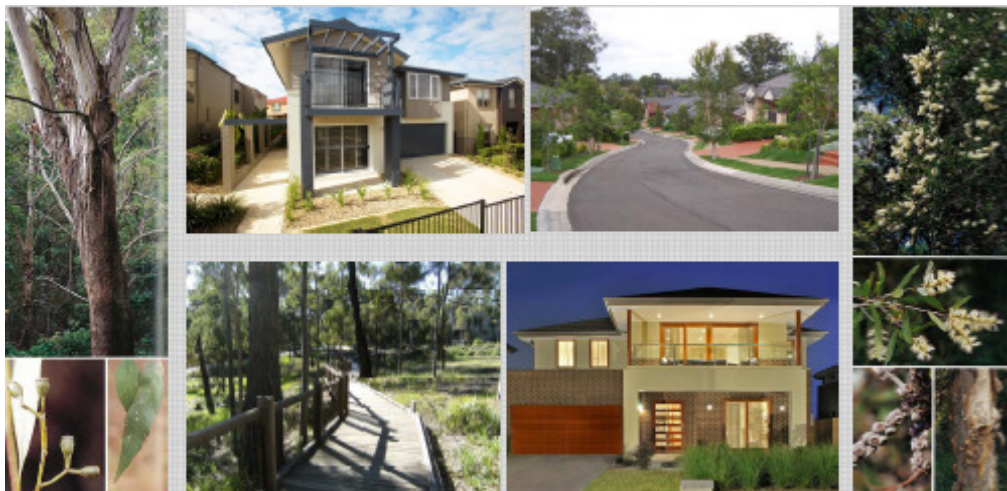




**SUBMISSION TO THE  
PARLIAMENTARY STANDING COMMITTEE  
ON PUBLIC WORKS**

**PROPOSED DEVELOPMENT AND CONSTRUCTION  
OF  
HOUSING FOR DEFENCE  
AT  
VOYAGER POINT NSW (FORMERLY EAST HILLS BARRACKS)**



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## List of Abbreviations and Acronyms

ADF	Australian Defence Force
ARI	Average Recurrence Interval
APZ	Asset protection zone
BES	Bushfire and Environmental Services
DA	Development Approval
Defence	Department of Defence
DCP 2.8	Development Control Plan 2008 Part 2.8
DHA	Defence Housing Australia
DHF	Defence Housing Forecast
EER	Energy Efficiency Rating
EPBC Act	Commonwealth Environment Protection & Biodiversity Conservation Act 1999
FSC	Federal Safety Commission
GLALC	Gandangara Local Aboriginal Land Council
GMREP	Greater Metropolitan Regional Environmental Plan
HLA	HLA Envirosiences Pty Ltd
LCC	Liverpool City Council
LEP	Local Environment Plan
LLEP 2008	Liverpool Local Environment Plan 2008
NatHERS	Nationwide Housing Energy Rating Scheme
PB	Parsons Brinckerhoff PB
PWC	Parliamentary Standing Committee on Public Works
RA	Rent allowance
SLB	Sale and lease back
VMP	Vegetation Management Plan
VPA	Voluntary Planning Agreement VPA
WELS	Water Efficiency Labeling and Standards

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## **IDENTIFICATION OF THE NEED**

### **1 PROJECT OBJECTIVES**

- 1.1** In this submission, Defence Housing Australia (DHA) seeks approval from the Parliamentary Standing Committee on Public Works (PWC) to develop a 15.74 hectare site in the Sydney south western suburb of Voyager Point, NSW. See site location map at Supplementary Item 1.
- 1.2** The objective of the Project is to:
- 1.2.1** Develop the greenfield site, initially producing a serviced, 120 lot subdivision, with potential to yield 137 dwellings.
  - 1.2.2** Provide 59 modern community standard dwellings for the Department of Defence (Defence), comprising 25 detached houses and 34 semi-detached duplexes in part satisfaction of the forecast housing requirements of Australian Defence Force (ADF) members serving in the Liverpool area, and particularly at Holsworthy Army Base, Holsworthy, Sydney.
  - 1.2.3** The remaining lots surplus to Defence provisioning requirements will be sold to the public.

### **2 HISTORICAL BACKGROUND**

- 2.1** The subject site, formerly known as East Hills Army Barracks, was originally acquired for Defence purposes in 1913 and was most likely used for field training.
- 2.2** In the 1950s a migrant hostel was constructed on the site. These buildings were subsequently converted into army barracks for soldier accommodation, including some married quarters. In 1999 the site was used to accommodate refugees from Kosovo and later East Timor. Finally, in 2000, the site was used for Operation Gold, the Olympics security operation.

- 2.3** Between 2000 and 2002, Defence demolished the above-ground structures and decommissioned all the services on and to the site. It was purchased by DHA in May 2003.

### **3 THE NEED**

- 3.1** There are currently about 880 Defence members with dependents who reside in the Liverpool area. The majority of these personnel work at the Holsworthy Army Base.
- 3.2** DHA currently manages about 831 dwellings in and around Liverpool, with about 10 per cent of families in private rental situations receiving rent allowance (RA).
- 3.3** Table 1 below depicts the housing situation for Defence personnel in the Liverpool area. The current Defence Housing Forecast (DHF) (2009/10-2018/19) indicates a reduction of 356 SR's in this region over the 10 year period. Notwithstanding this reduction, owing to the expiry of existing leases and the need to replace houses that do not meet the Defence housing standard that was introduced in July 2007, there is a requirement for an additional 65 dwellings between 2012/13 and 2013/14. The proposal is for the development of Voyager Point to contribute the bulk of this new housing requirement. It is expected that housing in this area will be popular with ADF members owing to its close proximity to the Holsworthy Base, motorway and public transport.

Financial Year		2009-10	2010-11	2011-12	2012-13	2013-14	Total
Defence Housing Forecast		879	840	517	520	523	—
<b>OPENING STOCK</b>		831	794	720	551	508	—
Subtract lease expiries & disposals of sub-standard stock		76	127	228	95	79	605
<b>New housing</b>	New direct leases	0	0	0	0	0	0
	Conversions and options on existing leases	39	53	59	27	3	181
	Direct purchase of existing properties	0	0	0	0	0	0
	Constructions				25	40	65
	<b>Total additions</b>	39	53	59	52	43	246
<b>CLOSING STOCK<sup>1</sup></b>		794	720	551	508	472	—

Table 1 : DHA Housing Requirements for Liverpool Region

#### 4 DESCRIPTION OF THE PROPOSAL

- 4.1** The proposal is to develop the 15.74 hectare site into a 120 lot subdivision for detached dwellings, with potential to yield 137 dwellings by constructing duplex dwellings on selected lots. The construction of duplex dwellings would be subject to further Liverpool City Council (LCC) approval.
- 4.2** The project will provide 59 modern community standard dwellings for Defence, comprising 25 detached houses and 34 semi detached duplexes. The remaining 78 lots that will be surplus to Defence provisioning requirements will be sold to the public.
- 4.3** Further details of the proposal are found in the second part of this submission under the heading 'Technical Information'. The Subdivision layout at Supplementary Item 2 also refers.

