated coastal cities and regions, the capacity to provide land to meet the increasing demand for on-water boat storage *(marinas)* has been diminishing. This has been as a result of the progressive scarcity of waterfront land in which to create or expand marinas and through other physical and environmental constraints as well as due to competing land interests.

Additionally, in the last 20 years, internationally and in Australia, there has been a strong growth in the ownership of larger recreational vessels *(refer **Section 3.2.2**)*. This universal demand for larger vessels has in turn created higher demand for floating marina berths. Many marinas have now begun to undertake programmes of reconfiguration with berth sizes enlarged to cater for the increased vessel size distribution being evidenced.

As a result of this higher demand for marina berths, rental rates have progressively risen. There is also a trend emerging for marina operators to price berths for rental based on the area of berth water space provided and irrespective of the size of the vessel being berthed. Thus it is progressively becoming unattractive to some owners of smaller vessels to retain a floating marina berth and the use of a modern dry-stack storage facility becomes a suitably affordable option.

Dry-stack storage of vessels, particularly for those stored in enclosed structures, has many attractions for vessel owners. These include:

- avoidance of the need to tow vessels on trailers with resultant overall cost savings;
- avoidance of the potential for on-road damage to vessels and/or theft;
- likely reduction in insurance charges;
- avoidance of queues and waiting time at boat launching ramps;
- avoidance of annual expense for anti-fouling hulls and stern-drives;
- substantial reduction in the deterioration of hulls, canopies etc by UV and weather affects thus maintaining a better vessel “presentation” and higher vessel resale value;

- concierge vessel launch, retrieval, washdown, engine flush and stacking service thus minimising, for the owners, time spent before and after outings;
- vessel housed in a safe, locked and managed facility with 24 hour security;
- the general availability at the storage facility of on-site fuel supplies, repair, maintenance and service contractors and food and beverage providores;
- usually, adequate secure car parking, client bathroom and toilet amenities and an attractive and suitably furnished lounge/waiting room; and
- annual storage charges are usually less costly than marina berth rentals.

Dry-stack storage began in the USA in the late 1950's as basic structures restricted by the height that then fork-lifts could reach. In the 1970's, industry developments changed the planning and design for dry-stack storage of vessels as fork-lifts were developed with "negative lifts" and, along with storage racks, were designed specifically for the weight and shape of vessels.

In the late 1980's dry-stack structures were further advanced by being designed with aesthetically pleasing exteriors *(rather than the previous shed or "barn" look)* to fit in with the local landscape and were combined with other amenities such as retail stores, offices, restaurants and even motels.

Today, dry-stack storage in USA is a vibrant niche industry with developments being planned as "boating destinations" either as stand alone projects, or associated with a traditional marina, or as an integral part of major waterfront projects.

Until recently, development of dry-stack facilities in Australia has been relatively overlooked in favour of on-water marina berthing facilities despite the continuing high ratio of vessels being sold and registered throughout Australia being in the under 8m in length and trailerable category.

This situation in Australia is changing for a variety of reasons:

- scarcity of land for new marinas or expansion of existing ones;
- increasing sales of larger vessels with the resultant increased demand for marina berths;
- reconfiguration of existing marinas to provide berths for larger vessels;
- increasing floating marina berth rates; and
- a more affluent and socially active society in which some owners of "smaller" vessels are seeking alternatives to trailing vessels.

5.1.2 Historical Demand for Dry-Stack Storage

The demand for dry-stack storage of vessels in Australia has been evidenced by the high occupancy levels being enjoyed by the nine existing Australian facilities as set out below in **Table 5-1**. Clearly the high occupancy ratios achieved at these facilities indicates the strong demand in these localities by boat owners for such a method of boat storage. There is reason to believe, given a modern facility, that a similar demand will exist within Lake Macquarie for dry-stack boat storage.

