



## **RAN Naval Base Requirements to the Year 2100**

By Lieutenant Commander Darren Cooper



# Soundings



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## Introduction

1. The Royal Australian Navy (RAN) has five naval bases<sup>1</sup> located in Sydney, Rockingham, Darwin and Cairns. The last to enter service was HMAS Stirling, also referred to as Fleet Base West (FBW), in 1978 following the adoption of a two-ocean navy policy. Over time, these bases have been upgraded, modernised, and wharves extended to meet the growing needs of the Fleet and to accommodate an increasing number of ships that are trending upward in size. All of these bases are currently either undergoing or are scheduled for further expansion or modernisation. However, there will come the point where development will reach a natural limit due to being constrained by external factors such as geography and urban encroachment.

2. Planning to prepare for the time beyond this point will require an extended lead-time to ensure that the Australian Fleet of the future does not endure a capability gap that will affect the RAN military capacity. While planned to be suitable for operational support of the Fleet into the 2030s, current bases may not be able to meet the strategic demands of a future fleet towards the end of this century.

3. **Scope:** This paper focuses on the constrained situation of the RAN's five naval bases and, in time, the RAN and the Australian Defence Force will need new naval bases to support its future Fleet and capabilities. The trend that RAN ships are increasing in size and number is identified. The issue that planning and development of new bases will take years to achieve and therefore investigations should commence sooner to streamline the future process is discussed. Australia's changing strategic situation towards a contested environment is observed as a factor that may accelerate this requirement. Potential basing scenarios are presented, and, from these, recommendations for capability planning are made.

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<sup>1</sup> The distinction is made between a naval base and a naval establishment for this paper. A naval base is where ships are homeported, and naval establishments are shore establishments with functions of command, administration, communications, air support and training.



## Aim

4. The aim of this paper is to propose that the ADF establish a project team to investigate realistic scenarios and options for future basing requirements suitable to support the RAN through to the end of the century in a contested environment so as to reduce the likely lead time that will be experienced when basing decisions are made.

## Australia's Strategic Situation

5. In the 70 years since World War Two (WW2), Australia has been involved in several military conflicts. However, except for Australia's involvement in the United Nations mission to East Timor, all have been located far from Australian shores against an enemy that has not matched Australia in terms of naval power. Australia has maintained a strong naval force relative to other regional powers. Additionally, Australia has maintained strong relationships with the United States and our regional neighbours, further promoting this period of relative peace.

6. The *2020 Defence Strategic Update* (DSU) notes that Australia is at the centre of a dynamic strategic environment. The main driver in this environment is the growing strategic competition between the United States and China. Within the region, military modernisation is accelerating faster than anticipated from even five years ago. "Regional modernisation has resulted in the development and deployment of new weapons that challenge Australia's military capability edge."<sup>2</sup> Significantly, the assumption that Australia will have at least ten years of strategic warning time of a military conflict is no longer considered appropriate for Defence planning. Changes in regional maritime power – the number, range and capabilities of foreign navies and the possibility of conflict in the Indo-Pacific, now less remote than ten years ago – may give stimulus to not-to-distant future decisions by the Australian Government that capitalise on Australia's defensive and offensive capabilities. The announcement of the AUKUS alliance and the decision for the Australian Navy to acquire at least eight nuclear-powered submarines is evidence of this.<sup>3</sup>

7. Australia has been steadily increasing its capabilities. Fleet numbers indicate a direction to increase the number of ships in the RAN and their capabilities. The Hunter-class frigate program plans nine vessels to replace eight Anzac-class frigates. The replacement

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<sup>2</sup> *2020 Defence Strategic Update*, (Department of Defence, 2020) p. 5.

<sup>3</sup> [Joint Leaders Statement on AUKUS | Prime Minister of Australia \(pm.gov.au\)](https://www.pm.gov.au/media/2021/09/16/joint-leaders-statement-on-aukus)



submarine program calls for at least eight submarines (previously 12 under the Attack-class program) to replace the six Collins-class submarines. The Joint Support Ship (JSS) program will replace HMAS *Choules* with two much larger vessels, and the Mine Warfare / Hydrographic program intends to replace six vessels with up to eight variants of the Arafura-class Offshore Patrol Vessel (ACOPV). There have been calls for additional Hobart-class destroyers<sup>4</sup> to support Australian shipbuilding and reduce the potential of capability gaps in the RAN's surface fleet caused due to delays in the Hunter-class program.

8. Future political decisions regarding the size and composition of the RAN will likely be made quicker in response to a changing regional strategic situation. Such decisions may include increasing the number of Major Fleet Units (MFU) in the RAN beyond that planned ten years ago, accelerating the construction drumbeat of the shipbuilding program beyond that identified in the *Naval Ship Building Plan*,<sup>5</sup> and increasing the RAN's ability to support joint operations through an increased strategic sealift capability.

9. While one response to Australia's changing strategic situation may be an increase in its naval power, the issue of sustaining such an increase needs to be examined. Many factors need to be considered regarding the sustainment of the Fleet; first and foremost is the homeporting of the vessels. Are the facilities sufficient and fit for purpose, and are there enough people to support the endeavour? These are issues that go beyond the planned works identified in the *Force Structure Plan 2020*<sup>6</sup> and the *Defence Estate Strategy 2016–2036*.<sup>7</sup>

## A Changing Fleet

10. Against the relatively benign backdrop of the last 70 years, numerous changes to the RAN have occurred. Following WW2, the RAN has consisted of an aircraft carrier capability, destroyers, frigates, replenishment ships, patrol boats, submarines, amphibious and hydrographic ships, with the bulk of the surface fleet up to the 1980s centred on the carrier capability. In 1982, a notable point in the RAN's history was when the aircraft carrier HMAS *Melbourne* was not replaced, and the fixed-wing component of the Fleet Air Arm disbanded.

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<sup>4</sup> *Delivering a stronger Navy faster* (Hellyer, 2021).

<sup>5</sup> *Naval Ship Building Plan 2017* (Department of Defence, 2017).

<sup>6</sup> *Force Structure Plan 2020* (Department of Defence, 2020).

<sup>7</sup> *Defence Estate Strategy 2016–2036* (Estate and Infrastructure Group, 2016).



11. The 1987 *Defence White Paper*<sup>8</sup> highlighted a change in strategy towards a Creswellian view of continental defence rather than power projection, placing the responsibility for protecting Australia's maritime approaches with the Air Force. Any calls to reinstate a RAN capability of carrier-based fixed wing aircraft for sea-borne power projection was effectively dismissed. The White Paper reaffirmed the acquisition of the future Anzac-class frigates to replace the River-class destroyer escorts, and Collins-class submarines to replace the Oberon-class submarines. The Anzac ships would be based at Fleet Base East (FBE) and Fleet Base West (FBW). The White Paper also identified an upgrade of HMAS Stirling so that more ships could be based in the west, including the new submarine fleet. The east coast submarine base, HMAS Platypus, would later be decommissioned.