<sup>1</sup> The closing stock numbers differ from the DHF numbers by an amount equal to the buffer stock and the number of members in private rentals and receiving Rent Allowance.

## **5 OTHER OPTIONS CONSIDERED**

**5.1** In order to meet ADF operational and Defence housing requirements, DHA uses a variety of delivery methods, including on-base and off-base construction, direct purchase, and various leasing arrangements. Consideration of these methods for the Liverpool area is as follows:

**5.1.1** On-base construction is not possible on nearby Holsworthy Barracks, as there is no suitable site.

**5.1.2** Direct purchase of dwellings is used to acquire stock, but such dwellings of the standard required by Defence are not available in the required locations and numbers. The five year program depicted in Table 1 has no provision for direct purchases.

**5.1.3** Leasing is used extensively by DHA, but most leases are created through DHA's sale and lease back (SLB) program. The five year program depicted in Table 1 has no provision for direct leases.

## **6 REASONS FOR SELECTING THE PREFERRED OPTION**

**6.1** In locations such as Liverpool where there is a high level of inherent Defence demand, constructed housing delivered through bulk procurement contracts is usually the most cost effective provisioning option. DHA is an experienced land developer with the ability to develop housing estates and contract out the construction of houses, with eventual sale through the SLB program. Moreover, control over the housing design enables DHA to deliver housing that is geared to Defence requirements in terms of the house specification and delivery time. The five year program shown at Table 1 has 65 constructions, including the 59 planned for the Voyager Point site.

## **7 ENVIRONMENTAL CONSIDERATIONS**

**7.1** The subject site includes bushland that is part of a significant corridor of native vegetation with associated habitat values. Several walking tracks,



including the Wetland Walk, Mangrove Walk, Eucalypt Walk and Creek Walk cross through this bushland and can be accessed from the site.

**7.2** The site falls within the Georges River Catchment. The New South Wales Greater Metropolitan Regional Environmental Plan (GMREP) No.2 – Georges River Catchment aims to protect the water quality of the Georges River and its tributaries and the environmental quality of the whole catchment. The GMREP No.2 sets out general planning principles to achieve its aim. These planning principles have been incorporated in the LCC Development Control Plan 2008 Part 2.8 (DCP 2.8)<sup>2</sup> which applies to the subject site and includes:

- Protecting aquatic vegetation, fauna and ecology.
- Retaining natural water bodies and wetlands.
- Maintaining and enhancing the natural ecology of the wetland.
- Protecting the river bank and riparian zone from accelerated erosion.
- Protecting and enhancing the riparian vegetation.
- Controlling sedimentation and pollution of Williams Creek and the wetland.
- Encouraging public access to Williams Creek.
- Ensuring effective stormwater management.
- Embellishing the amenity of Williams Creek and the wetland.

**7.3** A number of studies and management plans have been prepared to enable the development to comply with DCP 2.8 and thus ensure minimal or no harm to the environmentally significant parts of the site and adjoining sites. These include Flora and Fauna Surveys, a Stormwater Management Plan, Landscape Plans and a Vegetation Management Plan (VMP). These plans form the basis of a Voluntary Planning Agreement (VPA) signed by DHA and LCC, in which DHA agrees to remediate the vegetation in ecologically sensitive areas (see paragraph 7.4.1), establish an ecologically sound

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<sup>2</sup> DCP 2.8 is a part of the overarching Liverpool Local Environmental Plan (LLEP) 2008 and specifically applies to the Voyager Point site.

drainage system for the site (see paragraph 7.7) and if found necessary (paragraph 7.6), decontaminate the site. The basis of the VPA is that management of the E2 and SP Drainage zones, referred to in the VMP as 'designated areas', will be handed back to LCC at the completion of the project.

#### **7.4 Flora.**

**7.4.1** A flora and fauna assessment of the site was carried out by AES Environmental Consultancy. The consultants reported the presence of two endangered ecological communities: Sydney Coastal River-flat Forest (Forest Red Gum – Narrow-leaved Stringybark – Red Mahogany Open Forest) and Shale/Sandstone Transition Forest (Forest Red Gum – Rough-barked Apple Open Forest). The site also contains a Narrow-leaved Apple – Scribbly Gum Woodland, which, whilst not an endangered ecological community, is also considered a constraint on development, as remnants of this community play a vital supporting function for remnants of endangered ecological communities. These stands of vegetation are in the environmental conservation zone shown on the aerial photograph at Supplementary Item 3 (the zones on the photograph refer to the Zoning Plan at Supplementary Item 4).

**7.4.2** The VMP has been prepared to address the retention of significant vegetation, specify remedial action to be taken to control weeds and remediate areas within the environmental conservation zone and drainage areas, and to detail protective measures to be taken during construction. The VMP has been approved by LCC.

**7.4.3** The remainder of the site has undergone significant disturbance over the years and is considered to be much less ecologically significant. Nonetheless, within the already cleared areas, as many trees as possible will be retained, consistent with the redevelopment of the site.

#### **7.5 Fauna.**

**7.5.1** The AES report also included reference to threatened fauna species that may be considered likely to occur within the site from time to time. Environmental consultants Bushfire and Environmental Services (BES)

were engaged in March 2008 to provide an assessment to determine whether the proposed development is likely to have a significant effect on threatened fauna species, endangered fauna populations or their habitats, pursuant to Section 5A of the *NSW Environmental Planning and Assessment Act*. The consultants concluded that the proposal is unlikely to have a significant effect on threatened fauna species, endangered fauna populations or their habitats; nor does the site contain any potential koala habitat pursuant to NSW State Environmental Planning Policy No 44 – Koala Habitat Protection.

**7.5.2** Following consideration of the administrative guidelines for determining significance under the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999*, (EPBC Act) BES concluded that the proposal is unlikely to have a significant impact on matters of National Environmental Significance and a referral to the Commonwealth Environment Minister is not necessary. Nonetheless, BES recommended a number of impact mitigation and amelioration strategies which have been accepted by DHA.