Table 5-1 – Australian Dry-Stack Boat Storage Facilities – Annual Occupancy Percentages – year 2003/4

State	Facility	Total Spaces	Annual Occupancy	Spaces Used
QLD	Gold Coast City Marina	250	96.00%	240
	Horizon Shores Marina	360	85.00%	306
	Runaway Bay Marina	160	98.12%	157
	East Coast Marina	120	98.33%	118
	Spinnaker Sound Marina	66	98.48%	65
	Total – Queensland Facilities	*956*	*92.67%*	*886*
VIC	Pier 35 Marina	300	92.00%	276
	Patterson Lakes Marina	275	88.00%	242
	St Kilda Marina	110	94.54%	104
	Total – Victorian Facilities	*665*	*90.80%*	*622*
NSW	d'Albora Marina Akuna Bay	165	87.27%	144
	Total – NSW Facility	*165*	*87.27%*	*144*
National Totals - Australia		**1,806**	**91.47%**	**1,652**

5.1.3 NSW and Queensland Vessel Registration by Size Distribution

The boat size distribution of vessels registered in NSW and Queensland as at 30th June 2003 is shown in the following table:

Table 5-2 – Comparison of Vessel Registration by Size: NSW and Queensland (30 June 2003)

Vessel Size (m)	QLD		NSW		Combined QLD and NSW	
	No.	% of Total	No.	% of Total	No.	% of Total
Up to 3 m	10,254	5.84%	7,043	3.69%	17,297	4.72
3.01 - 4.0 m	68,101	38.77%	58,645	30.69%	126,746	34.56
4.01 - 4.5 m	37,703	21.46%	33,598	17.58%	71,301	19.44
4.51 - 5.0 m	19,966	11.36%	35,226	18.43%	55,192	15.05
5.01 - 6.0 m	21,719	12.36%	32,039	16.77%	53,758	14.66
6.01 - 8.0 m	9,466	5.40%	13,006	6.81%	22,472	6.13
8.01 - 10.0 m	3,378	1.92%	5,476	2.87%	8,854	2.41
10.01 - 12.0 m	2,838	1.62%	3,657	1.91%	6,495	1.77
12.01 - 15.0 m	1,724	0.98%	1,858	0.97%	3,582	0.98
15.01 - 18.0 m	358	0.21%	405	0.21%	763	0.21
18.01 - 20.0 m	74	0.04%	84	0.04%	158	0.04
20.01 - 25.0 m	42	0.02%	42	0.02%	84	0.02
25.01 m +	36	0.02%	10	0.01%	46	0.01
	175,659	100.00%	191,089	100.00%	366,748	100.00%

Source: NSW Maritime
Queensland Department of Transport

It is predicted that vessels in the size range 4.51m - 10.0m would create the major demand for dry-stack storage.

Table 5-2 demonstrates that NSW possesses a substantially higher number of registered vessels than Queensland in the size distribution most likely to create demand for dry-stack storage. Considering that Queensland possesses a greater number of dry-stack storage facilities with high occupancy rates, it is reasoned that there is likely to be a considerable latent demand in NSW for modern dry-stack facilities.

5.1.4 Predicted Dry-Stack Storage Demand in Lake Macquarie

Queensland dry stack storage facilities are predominantly located in and around the Gold Coast, south of the City of Brisbane. It is reasonable to assume that the major areas which would drive demand for dry stack storage in these facilities would be the Shires of Gold Coast, Logan, Redland, Ipswich and Brisbane City South.

For the purpose of predicting demand for dry stack storage at the Trinity Point Marina it is considered that the appropriate and most suitable method would be to determine this by way of a ratio of vessels in dry stack storage to total vessels registered.

It is considered that the Gold Coast facilities offer an appropriate comparison from which to predict potential demand for the Trinity Point Marina.

It is also considered that vessels registration statistics for vessels in the size range 4.51m to 10.0m are appropriate to use as a prime basis but that registrations restricted to the size range 6.01m to 10.0m are appropriate as an alternate basis.

The following table, **Table 5.3**, sets out vessel registrations by size distribution from 4.51m to 10.0m in the Queensland Shires surrounding the Gold Coast as discussed above.

Table 5-3 – Queensland Vessel Registration (4.51m to 10.0m) for Gold Coast, Ipswich, Logan and Redland Shires (30th June 2003)

Vessel Size	Gold Coast	Ipswich	Logan	Redland	Brisbane South	Total
4.51 - 5.0 m	2,226	516	760	1,201	1,629	6,332
5.01 - 6.0 m	3,126	495	825	1,342	1,768	7,556
6.01 - 8.0 m	1,734	147	263	637	789	3,570
8.01 - 10.0 m	693	32	91	286	367	1,469
TOTAL	**7,779**	**1,190**	**1,939**	**3,466**	**4,553**	**18,927**

Table 5.4, sets out the availability and current average annual occupancy at the Gold Coast region dry stack storage facilities.