12. In 1994 the two Kanimbla-class Landing Platform Amphibious (LPA) ships were commissioned. These were two of the largest vessels in the RAN, and both were homeported at FBE. These were replaced by the two Canberra-class Amphibious Assault Ships, otherwise known as the Landing Helicopter Dock (LHD). At 27,381 tonnes, these are the largest ships to have ever served in the RAN.

13. The Adelaide class of guided missile frigates (FFG), first commissioned in the 1980s, have now been replaced with three Hobart-class air warfare destroyers, which have retained the pennant numbers of their three DDG predecessors.

14. Minor warship capability has also evolved. Patrol boat classes (Attack, Fremantle, Armidale (ACPB) and Cape (CCPB)) have increased in capability and size every decade since the 1980s. A fleet of 12 Arafura-class OPV is currently being built to replace the ACPB and CCPB. An interim capability of eight evolved Cape-class patrol boats (eCCPB) is being introduced to cover the capability gap between ACPB/CCPB and OPV.

15. Similarly, mine warfare vessels have transitioned from Ton-class minesweepers to the Bay-class fibreglass catamarans, then to the current Huon-class minesweepers. The RAN's fleet of single class hydrographic vessels HMAS *Moresby*, HMAS *Cook* and HMAS *Flinders* were replaced by two Leeuwin-class vessels, which are now reaching the end of their service

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<sup>8</sup> 1987 *Defence White Paper* (Department of Defence, 1987)

lives. The mine warfare and hydrographic vessels are to be replaced with up to eight variants of the OPV, which will be longer, wider, and up to 1500 tonnes greater in displacement.

16. The trend, over time, is that vessels are increasing in size (see Annex A). As a result, existing bases have required upgrades and improvements to accommodate these larger ships. Wharves have been extended and added, and new support facilities such as training, logistics, engineering support and maintenance, and accommodation have been built to support the Navy's multiple capabilities.

### Constraintment

17. **Current naval bases:** The RAN currently has five naval bases, four of which were commissioned after WW2 (**Error! Reference source not found.**). MFU consisting of amphibious assault ships, destroyers, frigates, submarines, and tankers, are based at FBE and FBW. Patrol boats are based at HMAS Coonawarra and HMAS Cairns, and the hydrographic ships are at HMAS Cairns. The RAN Mine Warfare capability, sail training vessel, and landing craft are based at HMAS Waterhen.

Table 1: Naval bases of the RAN.

Base	State	Commissioned	Purpose
Fleet Base East	NSW	1788 <sup>9</sup>	Fleet Base
HMAS Waterhen	NSW	1962	Mine Warfare
HMAS Stirling	WA	1978	Fleet Base
HMAS Cairns	QLD	1974	Patrol / Hydrographic / Mine Warfare
HMAS Coonawarra	NT	1970	Patrol

18. These bases are currently undergoing redevelopment to meet capability requirements for current fleet units and the introduction of the OPV and Hunter-class frigate programs. At the same time, each is also constrained or restricted by either location, urban encroachment, or their size compared to changing capability requirements. The degree to which these

<sup>9</sup> The location of Fleet Base East was the original base of the Royal Navy squadron and continued to be used as a naval base when the Royal Australian Navy was formed in 1911.



limiting factors influence these bases' ability to support the Navy's future requirements is discussed below.

19. **Fleet Base East:** FBE is located on Garden Island/Potts Point in the heart of one of the best natural harbours in the world. Originally a separate island, Garden Island was joined to Potts Point during WW2 as part of major reclamation works that included the construction of Captain Cook graving dock. Potts Point is the northern edge of the residential and commercial suburbs of Kings Cross and Elizabeth Bay.

20. The base has over 1500m of wharves, and extensive restoration works of the wharves under Infrastructure Project N2253 have been underway for seven years and are estimated to conclude in October 2022.<sup>10,11</sup> Workshops, administration buildings, logistic warehousing and the Naval Heritage Centre currently occupy the entirety of the land. Fleet Headquarters is in HMAS Kuttabul, located on the heights of Potts Point, overlooking FBE.

21. Currently the western side of Garden island is fully developed. If required, the eastern side could be developed into additional wharf space. If an expansion, such as additional wharfage on the eastern side of the base, is required, then facilities to support more ships would need to be developed in the existing precinct. More workers (military and civilian) would seek additional parking places, offices and workshops, and accommodation, putting further pressure on a base that is already considered challenging to access. While ideally situated in terms of access to the harbour, access from land is constrained by suburban development. Access to the base is currently through a single access point via tightly winding streets that characterise central Sydney.

22. **Fleet Base West:** HMAS Stirling, located on Garden Island (West), Western Australia. The western side of the island is a national park protecting endangered fauna no longer found on the mainland. The national park boundary runs north–south through the centre of the island.

23. FBW is currently being redeveloped to accommodate the future homeporting of at least two OPV and potentially four Hunter-class frigates. Infrastructure Projects N2263 and N2265 include an additional wharf between the Diamantina Wharf and the Small Boat

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<sup>10</sup> Stage One – Garden Island (East) Critical Infrastructure Recovery Program.

<sup>11</sup> Stage Two – Garden Island (East) Critical Infrastructure Recovery Program.





Harbour, and an extension of the Oxley wharf. Additional training facilities, support facilities and accommodation are also being built to support the future capability. Further future development may include other wharves, but this would require extensive dredging and engineering works in Careening Bay to take advantage of the natural protection of the island from storms.

24. Garden Island is constricted by a single access point and a shared boundary with the national park that occupies the western half of the island. The 3.8km causeway connecting the island to Point Peron and the City of Rockingham represents a single point of failure for this base. It is the cause of congestion for service personnel and civilians accessing the base daily. If unserviceable for any reason, it would restrict access to the base. During winter storms, the causeway is often closed to vehicular traffic. The national park prevents development west of the existing Defence footprint.

25. **HMAS Coonawarra:** HMAS Coonawarra, formerly the Darwin Naval Base, is located on the lower terrace on the southern side of Larrakeyah Army Barracks. The base consists of a sheltered small boat harbour (the Basin) lined by the Attack Wharf (130m) and the Fremantle Wharf (200m), an administration building, and a hardstand, syncrolift and boat storage shed. The base currently supports ten Armidale-class patrol boats (ACPB) and a range of smaller craft (including Army LCM8 landing craft). Larger RAN ships have to berth at Fort Hill Wharf or the East Arm commercial wharf. The ACPB will be replaced by at least four OPV based in Darwin.

26. Under Infrastructure Plan N2265, the hardstand, syncrolift, boat storage shed, and workshop will be demolished, and the land redeveloped to support the OPV capability, and a new jetty is to be built outside of the Basin, south out from the location of the administration building for use by larger warships. Access to the base will always remain through the Darwin city centre.