**7.5.3** Because of the timescale over which previous assessments had been carried out, DHA engaged environmental consultants RPS to review the previous ecological reports with consideration to recent changes in legislation. RPS concluded that the development proposal is unlikely to have a significant impact on any world heritage areas, wetlands of international significance, nationally listed threatened species or migratory species, and confirmed that the proposal is not affected by the EPBC Act.

## **7.6 Site Contamination.**

**7.6.1** The previous Defence use of the site and the subsequent demolition of buildings introduced soil contamination to the site. Following building demolition, the site was remediated before HLA Envirosiences Pty Ltd (HLA) was engaged to conduct an extensive investigation involving the taking of 165 samples. HLA concluded that the site is suitable for the proposed redevelopment for residential use. However, HLA states that it

is likely that some contaminants may remain in-situ at the site. Accordingly, DHA will produce a Site Management Plan that addresses these risks, including the specification of:

- environmental management responsibilities;
- monitoring requirements;
- incident management;
- corrective action procedures;
- complaint handling procedures;
- auditing requirements;
- training programs;
- contingency plans;
- specific environmental management actions to be undertaken in relation to the works; and
- reporting requirements.

**7.6.2** No ground water investigations were conducted during the site investigation. HLA considered that the potential for ground water contamination was low and posed little risk to human health and the environment. HLA based this assessment on the fact that no significant contamination was identified at the surface of the site, no groundwater was encountered down to 2.5 metres (except in the floodplain areas) and the nearest bore was 2km away. The Site Auditor agreed that groundwater investigations were not warranted.

**7.7** ***Drainage.*** The site topography (elevated in the centre) does not present a problem for internal drainage. Stormwater management from the site has been investigated and modelled by consultants Parsons Brinckerhoff (PB) who have determined that, provided suitable water management measures are employed, the proposed development will not impact on flood levels in Georges River, Williams Creek and other related waterways. Stormwater drainage is addressed in further detail at paragraph 18.5.

## **8 HERITAGE CONSIDERATIONS**

### **8.1 European Heritage.**

- 8.1.1** The European land use history of the site is extensive and the study area has been substantially impacted by land use practices. Although it is not established what type of farming was carried out, it is likely to have been ploughed and cultivated.
- 8.1.2** The more major disturbances would have occurred in the 1950s with construction of a migrant hostel and subsequent conversion to an army barracks. The construction activity involved almost the entire site but concentrated on the central portion of the site, where roads, car parks and buildings were constructed along with supporting infrastructure such as power, water and sewerage. The barracks have subsequently been demolished and the work has left a large area of ground disturbance, although some native and exotic trees have been left standing. (See aerial photograph at Supplementary Item 3, taken after demolition of the buildings).

## **8.2 *Indigenous Heritage.***

- 8.2.1** Prior to European settlement, aboriginal tribes inhabited the area of Voyager Point. However, research has revealed no consensus as to the actual tribe.<sup>3</sup>
- 8.2.2** A field survey carried out by Navin Officer Heritage Consultants Pty Ltd in 2004 failed to identify any aboriginal sites. The survey was reviewed and updated by consultants RPS in February 2010, as the original survey was dated and the guidelines had changed. Both consultants concluded that, owing to the major disturbances since European settlement, the site has no Aboriginal archaeological significance.

## **9 *STAKEHOLDER CONSULTATION***

- 9.1 *Liverpool City Council.*** The LCC has been consulted through three formal pre-lodgement meetings (for Development Approval (DA)). LCC has not raised any issues that cannot and will not be satisfactorily addressed in the application for DA.

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<sup>3</sup> Heritage Report – Navin Officer Heritage Consultants Pty Ltd.

## **9.2 General Community.**

**9.2.1** Community consultation was undertaken by the LCC prior to re-zoning by the normal means of public exhibition of the Draft Local Environment Plan (LEP) and through letters sent to adjoining land owners. Further public notification will be undertaken by LCC as part of the DA process.

**9.2.2** Independent of the Council process outlined in paragraph 9.2.1, community feedback will be independently sourced by DHA through an information evening to be held in the first half of April 2010. The event will be advertised to residents through letter box drops and notices in the community newspapers. Outcomes from the information evening will be advised to the PWC at the public hearing, if required.

**9.3 *Indigenous Community.*** The Voyager Point study area is located within the boundaries of the Gandangara Local Aboriginal Land Council (GLALC). The Land Council was contacted prior to the conduct of both field surveys referred to at paragraph 8.2.2, with a GLALC representative assisting the archaeologists in the field survey of the study area on both occasions. Copies of the both archaeological reports were also forwarded to the GLALC for review and comment. No issues have been raised.

## **9.4 Defence.**

**9.4.1** The Director of Relocations and Housing, Department of Defence, Mr. Alan McClelland, has been briefed on the project and has written a letter of support (see Supplementary Item 5).

**9.4.2** A route for a new electricity supply through adjoining Defence land (see paragraph 18.7.1) was negotiated with Infrastructure Division of the Department of Defence.

**9.4.3** The Defence Families of Australia, National Convenor, Mrs. Julie Blackburn has been briefed on the project and has provided her support (see Supplementary Item 6).

**10 REVENUE**

- 10.1** Details of the financial aspects of the project are included in a separate commercial in confidence briefing to the PWC.

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## **TECHNICAL INFORMATION**

### **11 LOCATION**

- 11.1** The subject site is identified as Lot 7 in Deposited Plan 803038, located in the Liverpool local government area (see Supplementary Item 4). The south and south-eastern boundaries of the site adjoin a residential development known as “The Sanctuary”. Williams Creek, a tributary of the Georges River, forms the western boundary of the site and connects to the Georges River approximately one kilometre to the north. The western, northern and north-eastern boundaries of the site adjoin bushland on the Voyager Point Peninsula which is formed by the confluence of Georges River and Williams Creek.
- 11.2** To the north, beyond Georges River, is an established residential area in Hammondville, Holsworthy and Wattle Grove. The site is approximately 26km (direct line) southwest of Sydney’s Central Business District, 6km to the southeast of Liverpool, and 8km southwest of the Bankstown town centre.
- 11.3** The site is ideally located for personnel working at Holsworthy Base, just 3 km away. Access is via Heathcote Road which connects to the M5 South Western Motorway. A location map is at Supplementary Item 1.