Table 5-4 – Gold Coast Region – Dry Stack Storage facilities

Facility	Average Boat Stored	No. of Spaces	Annual average occupancy 2003/2004	No. of vessels stored
Runaway Bay Marina	22'	160	99%	158
Gold Coast City Marina	26'	250	99%	248
Horizon Shores	26'	360	80%	288
TOTAL		**770**	**90%**	**694**

From the previous **Table 5.4** it is noted that registered vessels in the catchment regions in the size category 4.51m to 10.0m total 18,927 vessels. The ratio of demand for dry stack storage vessels as a percentage of registered vessels in the size range is therefore approximately 3.7%.

As an alternate basis of calculating demand, it is considered reasonable to notionally restrict the vessel size categories to the 6.01m to 10.0 range. This is more in keeping with the average size of vessels being stored. From **Table 5.4** it is noted that, in the Shires considered, there is a total number of 5,039 registered vessels between 6.01 and 10.0 metres. Applying this number of vessels to those currently stored (694) the demand ratio is approximately 13.8%.

In summary, the number of dry stack storage berths occupied in the Gold Coast Region was as follows:-

- High Range – 3.7% of registered vessels in the size range 4.51m to 10m
- Low Range – 13.8% of registered vessels in the size range 6.01m to 10m

It is considered reasonable to adopt these demand rates for Lake Macquarie.

Vessel registrations for these size ranges at 30th June 2006 for the Lake Macquarie and Newcastle LGA's are estimated from data provided in **Table 3-1**:

Table 5-5 – Potential Dry-Stack Vessel Demand

Vessel Size	No. Vessels Registered (2006)
4.51m – 10.0m *	9,281
6.01m – 10.0m	2,400

** for this analysis, it has been assumed that half the vessels in the range 4.00 – 4.99m would be greater than 4.5m)*

Inclusion of Newcastle LGA vessel registration data may lead to an overestimate of demand as Newcastle residents may not choose to store vessels at this location when they can trailer vessels to much closer launching points. As identified in **Section 3.2**, Newcastle contributed to 12.7% of the registered vessels in the Lake Macquarie and Newcastle LGA's combined, and this should be subtracted from the above number of vessel registrations. Many vessels on the eastern side of the lake may also be reluctant to use the facility for the

same reason. It is therefore considered conservative to notionally further reduce the remaining total number of vessels by 50% to account for the decrease in demand due to distance. Adopted vessel registrations are therefore as follows:

Table 5-6 – Potential Dry-Stack Vessel – Reduced Demand

Vessel Size	No. Vessels Registered (2006)
4.51m – 10.0m *	4,051
6.01m – 10.0m	1,048

** for this analysis, it has been assumed that half the vessels in the range 4.00 – 4.99m would be greater than 4.5m)*

Applying the demand ratios to the above vessel registration statistics the predicted high and low range demand for dry-stack storage at June 2006 would be:

- High Range 3.7% of 4,051 150 vessels
- Low Range 13.8% of 1,048 145 vessels

As outlined in **Section 3.2.3**, growth in vessel registrations in NSW is 3.1% per annum, which is lower than that for Lake Macquarie / Newcastle and the Hunter Region of 4.0% and 4.37% respectively. As such, applying a conservative 3.1% average annual growth to the 2006 vessel registration figures, the demand for dry-stack storage in the Lake Macquarie region is predicted to be:

Table 5-7 – Lake Macquarie Dry-Stack Demand

Year	Low Range	High Range
June 2006 (Base)	145	150
June 2011	169	175
June 2016	197	204
June 2021	229	237
June 2026	267	276
June 2031	311	322

The above conservative demand predictions indicate that opportunity exists for a dry-stack storage facility at the Trinity Point site for around 150 vessels at the present, and around 180 vessels in 4-5 years time. As this would be the first facility of this nature on Lake Macquarie, it would be considered prudent that such a facility be developed in a staged manner, starting with around 60% the demand predicted for 5 years time – that is, around 100 storage berths, to allow for a lag or 'pick-up' in this total demand over time. This would also allow for the possibility of development of dry stack storage elsewhere on the Lake. Anecdotal survey information indicated that Marmong Point Marina was planning a covered storage facility for some 60 vessels though no approvals have been given for this proposal as yet.