27. The base is constrained by the dimensions of the Basin and Larrakeyah Barracks. The Attack and Fremantle wharves are being redeveloped to accommodate the larger and much heavier OPVs. However, these wharf extensions will use up the remaining available space within the Basin. Any future requirement to expand the size of the Basin will entail the



creation of a new seawall out into deeper water or development of the Nebraska Beach site to the immediate west of the Basin.

28. **HMAS Cairns:** HMAS Cairns is located on the northern bank of Chinaman Creek, Cairns. It is the homeport of the hydrographic capability as well as an ACPB and two CCPB. The base currently has a single 120m wharf that is in the process of being redeveloped under N2265 to accommodate eCCPB and OPV vessels. The slipway shed located at the northern end of the base will be demolished as part of the redevelopment.

29. The base is constrained by the proclaimed channel within the river.<sup>12</sup> The land surface of the base has maximum dimensions of 350m (N–S) and 150m (E–W). HMAS Cairns also includes two offsite locations in Cairns – an accommodation space and a storage area. While Defence can acquire the surrounding land for future development, the base, in its current location, will always be constrained by the river and city. As the city expands, this will place additional pressure on the military presence.

30. **HMAS Waterhen:** HMAS Waterhen is located on a quarried land surface at the base of a cliff fronting Balls Head Bay in Waverton, Sydney. It consists of three buildings for administration, training and workshops, and two jetties approximately 150 and 170m long. Homeported at this base are four Huon-class minehunters, LCC landing craft, the Sail Training Ship *Young Endeavour*, the Maritime Aviation Training Vessel (MATV), and Navy dive boats. It is also the location of the RAN's embryonic Robotic and Autonomous Systems (RAS) capability (SEA1905 Phase 1). However, RAS units cannot be used in this location due to potential undesired interactions with other users of the local waters – Sydney ferries, commercial watercraft, and recreational users.

31. HMAS Waterhen is constrained by the surrounding landscape between the waterfront and the high vertical quarry rock face to its rear. The usable land surface is approximately 85m wide by 300m long. Its southern edge contains the single access road leading down to the base, and the northern edge backs onto waterfront residential housing. Residential housing and commercial buildings surround the base preventing further expansion of its land footprint. Additionally, the seabed drops away sharply from the beach,

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<sup>12</sup> Current indications are that two OPVs will not be rafted up at the new wharf as their combined beams would place the outboard vessel within the channel.



making extending the jetties an expensive proposition. Investigations are currently underway considering the site for redevelopment to support variants of the OPV.

32. **Summary.** All RAN naval bases are either undergoing or planned for redevelopment for future fleet units entering service over the next 20 years. However, given the constraints of each base, it is suggested that except for HMAS Stirling, these redevelopments could or should be the last made to increase their capacity for larger naval units and capabilities.

### The Future Fleet

33. The ships of the Royal Australian Navy are getting bigger and will continue to do so into the foreseeable future. Over the next 20 years, the RAN fleet will continue its transformation as new vessels replace the old. The number of ships entering service is increasing (**Error! Reference source not found.**), and they are larger than their predecessors. The change in the size of the ships is driving the requirement for wharf extensions in Stirling, Cairns, Darwin and potentially Waterhen.

Table 2 Numbers of ships entering service by class.

In Service	LOA (m)	Entering Service	LOA (m)
Anzac Class FFH(8)	118	Hunter Class FF (9)	149.9
Armidale Class PB (13)	56.8	Evolved Cape Class PB (8) Arafura Class OPV (12)	58 80
Huon Class (4), Leeuwin Class (2)	52.5 71.2	OPV Variant ( up to 8)	90–95
Bay Class LSD(1)	176	Joint Support Ship (2)	200(?)
Collins Class (6)	77.4	SSN (at least 8) Astute Class (UK) Virginia Class (US) Virginia Class (Block 5) (US)	97 115 140



34. If length-over-all (LOA) is used as a measure, the overall growth of the Fleet is significant. Every replacement class, with the exception of hydrographic vessels, is at least 20% larger than its predecessor (Figure 1). In the next three years, the STS *Young Endeavour* will also be replaced with a larger sailing ship.

35. New additional capabilities (those not replacing an existing capability) will further stress the current capacity of RAN naval bases.<sup>13</sup> The Landing Ship Dock (LSD) HMAS Choules is to be replaced with two Joint Support Ships (JSS), whereas a reasonable expectation was that it would be replaced with a single ship. Additional sealift capability is being planned for under project SEA 1655. A reasonable question could be asked as, moving towards a more Fosterite form of defence strategy, what additional unplanned capabilities might a future Australian Government approve in the next 10–20 years that are not considered now? Could the RAN acquire additional capital ships in the future?

36. For decades, the RAN's premise has been a fighting order of 12 surface warships. In that time, the Navy has not expanded the number of vessels during replacement; the number of DDGs, escorts, submarines and oilers has remained the same. In a contested world, these paradigms are likely to change. Evidence of this is already occurring. Nine Hunter-class frigates will replace eight Anzac frigates. At least eight nuclear submarines will replace six Collins submarines, with a political appetite for up to 12 submarines previously demonstrated. There is constant pressure on the Australian Government to provide an interim capability of conventionally powered submarines to de-risk the potential of a submarine capability gap.<sup>14</sup>

37. Ten years ago, replacing the ACPB, Huon and Leeuwin classes with twenty 1800-plus tonne ships was not considered, and replacing Collins with a nuclear-powered submarine would have been unthinkable. What future force structures for the RAN have not yet been considered, and how will these 'other' vessels be accommodated within the existing basing strategy?

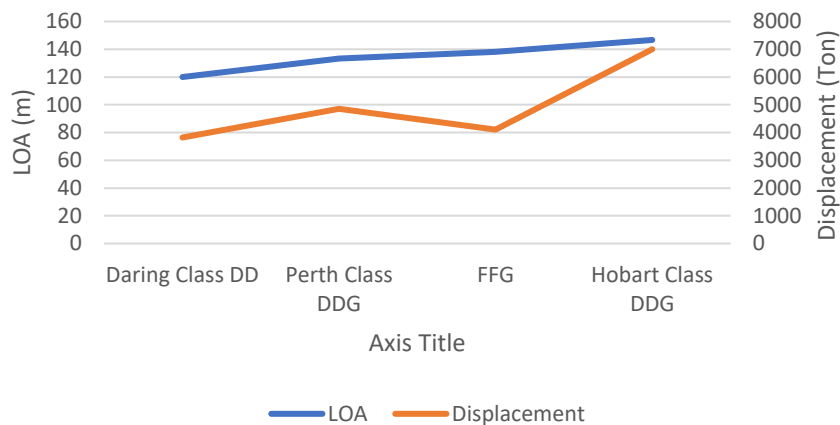
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<sup>13</sup> The recently acquired South West Pacific Large Hulled Vessel *ADV Reliant* will operate out of a commercial berth in Brisbane, but this does not preclude a future requirement to operate out of dedicated Defence base.