### **12 PROJECT SCOPE**

- 12.1** The scope of the project is to sub-divide the usable, more elevated area of the site into 120 freehold lots. Seventeen of the lots will have the potential to be used to construct duplex dwellings, such that, subject to further approval by LCC, the site has a maximum capacity for 137 dwellings. A Subdivision layout is at Supplementary Item 2.
- 12.2** The subdivision is to be developed in two staggered stages. The progressive delivery of sites accommodates DHA’s required provisioning schedule, enables sewerage services to be phased to topographical constraints and improves DHA’s cash flow situation.



### **13 SITE SELECTION**

**13.1** As outlined at paragraphs 2.2 and 2.3, the site was surplus Defence land that was offered to DHA on a Priority Sale basis. Being suitable for residential development and conveniently located to the Holsworthy Barracks, DHA negotiated the purchase at valuation.

### **14 SITE DESCRIPTION**

**14.1** The site has a central ridge, with gentle slopes generally falling in two directions, west towards Williams Creek and east towards an unnamed water course flowing to the Georges River. The site is relatively flat, with slopes varying from less than 2 per cent to approximately 5 per cent.

**14.2** As noted in paragraph 8.1.2, the site has been subjected to building and subsequent demolition that has left large area of ground disturbance, with some native and exotic trees left standing. (See aerial photograph at Supplementary Item 3, taken after demolition of the buildings).

**14.3** As noted in paragraph 7.6 the previous Defence use of the site and the subsequent demolition of buildings introduced soil contamination to the site. While the site has been remediated, it is likely that some contaminants may remain. Removal of any contaminants discovered will be managed through a Site Management Plan.

### **15 ZONING AND APPROVALS**

**15.1** At the time of DHA purchase, the site was zoned “Special Uses 5(a) – Military”. Subsequently DHA was granted rezoning approval of the site to permit residential use to a maximum yield of 137 dwellings. Rezoning of the site to include predominantly R2 (low residential), as well as SP2 (Infrastructure-drainage) and E2 (environmental conservation) was formally approved in September 2008. A map showing the different zones is at Supplementary Item 4.

**15.2** A condition of the rezoning is that the site is now subject to the planning provisions of:

- the Comprehensive Liverpool Local Environment Plan 2008 (LLEP 2008);
- the Site specific Liverpool Development Control Plan 2008 *Part 2.8 Land Subdivision and Development North of the Railway Line at Voyager Point*; and
- a site specific Planning Agreement signed by DHA and the LCC.

## **16 DETAILS OF LAND ACQUISITION**

**16.1** In May 2003, DHA purchased the 15.74 hectare surplus site from Defence under the Priority Sale provisions of the Services Agreement<sup>4</sup>.

## **17 CODES AND STANDARDS**

**17.1** All design and construction works carried out as part of this project will comply with or exceed local, State and Federal controls and requirements, and all housing works will meet the Building Code of Australia.

**17.2** Site engineering works will be certified by LCC or an LCC approved private certifier.

**17.3** All building construction requiring certification will be undertaken by approved Private Certifiers.

**17.4** All contractors used for civil works and construction of houses will be accredited by the Federal Safety Commission (FSC) under the Australian Government Building and Construction OHS Accreditation Scheme, and compliant with the National Code of Practice for the construction Industry.

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<sup>4</sup> The Services Agreement on Housing and Related Matters requires Defence to provide notice of surplus land to DHA for a potential priority sale in accordance with the Commonwealth Property Disposals Policy.

## **18 PLANNING AND DESIGN CONCEPTS**

### **18.1 Structure, Materials and Finishes.**

**18.1.1** Dwellings will be constructed by local contactors engaged through a 'Design and Construct' request for tender. Contractors will be expected to submit house designs using materials that are durable and robust. Contractors will be required to deliver homes that are well constructed and that do not require regular maintenance such as painting.

**18.1.2** DHA expects that designs tendered will be contemporary using a mix of different external materials and finishes. Duplex designs will be designed to resemble large houses, consistent with the scale in the neighbouring estate and what is expected to be built on the subject estate. To achieve this outcome, DHA will issue architectural guidance for duplex homes. Generally, the intention is for DHA houses on the site to blend into the other homes that are built on the lots sold to the general public. Supplementary Item 7 shows typical house designs that are expected to be tendered.

### **18.2 Subsurface Conditions.**

**18.2.1** A geotechnical survey was carried out by consultants PB. PB found the development area to be generally underlain by medium to high plasticity residual clays overlying weathered sandstone bedrock 0.6m to 1.8m below ground level. The consultants concluded that the site was generally favourable for residential development and road construction, but noted that excavations at the site may be difficult in areas where shallow, high strength sandstone is encountered. They further advised that foundations at the site should be designed to allow for moderately to highly reactive soil movements due to potential moisture variation in the reactive clay soils.

**18.2.2** Further geotechnical investigation will be required to determine specific issues for individual lots following construction of the subdivision and completion of regrading works. However, based on the survey results, DHA is confident that estimates for site engineering works will cover any soil conditions encountered.



### **18.3 Erosion and Sediment Control.**

**18.3.1** Development of the site will involve considerable excavation and earth works to realign the 100 year Average Recurrence Interval (ARI) flood contour (refer paragraph 18.5). All erosion and sediment controls will be established and maintained in accordance with LCC's current Erosion and Sediment Control Standard and as documented on the approved Construction Certification drawings for the project. During earthworks operations, detention basins will be used within the site to protect adjoining properties from runoff. The proposed development will not alter local drainage characteristics and will not cause ponding or negatively impact on adjacent properties or roadways.

**18.3.2 *Excavation of Fill.*** Excavation and fill operation and controls will be established during construction work. Dust emissions will be controlled by sprinkling from a water truck, and by minimising site disturbance.

### **18.4 Water supply.**

**18.4.1** An assessment of the water supply requirements for the site was carried out by consultants PB who have determined that the peak demand of 1,082 kL/day can be met by two 150mm mains connected into the supply to the neighbouring development to the south-east (The Sanctuary).

### **18.5 Drainage.**

**18.5.1** As noted in paragraph 14.1 the site features a central ridge, with gentle slopes generally falling in two directions, east and west. Two stormwater catchments are thus formed: one draining westward to Williams Creek, the other eastward to Georges River via an unnamed waterway.

**18.5.2** Parts of the site are flood prone, reducing the area available for residential development. The 1 in 100 year flood level has been determined through flood modelling and lies along the western and eastern edge of the site. The majority of the flooding is limited to riparian zone, but some portions of the proposed development (16 lots) are located a small amount below the 1 in 100 year flood level. Accordingly, some cutting and filling will be undertaken to ensure the required flood elevation plus 0.5m freeboard is achieved. PB has determined that the

extent of filling will maintain the flood plain volume balance and produce no net impact on flooding adjacent to, or upstream of the development site.