The Trinity Point facility should be constructed to allow additional storage berths to be added in the future as demand increases over time, and it is recommended that the dry-stack storage facility be designed to eventually cater for a total demand of around 200 vessels.

6 OTHER MARINA REQUIREMENTS

In association with the marina at Trinity Point, other boating and marina-associated facilities are proposed. These include:

Hardstand and Repair Yard Facility
There are currently boat repair facilities at Marmong Point, Marks Point and Lake Macquarie Yacht Club at Belmont ie. three of the existing six marinas. There is therefore scope for another such facility to service vessels moored at the Trinity Point Marina and other vessels moored in the southern portion of the Lake. The repair facility would need to include a workshop building (*shipwright services*) for undertaking work and a second building providing offices, staff amenities and storage. A secure hardstand area incorporating appropriate environmental control measures would also form part of the repair facility.

Fuel facility
There are currently fuel facilities at Marmong Point, Marks Point, Wyee Point and Pelican Marinas. For a marina the size of the proposed Trinity Point Marina, fuel facilities would be expected by the clientele. The fuel facility could be based on a floating pontoon. The exact location of the dedicated fuel pontoon would need to be considered in the detailed design taking into account the following issues: minimising the 'run' of fuel delivery lines from fuel storage tanks; providing a location convenient for transiting vessels with adequate protection from wave activity; providing a location that removes a potential fire hazard from the main marina and where fire services can readily access the facility in the event of such an occurrence.

Sewage Pump-out Facility
Sewage pump-out facilities are currently only available at two out of the six existing marinas, namely, Pelican Marina and Lake Macquarie Yacht Club. As noted above, for a marina the size of the proposed Trinity Point Marina, sewage pump-out facilities would be expected by the clientele and the NSW Environment Protection Authority. The sewage pump-out facility would be housed on the same pontoon as the fuel facility.

A Combined Marina / Tourism Village
It is anticipated that the combined marina / tourism village will incorporate the following :
- function centre and meeting rooms;
- marina and tourism sales and support uses;
- marina and tourism amenities including showers, toilets and laundry;
- café;
- restaurant;
- tourism services including small gym/fitness area, day spa/beauty salon;
- marina and tourism offices/administration spaces/boat sales;
- club;
- boardwalk; and
- car parking.

Other issues including Automatic Teller Machines, ice supplies for vessels, etc will be resolved as part of the detailed design of the marina and the combined marina / tourism village.

Helipad

Experience at other coastal boating and tourism destinations has shown demand will exist for transportation to and from the area by helicopter. Such a demand will come from boat owners, conference and corporate executives, tourists and others just seeking an experience. A helipad would also provide a ready access point in the event of emergencies and accidents requiring injured persons to be air-lifted. The helipad design will be outlined in further detail in a separate report.

Tourism Vessel Berths

There is potentially also demand for tourism vessels such as charter vessels for coffee cruises and dinner cruises around the Lake to be located at the Trinity Point facility. This demand has not been taken into account in the berth size distributions however provision of an appropriate temporary berthing has been recommended.

7 SUMMARY

The demand study has looked at a number of scenarios to predict the existing and future berth demand on Lake Macquarie. Based on the range of values determined (*refer* ***Table 4.8***) , the adopted berth demand for 2006 and 2011 is 200 and 280 respectively. The number of berths therefore recommended for the Trinity Point Marina is 200 to 250 with provision for future expansion to 300 berths by say 2016 if this demand is evident.

The proposed berth size distribution for the Trinity Point Marina is as follows:

Table 7-1 – Recommended Berth Sizes

Berth Size	% Size Distribution
8m	*6%*
10m	*9%*
12m	*40%*
14m	*35%*
16m	*7%*
18m	*2%*
20m	*1%*
Total	***100%***

The recommended power to sail vessel ratio for the Trinity Point Marina is 60:40.

The recommended dry stack storage capacity for Trinity Point Marina is 100 vessels initially with a view to expanding to 200 vessels within 5 years.

It is noted that this demand study has been developed in a methodical and robust manner adopting conservatism throughout. One of the main conservatisms is the fact that the demand from the Sydney market has not been quantitatively accounted for due to the complexities of this aspect of demand.

FIGURES

Patterson Britton
& Partners Pty Ltd

FIGURE 1

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SITE LOCATION PLAN