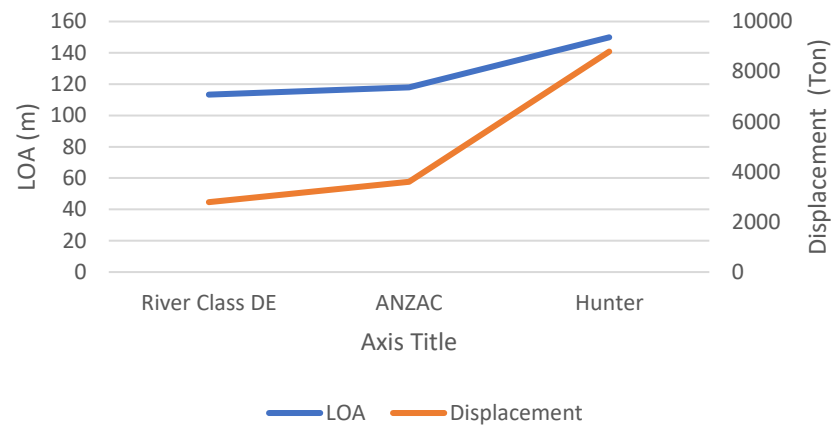
<sup>14</sup> [New Collins-based submarine 'best fit' while waiting for Aukus, defence experts say | Australian military | The Guardian](#) (Shepherd, 2022).



### Destroyer Evolution



### Frigate Evolution



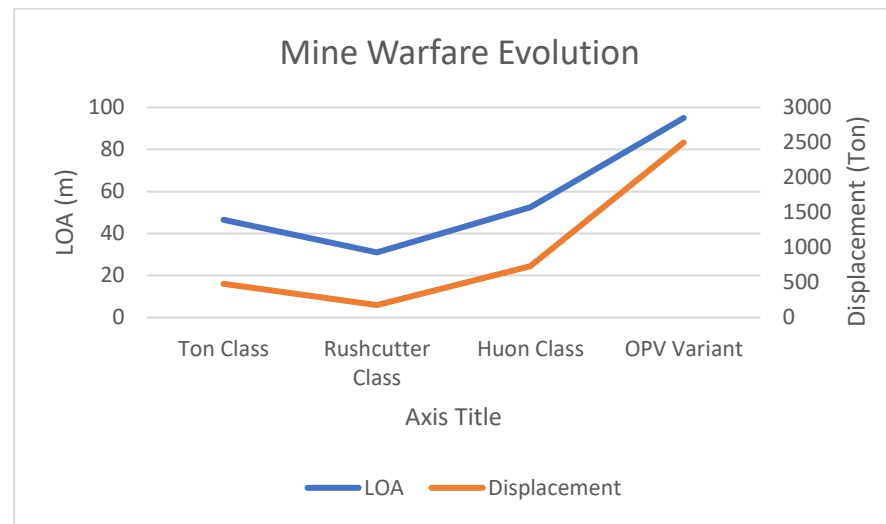
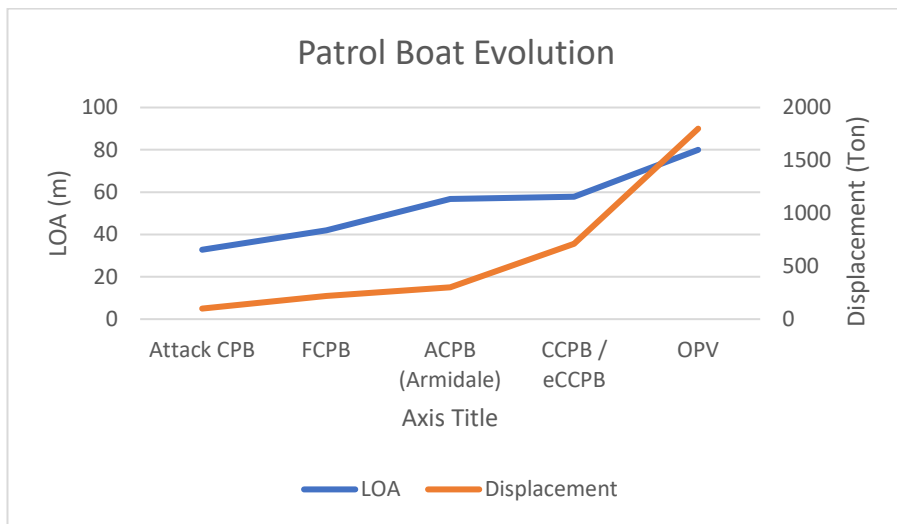
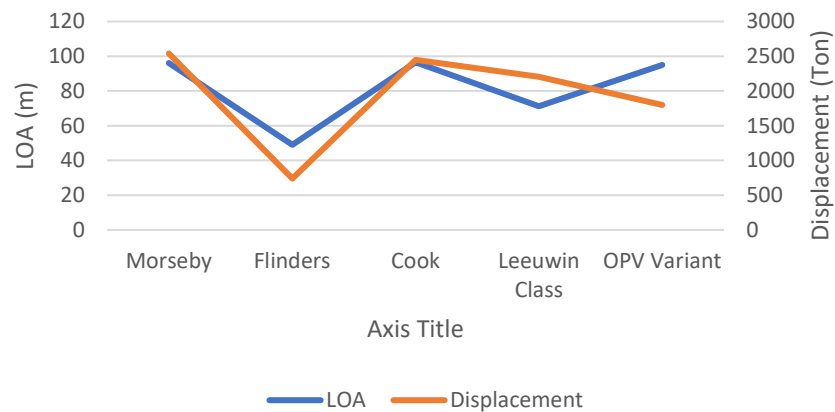


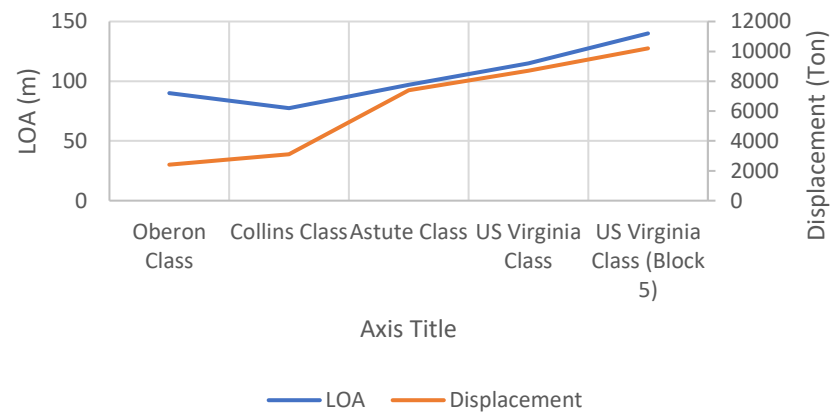
Figure 1. Evolution of Naval capability by size and displacement.