- 18.5.3** A high standard of water quality treatment is required before stormwater can be released into Williams Creek and the Georges River. The required runoff water standard will be achieved by the use of water quality devices such as water tanks to collect roof runoff on each lot, grass-lined swales and detention basins (see paragraph 27.3). Design of these devices will meet treatment criteria prescribed in Australian Runoff Quality (Engineers Australia, 2006). The locations of detention basins, are shown in Supplementary Item 8.

## **18.6 Sewerage.**

- 18.6.1** In the past, wastewater flows from the barracks were transferred to the Holsworthy sewage treatment plant which is located approximately 500 metres to the northwest of the site. This local sewage treatment plant is no longer operational and is currently being decommissioned and remediated by Sydney Water. A transfer pumping station is now operating, pumping wastewater to the Liverpool regional sewerage treatment plant.
- 18.6.2** Consultants PB carried out a study of the sewerage requirements examining a number of options. The accepted solution is to construct a new sewage pumping station within the drainage reserve on the south-eastern corner of the site. The pumping station will transfer wastewater flows from the eastern side of the site via a rising main to connect to an existing 300mm sewer main in the public reserve north of Buxifolia Court in 'The Sanctuary'. Flows from the western side will gravity feed to the same connection. Sydney Water has advised that the sewerage system in 'The Sanctuary' has sufficient capacity to accommodate DHA's maximum proposed development of 137 lots.

## **18.7 Electrical Services.**

- 18.7.1** Integral Energy advised DHA that supply of electricity via 'The Sanctuary' would not be possible because the demand would exceed the capacity

of the electrical spur that supplies that site. To resolve the issue, DHA has successfully negotiated with Defence to access, augment and extend the existing electrical infrastructure on neighbouring Defence site, west of Williams Creek. A new 11kV feeder main will be laid including an underbore of Williams Creek. Project budgetary estimates allow for this work. Supplementary Item 9 refers.

**18.7.2** Integral Energy has expressed satisfaction with this solution, subject to detailed design. Indeed, as part of the electrical reticulation plans, a cross connection will be made to the adjacent development, resolving the current electrical servicing issue in the wider area, thereby benefitting the surrounding community.

**18.7.3** Electrical power to individual lots will be provided underground in accordance with the requirements of LCC and Integral Energy.

**18.8 *Gas Supply.*** Alinta has advised that gas is available to the site via connection to an existing 50mm diameter gas main that runs parallel to a section of neighbouring Sirius Road. The existing main will be extended into the development and will act as a ring main to supply the household reticulation system.

**18.9 *Telecommunications.*** Telstra has advised that telephone services will be connected to the site the estate from the neighbouring estate in Sirius Road. Telstra has also advised that the nearest exchange (Revesby) has sufficient capacity to accommodate the development.

**18.10** The opportunity to provide the development with a range of enhanced telecommunications services, such as high speed broadband and cable television, will be further discussed with Telstra (or other national broadband network provider if available) following issue of the Development Application.

**18.11 *Mechanical Services.*** All houses will be air conditioned in accordance with Defence requirements, which for the Sydney area require reverse cycle split systems fitted to the main bedroom and living rooms, plus ceiling fans to all bedrooms and living rooms.

## **19 ACOUSTICS**

**19.1** There are no acoustics issues associated with the site.

## **20 WATER AND ENERGY CONSERVATION MEASURES**

**20.1 Water.** Reduction of demand on the potable mains supply will be in accordance with the DHA Performance and Design Requirements (Supplementary Item 15). Specifically:

- plumbing – minimum Water Efficiency Labeling and Standards (WELS) ratings 4 star for tap ware and showers and 6/3L dual flush toilets; and
- the roof runoff from each dwelling will be connected to a 5kL tank. The collected water will be used for gardening purposes, the cold water washing machine tap and toilet flushing.

### **20.2 Direct energy consumption.**

**20.2.1** All dwellings must comply with DHA's Performance and Design Requirements. In particular, all dwellings must achieve a minimum 6 star Energy Efficiency Rating (EER) as certified by an independent accredited assessor, using the Nationwide Housing Energy Rating Scheme (NatHERS) or other equivalent method.

**20.2.2** Good solar orientation of the site will facilitate 6 star construction. The lot layout has been designed to achieve 92 per cent of lots oriented in the optimum direction for good solar access (see paragraph 21.2). For the remaining 8 per cent, good passive solar design will overcome orientation deficiencies.

## **21 MASTER AND SITE PLANNING CONSIDERATIONS**

**21.1 Lot arrangement.** The subdivision plan is shown at Supplementary Item 2. The site will be divided into 120 housing lots, generally ranging in size from 450 sq.m. to 700 sq.m. DHA intends to seek further DA to create duplex sites on 17 of the larger lots, to give a total site yield of 137 lots. The



duplex sites will be in accordance with DCP 2.8. It should be noted that, while the subdivision plan at Supplementary Item 2 shows 36 lots as potential duplex sites, LCC has limited the maximum number to 17.

**21.2 Lot orientation.** Lot orientation is such that it maximises solar access and capitalises on the proximity to surrounding bushland. Lot orientation took into account the micro climatic aspects of the area, shown at Supplementary Item 10. With optimum solar access the major consideration, the site plan aimed to align streets in either a east-west or north-south orientation with the following tolerances:

- north-south – between 20 degrees west and 30 degrees east of true north; and
- east-west – between 30 degrees south and 20 degrees of north.

Supplementary Item 11 illustrates the concept. A total 110 of the 120 lots (92 per cent ) were able to be aligned in the optimum direction.

**21.3 Recreation Area.** Site master planning has been developed with consideration of a gully line running through the site to the west of the central ridge feature. This gully alignment is incorporated into the configuration of the streets and a drainage reserve that acts as open space. A shallow detention basin in the drainage reserve will allow for passive recreation uses within the open space area when the basin is dry.

#### **21.4 Roads.**

##### **21.4.1 Connection to External Road Network.**

**21.4.1.1** The site will connect to the external road network via the neighbouring estate at Sirius Road, joining Heathcote Road at The Avenue. See Supplementary Item 12. Note that the bridge over the Georges River joining Voyager Point to East Hills is a foot bridge.

**21.4.1.2** An analysis of external traffic by consultants PB examined existing and future traffic conditions at several key intersections in the vicinity of the site. The intersection analysis results indicate that the additional traffic generated by the proposed redevelopment of the site would not create any significant adverse impact to the performance of any intersections,

with the possible exception of the intersection of Heathcote Road and Macarthur Drive. The consultants believe that this intersection would require upgrade to traffic signals in order to accommodate future traffic demand due to the natural growth in the background traffic, as well as traffic generated by proposed developments in the area. However, the traffic report recommended that the performance of this intersection be monitored for signs of unacceptable congestion and delay prior to any works being undertaken. DHA has made an allowance in the project budget to contribute to this future eventuality.

**21.4.2 Internal Road Network.** The subdivision has been designed to create a logical street hierarchy, which comprises an entry road off Sirius Road and a perimeter road which provides good access to the proposed open space network surrounding the site and a network of local streets. The internal road design is in accordance with the specifications detailed in DCP 2.8 with intersections designed in accordance with the RTA Austroads Road Design Guide. The entry road to the site from Sirius Road and is 11m wide in recognition of its status as an entry road and the slightly higher traffic density. The perimeter road around the western, northern and eastern boundaries is 8.5m wide and forms part of the bushfire related asset protection zone (APZ) described at paragraph 25.2. Other roads are 8m width.

**21.5 Footpaths.** The site will include footpaths and bicycle paths to encourage cycling and walking. Two shared bicycle and footpaths will be provided to link Sirius Road to existing bushland paths to the north of the site: one on the western side via the perimeter road, the other on the eastern side on perimeter road and through the drainage reserve. Sirius Road provides residents of the new site with bicycle and pedestrian access to East Hills via a footbridge over the Georges River.

**21.6 Car Parking.** All dwellings will be designed to accommodate two parking spaces each. Visitor parking is accommodated by the width of the streets.

## **22 PROVISION FOR PEOPLE WITH DISABILITIES**

**22.1** The current Defence policy is for Defence families with special needs to be accommodated by DHA by either modifying existing homes, or by renting properties that are already modified or that can be modified to meet the particular requirements of the family.

**22.2** DHA is cognisant of the previous PWC recommendation to establish the demand for houses with disability provisions and to reflect this demand in a designated proportion of housing stock. This recommendation is currently under consideration by Defence and DHA, taking into account the complex issues involved including:

- the ability or inability of the current approach to match, in a timely and cost effective manner, appropriate housing for member families with disabilities,
- the percentage of special needs families,
- specific requirements to cater for the different types of disabilities,
- the rate of house turnover,
- the availability of houses with disabled facilities at the time when they are required for allocation,
- the satisfaction of personnel without special needs being required to live in a house that incorporates facilities for the disabled (otherwise the home would remain vacant),
- the effect on DHA's funding model as these special homes may be required to be retained in DHA ownership rather than sold via DHA's sale and lease program,
- the additional costs of building a pre-determined percentage of houses with disabled provisions in terms of additional footprint/block size and buying non-standard fittings, and
- the relative costs of establishing this percentage of houses with disabled provisions vis-à-vis the current policy of supplying on demand.

**22.3** Meanwhile, the Voyager Point development includes 12 lots (10 percent) that have topography and size conducive to building houses with disabled provisions.

## **23 HERITAGE CONSIDERATIONS**

**23.1** Heritage considerations have been addressed in paragraphs 8.1 and 8.2. In summary, assessment by Navin Officer Heritage Consultants Pty Ltd has determined that the site contains no items of heritage significance with respect to either its aboriginal or European heritage. A subsequent review by consultants RPS confirmed this finding.

## **24 COMMUNITY FACILITIES**

**24.1 *Shops and Services.*** The site is located in the Liverpool local government area and is approximately 26km southwest of Sydney's Central Business District. The closest regional centres are Liverpool which is approximately 6km to the northwest, and Bankstown which is approximately 8km to the northeast. The shopping centre at nearby Wattle Grove (3km away) includes a Coles supermarket.

### **24.2 *Public transport.***

**24.2.1** There is a limited bus service that runs between Liverpool and Holsworthy and which stops at Voyager Point: three buses in the morning between 7.17 and 8.26am and four in the afternoon between 3.22 and 6.23pm.

**24.2.2** The closest railway stations serving the site are Holsworthy and East Hills on the Airport and East Hills line. East Hills station is less than a 2km walk via a footbridge over the Georges River. A journey to Circular Quay takes approximately 50minutes, and trains run every 15 minutes at peak times 30 minutes off peak.

### **24.3 Education.**

**24.3.1 Primary Schools.** The nearest primary schools are in the neighbouring suburbs of East Hills, Wattle Grove and Hammondville.

**24.3.2 Secondary Schools.** High schools are located at Holsworthy and Moorebank.

**24.4 Child Care Facilities.** There are numerous child care centres located in Hammondville, Holsworthy, Wattle Grove and East Hills.

## **25 FIRE PROTECTION AND SECURITY MEASURES**

**25.1** Voyager Point is identified by LCC as bushfire prone land. To comply with the Rural Fires Act 1997, a Bushfire Protection Assessment has been prepared for DHA by consultants BES and reviewed and updated by consultants RPS. The consultants have advised that the APZ for the proposed sub-division exceeds the 25m minimum requirement and that other aspects of road and hydrant design comply with requirements.

**25.2** Design of the site has incorporated a 50 metre APZ along the western and eastern boundaries. This increased APZ will allow for a level 1 construction standard (per AS 3959-1999) on the eastern and western sections of the subdivision and will result in an overall reduction in lots burdened by bushfire construction standards, thereby reducing building costs and increasing affordability. Supplementary Item 13 refers. A Bushfire Safety Authority is expected to be provided by the NSW Rural Fire Service as part of the DA approval process.

**25.3** Dwelling construction will conform to Australian standards and the Building code of Australia.

**25.4** Combined security / insect screens will be fitted to all external doors, including sliding doors, and security screens will be fitted to all opening windows.

## **26 OCCUPATIONAL HEALTH AND SAFETY**

- 26.1** All DHA civil works and construction contractors to be used in the project will be accredited by the Federal Safety Commissioner.