### Hydrographic Ship Evolution



### Submarine Evolution



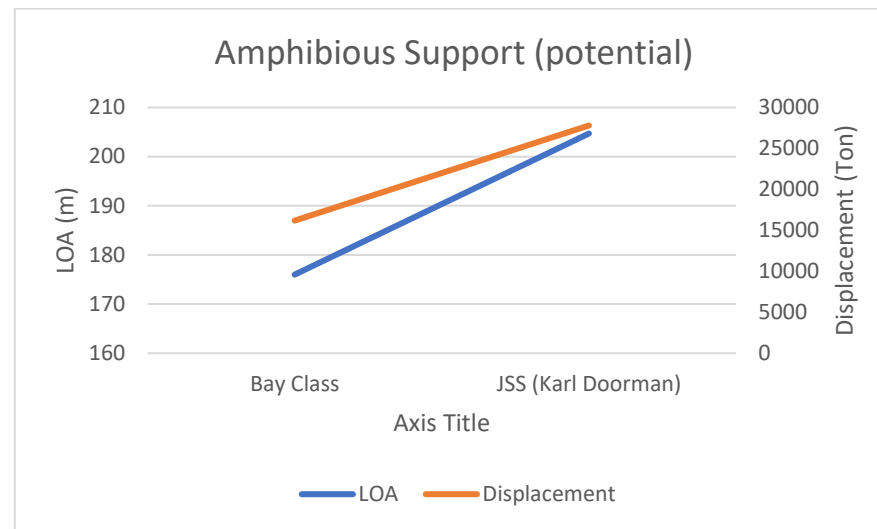
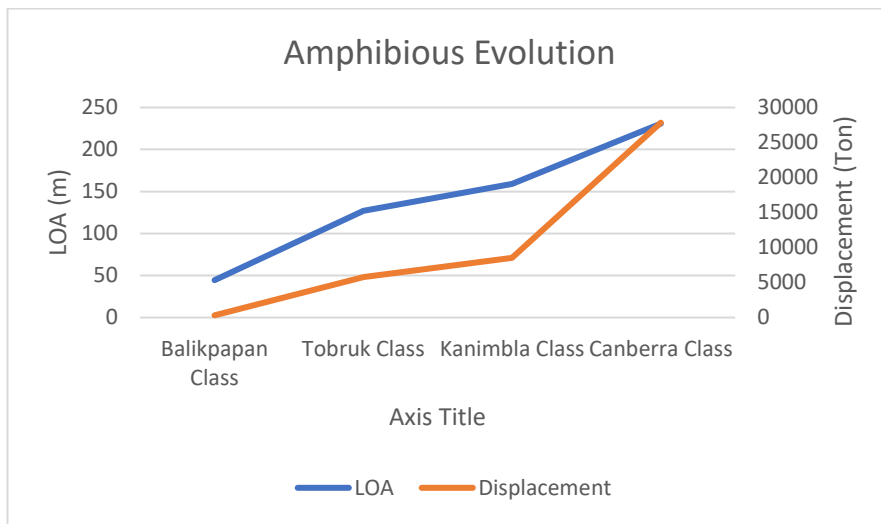


Figure 1. Evolution of Naval capability by size and displacement (cont'd).





## Future Basing Requirements

38. Each Australian naval base is located on land previously utilised by or identified for Defence purposes. FBE is located on the original Royal Navy naval depot. The Commonwealth resumed Garden Island (FBW) in 1911 for use as a naval base. HMAS Waterhen is on the site of a WW2 Boom Defence Depot, and HMAS Cairns is built upon a WW2 Defence ship repair facility. HMAS Coonawarra is on the waterfront of the Larrakeyah Army Barracks.

39. The current redevelopments are necessary works to ensure effective support of planned future vessels. When looking towards the year 2100, will these locations be enough to support the RAN in 40, 50 or 80 years? It is not unreasonable to assume that additional basing options will be required at some point. However, when set against the backdrop of a contested environment, the need for such basing options may be a requirement sooner rather than later.

40. One of the two main arguments, at least for the east coast, is that Sydney Harbour is the best natural harbour globally, so why would the RAN seek to move from this location. The author does not suggest that the RAN give up either of its bases in Sydney Harbour in support of new development. FBE and HMAS Waterhen will continue to play a vital role in the future of the RAN. However, unless real estate can be made for the RAN to expand its current basing locations, the issue of constriction will remain.

41. The second argument is cost. The funding required to establish new bases would be significant and would need a committed, bipartisan, whole-of-government approach, not to mention agreement at all levels of government in the states involved. If deemed unaffordable, the issue could be quickly dismissed as an overreach by Defence for public funds. But the loss to future capability may prove more costly, either through congested working locations or potentially having to move due to future political direction based on urban or commercial requirements. A greater long-cast view is required beyond that of current political election cycles.

42. Considering these two arguments, the issue of new basing requirements for the future Fleet is a prudent conversation. By considering additional new sites, the RAN would be diversifying its support and sustainment options, thus providing greater resilience to the



future Fleet through the provision of modern facilities free from past infrastructure.

Examining location options and the identification of issues to be overcome would inform the viability of the matter. Analysis of the positive and negative impacts that such an addition(s) would have on existing naval bases in terms of capability delivery and potential savings in future redevelopment costs should also be assessed.

43. The development of new sites has the initial advantage of not impacting current capability. Often, base redevelopment entails current operational capability occurring ‘on top of’ site works that may happen for extended periods running into years. The increase in non-military personnel, cars, machinery, temporary workspaces and buildings, and denial to base areas all influence capability and morale. Developing new sites separate from existing capability permits new construction to occur unimpeded by Defence activities and Navy capability not being disrupted. Previously undeveloped greenfield sites offer many advantages over existing infrastructure or brownfield sites.

44. **Advantages of greenfield sites.** The issue of urban encroachment constraining naval bases has been cited above. The use of a greenfield site away from urban centres removes this issue. Bases need to be far enough away to avoid future urban encroachment but still located within a reasonable distance to urban centres connected by good road systems for both industry support and to provide alternative accommodation options to live-in-accommodation (LIA) on site. Other advantages of greenfield sites are:

- a. There is no existing infrastructure that needs to be removed or avoided during construction
- b. Flexibility in design options to meet stakeholder requirements
- c. Entertain capital development unfeasible in any other circumstance (alternative graving dock and slipways)
- d. Ability to plan for future technological advances
- e. Timelines for construction will be faster
- f. Large areas of land can be set aside for future development beyond existing needs. This could be considered wasteful but should be viewed as future-proofing



- g. Contamination issues are minimal compared to brownfield sites, and
- h. Little impact to surrounding residents regarding noise, visual and air pollution, potential risk to property caused through vibration, and increased heavy vehicle presence on local streets during development.