## **27 LANDSCAPING**

- 27.1** The objective of site landscaping is to create a quality community residential development with high standards of environmental sustainability, accessibility, recreational open space and streetscape character that is sympathetic to the existing surrounding forest bushland character and riparian corridor to Williams Creek. A Landscape Plan is at Supplementary Item 14.
- 27.2** Williams creek and surrounding forest will be rehabilitated by removing weeds and replanting with native species to protect and enhance existing stands of vegetation. A range of native vegetation will be introduced into the streetscape and open space areas to blend the urban and natural character of the site.
- 27.3** The landscape design incorporates the grass-lined swales and detention basins to control run-off, as required by the drainage plan (paragraph 18.5). These basins will not hold water for prolonged periods, and for ease of maintenance have been designed to become part of the surrounding grassed parkland areas which also form part of the asset protection zone. The overflow swales are designed at a 1per cent incline across the existing contours to provide further infiltration and slowing before the stormwater finally is dispersed into Williams Creek.
- 27.4** Landscaping of lots will be in accordance with the DHA Design and Construction Specification (Supplementary item 15), using drought resistant native plant species appropriate to the Sydney climate.

## **28 CONSULTATION WITH AUTHORITIES**

- 28.1** Over the process of the rezoning application and intended future subdivision of the subject site, a number of meetings were held with state agencies

including the (then) Department of Infrastructure, Planning and Natural Resources, the (then) National Parks and Wildlife Service and LCC.

## **28.2 Liverpool City Council.**

**28.2.1** LCC was consulted from a very early stage of the project. A number of development options and schemes were assessed in an effort to achieve an acceptable return on investment, provide the necessary flexibility for future Service Residence provisioning, creation of a good mix of lot sizes to best fit DHA & private market differing requirements, and meet LCC requirements. The current scheme that forms part of this proposal is an evolution of this process.

**28.2.2** A meeting was held with LCC Staff in June 2007 to discuss the detailed expectations of the Council. At the Council's request, a Pre-Development Application meeting was held on Wednesday 28 November 2007, and further pre-lodgement meetings have been held on 12 October 2009 and on 24 February 2010. DHA believes it has addressed all the requirements for Development Approval.

**28.2.3** LCC has advised DHA that the proposal is supported in principle, but that final DA will be subject to a detailed assessment of DHA's application, including the review of any issues raised via the public submission process. Formal submission for DA was lodged on 12 March 2010.

**28.3** A project briefing has been provided (through the Minister for Defence Personnel, Materiel and Support) to the local Federal Member of Parliament, Dana Vale MP, member for Hughes.

## **29 IMPACT ON THE LOCAL COMMUNITY**

**29.1 General.** The eventual addition of up to 137 families to the suburb of Voyager Point should have little impact on the local community. As indicated in paragraph 21.4, vehicular traffic from the Estate will not significantly affect traffic volumes in the surrounding road network, although

the traffic consultants noted (paragraph 21.4.1) that the intersections with Heathcote Road and Macarthur Drive should be monitored.

**29.2 *Economic.*** The proposed project will have a positive economic effect during the development and construction period. Economic activity is generated by individuals and local businesses working directly on site as well as by individuals and businesses off-site providing goods and services to support the project. The construction of 59 new dwellings for DHA and the eventual construction of 137 total is not expected to affect either the sale or rental markets for residential accommodation in the local area. Sale of DHA properties will be confined to the investor market, while the reduction in rental demand will be a very small proportion of the Liverpool market.

### **30 *PROJECT COSTS***

**30.1** The estimated overall project cost is \$45.1million including GST and the cost of land.

**30.2** The cost of the project will be funded by DHA and recovered through its SLB program. Confidential costing information will be supplied separately to the PWC.

### **31 *PROJECT DELIVERY SYSTEM***

**31.1** The project will be delivered in two stages that will align to the topography/draining of the site. The street layout facilitates this staged development.

**31.2** Development and construction packages will be contracted on a fixed price lump sum basis to a select panel of FSC accredited tenderers who will have been successful in addressing the selection criteria from a call for expressions of interest. The successful tenderer will be required to comply with the DHA Performance and Design Requirements (Supplementary Item 15), and with architectural guidelines aimed at delivering homes that are sympathetic to the general character of the area.



## 32 PROJECT SCHEDULE

32.1 Subject to Parliamentary approval in or by June 2010, the significant milestones to achieve completion of the project by December 2013 are:

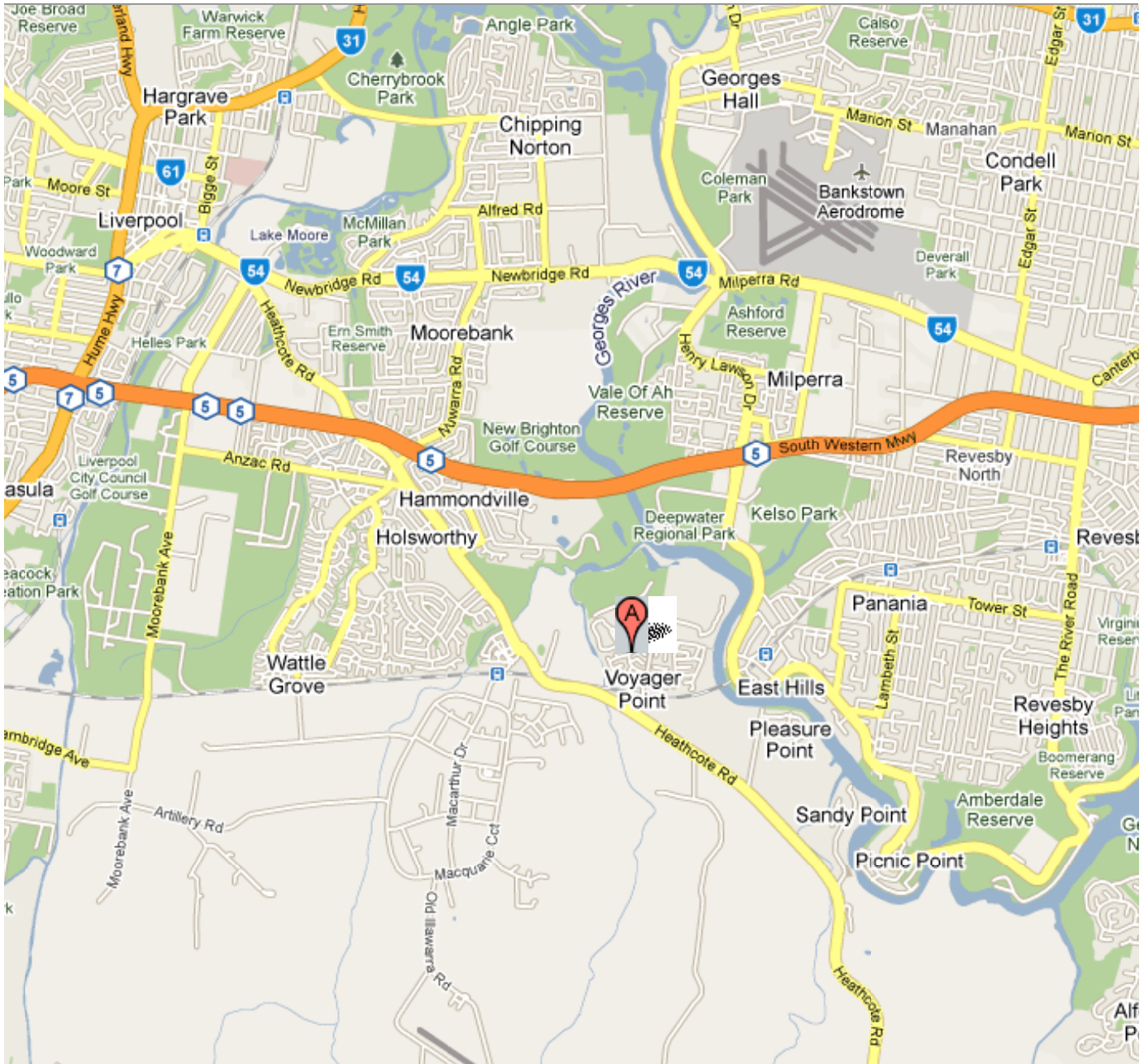
<b>Activity</b>	<b>Start</b>	<b>Completion</b>
<i>Preparation of detailed documentation for site engineering works</i>	July 2010	November 2010
<i>Civil works tender, evaluation and award</i>	December 2010	February 2011
<i>Site engineering works;</i>		
<i>Stage 1(65 lots)</i>	March 2011	July 2011
<i>Stage 2 (55 lots+ Sewer Pump Station &amp; rising main)</i>	May 2011	October 2011
<i>Subdivision Freehold Titles</i>		
<i>Stage 1</i>	August 2011	October 2011
<i>Stage 2</i>	November 2011	January 2012
<i>Construction of 59 dwellings</i>	January 2012	December 2013