45. **Disadvantages of greenfield sites.** The advantages of greenfield sites need to be balanced against their disadvantages. First and foremost, the environmental impact of such a development on coastal areas, river mouths, and flora and fauna would be a challenge and would take time to resolve. Heritage risks and management would need to be assessed. Power generation and infrastructure would need to be constructed, although a fresh approach could take advantage of green energy options such as solar farms and wind power generation not available on current bases.

46. **Options and opportunities.** Four scenarios presented below support the argument of the advantages of new naval bases supporting the RAN and the ADF. These are proposed in order to promote discussion on this matter and are seen as potential options. These projects offer a range of commercial opportunities in addition to construction for local businesses. Construction of housing for military and civilian personnel living off base, of primary and secondary schools for families, shopping centres, recreational facilities, local government administration, and public transport systems, in addition to technical trade and business parks, all represent Australian civilian jobs supporting the national endeavour and would represent a significant boon to the local and national economies.

47. **New east coast Fleet Base.** A new east coast Fleet Base is proposed to be built to support both Major and Minor Fleet Units and which would reduce the future pressure on FBE and HMAS Waterhen. Logistic vessels such as the Joint Support Ship, visiting DDG and Hunter-class vessels, and future OPV variants of the mine warfare and hydrographic capabilities (SEA1905 Phase 2), including the RAS capability, could be located at this base. The new site could provide for slipways and a second east coast graving dock if the requirement was identified. Potential options for development could also include explosive ordnance (EO) storage and loading facilities providing a second east coast EO loading point and reducing the requirement to transit south to Eden to re-arm. Streamlined access to separate entry points for personnel and supply vehicles and trucks allowing for better security



screening and inspection infrastructure could be planned, compared to the single road access at FBE.

48. In March 2022, the Australian Government announced a new east coast fleet base to support its new nuclear submarine fleet.<sup>15</sup> Logically, additional naval and support and security units would be based at this location to maximise the return on government investment. Details surrounding the development of this base will be determined in the coming years.

49. Site planning could include storage for humanitarian aid disaster relief (HADR) missions. By storing HADR supplies, including response vehicles and construction equipment on-site, the requirement to move equipment and trucks through a city to a civilian wharf such as Port of Brisbane is removed, response time reduced, and the evolution better coordinated with no negative interactions with the civilian population.

50. Future redevelopment costs expected for FBE and HMAS Waterhen would be reduced as the new base would accommodate new capabilities. The redevelopment of the east side of Garden Island would not be required, nor the provision of additional logistic warehousing and engineering support, with fewer complaints from local residents. HMAS Waterhen would continue as an important training establishment supporting the LHD landing craft, sail training ship, steppers, and the MATV.

51. While the location of the new east coast base has yet to be announced, potential locations could include sites near Wollongong, Newcastle, or Brisbane, or alternative locations between these centres. Service personnel posted to the new location would reduce the requirement for additional Service housing and rental assistance subsidies in Sydney while creating opportunities for cheaper housing in the new area.

52. **New Darwin base.** A new fleet base could be built near the City of Darwin, which would be the RAN's gateway to Asia. Being the closest point to Asia, such a base would become a Forward Operating Base for the whole of the RAN and not just the patrol capability. The opportunity would exist to plan facilities required to support the Australian Fleet and foreign allies, and Command facilities for the near region. Dedicated submarine

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<sup>15</sup> [Australia to Build New Sub Base for Nuclear Attack Boat Fleet - USNI News](#) (Mahadzir, 2022).



berths could support the future submarine capability, removing the need to return south for minor maintenance tasks. This would also allow for the option of homeporting Australian MFU close to the Indonesian Archipelago and the South China Seas. Current and future Australian Border Force vessels, currently without a permanent berthing arrangement, could also utilise this location.

53. The possibility exists for a joint venture between Australia and the United States to develop a major northern fleet base. In December 2020, the United States announced that it would reform the US Navy's First Fleet for the first time in 40 years.<sup>16</sup> Its primary area of responsibility will be the South Asian region, with the aim of rebuffing China in the South China Seas. With the announcement of the AUKUS alliance, a joint fleet base in northern Australia would provide the US a southern point of operations in a friendly country and give the US strategic placements of a northern battle group, the 7th Fleet in Japan, and a southern battle group, the 1st Fleet, in Australia. A jointly funded Australian–US fleet base would be a significant capability leap for supporting coalition warships in a contested world.

54. The argument that the City of Darwin does not have the industrial capability to support a major naval base could be offset through strong industry engagement signalling the services and trades required well in advance. The level of investment for building the base would indicate the federal government's commitment to the capability. The increase in personnel living in Darwin would generate an economic stimulus and increase the requirement for schools and commercial businesses.

55. Two potential greenfield/brownfield sites are located near Darwin. The former Shoalhaven Naval Communications Station is located to the northeast of Darwin and is clear of any development. It is close to Darwin, allowing easy access but is potentially too close such that encroachment in future years becomes a real risk. It is immediately north of Robertson Barracks which would promote joint and combined activities, noting that US Marines are also billeted there. The second location is Glyde Point, further to the northeast. This greenfield site has protected access to the ocean and is connected to Darwin by an existing roadway. Although a reasonable drive to Darwin, it is not excessive by Australian standards.

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<sup>16</sup> 'US Plans to restore Navy's 1<sup>st</sup> Fleet in rebuff to China in South China Sea' (Jennett, 2020).



56. East Arm is not considered a viable option due to the presence of commercial wharves and businesses already located there and the strategic risk presented by the INPEX Liquid Natural Gas refinery located 3km to the south at Blaydon Point.
57. Current investment in HMAS Coonawarra would not be wasted as this facility would continue to be used by Navy until the new base was constructed, and could then be transferred to the Army to support watercraft being delivered through LAND 8710, or utilised by Australian Border Force vessels to support its ongoing maritime capability.
58. **Future submarines.** The decision by the Australian Government to replace the Collins class with nuclear-powered vessels raises the question of where these vessels will be homeported. A diesel 'like-for-like' replacement could see FBW continue to co-locate the submarine capability, but the requirements of nuclear-powered vessels have not yet been determined, and FBW may not be suitable. Would or could FBW support two classes of submarine, with different propulsion systems, simultaneously? Can FBW development plans support the requirement for the maintenance of nuclear power plants?
59. As a theoretical exercise, as the boats are to be built in Adelaide, then the concept of developing a dedicated submarine base near such bespoke technical facilities is proposed. While an east coast submarine base has been announced, this is potentially not the correct decision for the long term.
60. The use of a greenfield site is ideal for this purpose as the specific technical requirements of the nuclear capability can be addressed without impacting any other military or civilian capability. The site would be close to the Osbourne Shipyards, which would serve as the major service and repair facility as it will be technically equipped and tooled to resolve the total range of issues for a nuclear submarine.
61. A suggested site for a new submarine base is the eastern side of St Vincent Gulf, north of Port Gawler. The site is close enough to be supported by commercial industry from Adelaide, yet far enough away not to suffer from encroachment in the long term. Being northwards in the Gulf would offer sheltered waters. Unlike FBW, the site is a mainland location, therefore there are no issues regarding access. Although homeported in South Australia, nuclear submarines (being faster than diesel submarines) could move quickly to either the east or west coasts for deployment, stopping at FBW or FBE (or new east coast



base) for logistic support if required. The base may require local submarine rescue capabilities that could also assist in submarine Test and Evaluation trials and training.

62. FBW would continue to support Collins through to its retirement. Its operational capability would not be impacted by the incorporation of a nuclear capability alongside the other fleet units. The gradual drawdown of Collins would mean submarine berths could be re-tasked to support future fleet units in the west.

63. **New FNQ naval base.** The city of Cairns has been visited by the RAN since before WW1. A new location for a Far North Queensland base is a difficult proposition as the only suitable commercial and population centres are Cairns and Townsville. The coastal areas in this region are characterised by tidal flats and mangroves, national parks and long pristine beaches with few sheltered locations that are not constrained by those mangroves or national parks.

64. The current site of HMAS Cairns could be expanded through the acquisition of the adjacent Sugar Wharf site and Tropical Reef Shipyard and slip, and the land bounded by the railway line, Fearnley Street, Cook Street and Draper Street could add a limited area to the existing footprint that could be redeveloped in isolation from the existing base. The limiting factor of the river channel could be negated by the excavation of the land fronting the river to build new wharves and slipways if required. However the issue of encroachment would be ever present and there may be consequences of having a railway line running along one side of the base.

65. Another alternative is the development of Admiralty Island opposite HMAS Cairns. This would require an extensive investigation due to the environmental and geophysical studies needed to establish the feasibility of such a project. Having a water barrier with the city, the issues of future urban encroachment would be avoided, and Defence would have a large area to develop future capabilities. Being low-lying ground, significant, but not impossible reclamation earthworks would need to occur to render the land useful for development purposes.

66. The base could be designed to support a larger number of larger war vessels and as an emergency repair base, and to co-locate Army Water Squadron vessels and elements of the



RAN RAS capability. Off-site storage and accommodation could also be brought onto the base.

67. While the basing disposition of future OPV variants has not yet been finalised, it is likely that several of these larger OPVs will be based in Cairns in addition to the 80m OPVs. Designing 'into' the footprint of the island, for a larger and wider harbour than what will be available after current infrastructure works at HMAS Cairns are completed, would better support future naval requirements.

## Fundamental Inputs to Capability

68. **Requirements.** A naval base is a complex system of systems, with all fundamental inputs of capability (FIC) stakeholders contributing to the provision of capability. Establishing requirements from the various stakeholders can be extensive, but they are not working from a vacuum, and existing naval infrastructure would be a starting template.

69. FIC requirements would be refined against the capabilities that will be located at the base. An extensive exemplar requirements list would be developed through engagement with stakeholders. Requirements would be based on the type of vessels the base would support, what joint and combined capabilities would be supported, engineering requirements, and the number of personnel. A general model of common base functions would also be included – command and administration, base security, LIA, messing, facilities, workshops, logistics and warehousing, and port services. Detailed planning would be considered upon approval of the project.

70. The two FIC elements that have the longest lead times are Infrastructure and Personnel (Workforce). In examining an initial basing concept, the Infrastructure FIC would take precedence and be coordinated through the Estate and Infrastructure Group.

71. **Infrastructure.** Currently, the estimated timespan for infrastructure development over the value of \$100 million (AUD) is 7.75 years and could be assumed to involve building new wharves or large-scale base redevelopments. It is assumed that these works occur on existing Defence sites. The development of a greenfield or brownfield site for a new naval base would take longer in the Strategy and Concepts, and Risk Mitigation and Requirements Setting phases. Many studies in the initial stages of site identification would need to occur, such as resolving land ownership and environmental and heritage issues, feasibility studies,





hydrodynamic geophysical assessment studies, and the agreement between the Commonwealth and the state over the supporting infrastructure. Construction, however, would occur at a faster pace, similar to other civil projects.

72. **Workforce.** Workforce challenges represent the most significant strategic risk to delivering Navy capability.<sup>17</sup> To meet known future capability requirements, Navy workforce is projected to increase by 25%, or approximately 5000–6000 personnel, to 20,000 personnel by the year 2035.<sup>18</sup> The submarine workforce is expected to triple by 2050 in support of the new submarine capability. The recent change of submarine type will see this requirement increase given the difference in crew size between the Collins class and the Astute and Virginia class options.

73. Introducing the prospect of one or several new naval base proposals would require additional military workforce. At the same time, however, new bases would increase shore posting opportunities for Command, training and support roles in location. Additionally, there will be increased employment opportunities for Australian Public Service (APS), contractors and civilians.

## Path Forward

74. The ADF currently has plans for one new naval base, announced in March 2022, which is currently being investigated. The Defence Estate Strategy details development and improvements to the five existing naval bases. These plans have been developed over many years and aim to ensure those bases continue to support naval capability into the near future. The planning for new bases would, using the current Capability Life Cycle model, take several years. If there were an urgent need for such bases, Defence would be operating under pressure to provide detailed information in a reduced timeframe. The need for development would influence the quality of the studies, which may negatively impact the timelines for approvals and development.

75. To safeguard against this, Defence should proactively investigate naval base requirements to support the RAN through to 2100. Defence should form a project team to

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<sup>17</sup> *Department of Defence Annual Report 2018–2019.*

<sup>18</sup> Chief of Navy – Incoming Government Brief.



wargame the RAN's future needs against a range of capability scenarios, in different contested and non-contested circumstances, and the viability of basing solutions.

76. The aim of work should be to take a program approach analysing whole-of-Navy requirements into the future rather than a piecemeal assessment that focuses on a single or small range of issues. Forward investigation of requirements, including location, could be used to reduce the concept and requirements phase for future development by identifying and examining issues that may preclude or be an obstacle to development. To be clear, actual studies should be conducted. For land acquisition, this would include, but not be limited to, identification of land status (national park classifications), heritage, environmental sensitivity, flora and fauna surveys, soil profile, land surface, hydrodynamics of location, the impact of weather and cyclonic systems, road and sea access, the requirement for bridges, power generation options, security, freshwater sourcing, sewerage and water treatment. This is not to say that these issues need to be fully resolved, just investigated.

77. Early investigation may identify opportunities not obvious without meaningful data. Engagement of FIC would be essential for identifying flexible capability requirements aligned to stated capability outcomes and predicting ways that can facilitate expansion into the future. Consultation with other militaries (for example, UK or US) regarding how they are future-proofing their bases would also be recommended.

78. Developing basing options does not mean that such plans would need to be effected immediately. Such an investigation would prepare options that could streamline a future development process while ensuring that new facilities are considered without haste and configured for future expansion to embrace new technologies without impacting a surrounding urban population.

79. For historical precedent, having a greater naval base capacity in a contested strategic environment is beneficial. Looking back to WW2, when Australia was threatened and the mainland directly attacked, in 1939 the RAN consisted of 13 ships – two modern heavy cruisers, three modern light cruisers, one cruiser of 1912 design, five WW1 vintage destroyers and two sloops, and had a strength of less than 3000 personnel.<sup>19</sup> Towards war's end, in June 1945, the RAN consisted of 337 vessels including four cruisers, 11 destroyers,

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<sup>19</sup> *The Decline of Australian Naval Deterrence 1919–1939* (Kerr, n.d.).



six frigates, 53 corvettes, three infantry landing ships, three anti-submarine auxiliaries, six minesweepers, one minelayer, one fleet oiler, 12 stores ships, and three repair ships. RAN workforce consisted of 36,976 excluding women's services.<sup>20</sup>

## Conclusion

80. The RAN's five naval bases are constrained by their locations, and urban encroachment makes expansion challenging at best. Three bases – HMAS Coonawarra, HMAS Cairns and HMAS Waterhen – are approaching capacity. Additionally, ships are getting bigger, with each new generation of RAN warships larger than its predecessor, and the number of vessels is increasing. The requirement to support new classes of warships will inevitably place strain on existing infrastructure. Added to this reality is the future inclusion of nuclear-powered submarines into the Fleet, bringing a unique set of requirements never before experienced by this Navy.

81. At some point, there will be a requirement for new bases to support the growing Fleet. The requirement may not be in 2025 or 2030, but by 2035 and 2040, this requirement will become ever-present. Given the long lead times for infrastructure projects, it would be prudent to begin to examine these requirements with a mind to plan for development and expansion to accommodate future technology and capability beyond 2040 and through to 2100.

82. Greenfield sites located away from urban centres are advantageous for prospective new bases so to avoid urban encroachment yet still close enough to be supported by industry and commercial entities. Development of such sites can occur without managing previous infrastructure and contamination issues nor impacting current military capability. However, such sites also have environmental and heritage values that need to be assessed and managed.

83. The accepted window of seven years for delivery assumes that works are being carried out on military sites or land already owned by the Commonwealth. Even then, the works are limited in size. Due to necessary site identification and assessment studies, the acquisition of land suitable for naval bases will lengthen the development timeline; this may be time that the Australian Government will not have due to international events.

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<sup>20</sup> *Royal Australian Navy 1942-1945* (Gill, 1968).



84. Defence needs to assess its future basing requirements beyond 2040 to ensure realistic options for Defence are achievable without a self-inflicted capability gap. If Australia's strategic situation transforms from a non-contested to a contested environment, future requirements may be required sooner than anticipated. The RAN's current five naval bases alone are likely to be insufficient to support a future Australian fleet.

## Recommendations

85. In response to a growing and larger Australian Fleet, and an increasingly contested strategic environment, it is recommended that, in consultation with the Estate and Infrastructure Group, that:

- a. Defence form a project team to begin assessing the requirements surrounding additional naval bases to support the future Australian Fleet through to 2100
- b. Defence begins identifying locations for potential naval bases for planning purposes
- c. Defence begins identifying environmental (hydrographic, geophysical, flora and fauna) and heritage (Aboriginal and natural) issues for future assessment
- d. Defence prepares a report for the Minister of Defence within two years detailing the findings of the previous recommendations to progress towards formal planning.

**DB Cooper**

Lieutenant Commander, RAN

07 November 2021

## Annex:

- A. RAN Capability Evolution



## ANNEX A: RAN Capability Evolution

	LOA	Beam	Draught	Displacement		LOA	Beam	Draught	Displacement
	(m)	(m)	(m)	(Tonnes)		(m)	(m)	(m)	(Tonnes)
<b>Frigates</b>					<b>Hydrographic</b>				
River Class DE (12M)	113	12.5	3.9	2560	Morseby Class	96	13	4.2	2540
River Class DE (12I)	113.3	13.1	4.5	2790	Flinders Class	49	10	3.7	740
ANZAC Class FFH	118	14.8	4.5	3600	Cook Class	96.5	13	4.6	2450
Hunter Class FF	149.9	20.8		8800	Leeuwin Class	71.2	15.2	4.3	2205
					OPV Variant	95	13	4	1800
<b>Destroyers</b>					<b>Submarines</b>				
Daring Class DD	120	13	3.89	3820	Oberon Class	90	8.1	5.5	2410
Perth Class DDG	133.2	14.3	6.1	4850	Collins Class	77.42	7.8	7	3100
Adelaide Class FFG	138.1	13.7	7.5	4100	(Astute Class)	97	11.3	10	7400
Hobart Class DDG	146.7	18.6	7.2	7000	US Virginia Class	115	10	-	8700
					US Virginia Class (Block 5)	140	10	-	10200
<b>Patrol Vessels</b>					<b>Amphibious Support</b>				
Attack Class PB	32.8	6.1	2.2	100	Bay Class	176	26.4	5.8	16190
Fremantle Class PB	41.9	7.7	1.75	220	JSS (Karl Doorman)	204.7	30.4	7.8	27800
Armidale Class PB	56.8	9.7	2.7	300					
Cape Class PB	57.8	10.3	3	713	<b>Replenishment</b>				
Arafura Class OPV	80	13	4	1640	Tide Class	176.7	21.5	9.7	25941
					Durance Class	157.2	21.2	8.6	18221
<b>Mine Warfare</b>					Supply Class	173.9	23	8	19500
Ton Class	46.6	8.8	2.5	480					
Rushcutter Class	31	9	2	178	<b>Fleet Oiler</b>				
Huon Class	52.5	9.9	3	732	Westralia Class	171	26	12.03	25870
OPV Variant	95	13	4	1800	Sirius Class	191	32	11	25016
<b>Amphibious</b>					<b>Miscellaneous</b>				
Balikpapan Class	44.5	10.1	-	316	MATV (FBE)	93.96	14.4	3.9	2935
Tobruk Class	127	18	-	5800	Salvage/Rescue Vessel	83	16	4.25	3231
Kanimbla Class	159.2	21.2	-	8534	Offshore Supply Vessel	93.2	16	4.05	3690
Canberra Class	230.8	32	7.18	27831	Landing Craft (LCC)	23.3	6.4	-	56.6
					STS Young Endeavour	44	7.8	4	239



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## OUR VALUES

SERVICE

COURAGE

RESPECT

INTEGRITY

EXCELLENCE