# Supplementary information

- Item 1 Site Location Map
- Item 2 Sub-division Layout
- Item 3 Vegetation Management
- Item 4 Zoning Map
- Item 5 Letter from Director of Relocations & Housing
- Item 6 Letter from Defence Families Australia
- Item 7 House Typologies
- Item 8 Stormwater Management Plan
- Item 9 Electricity Supply Route
- Item 10 Microclimate
- Item 11 Lot Orientation
- Item 12 Transport Network
- Item 13 Bushfire Protection Plan
- Item 14 Landscape Plan
- Item 15 Design and construction specifications for DHA residences

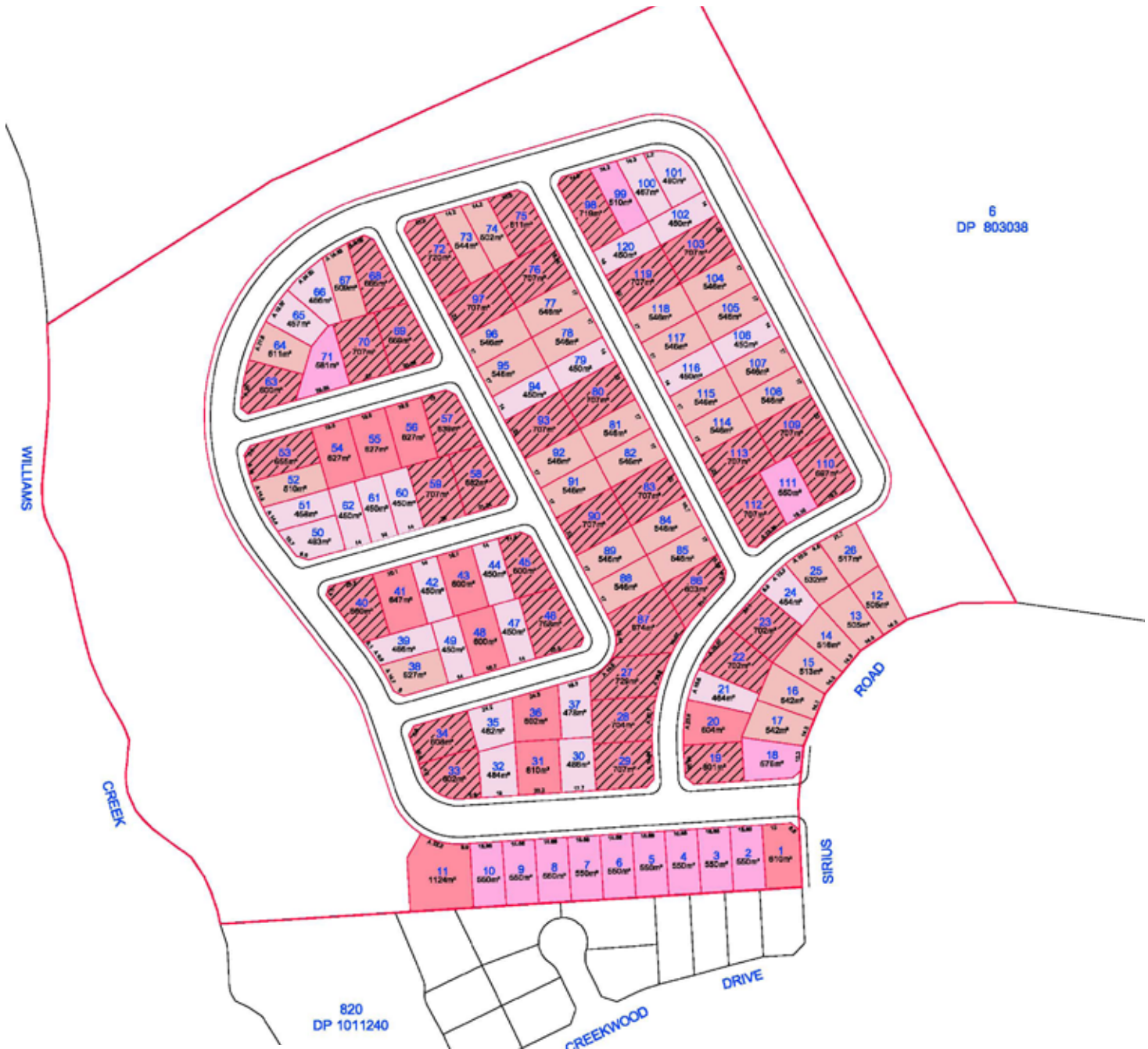
# Supplementary item 1

## Site Location Map



# Supplementary item 2

## Sub-division Layout

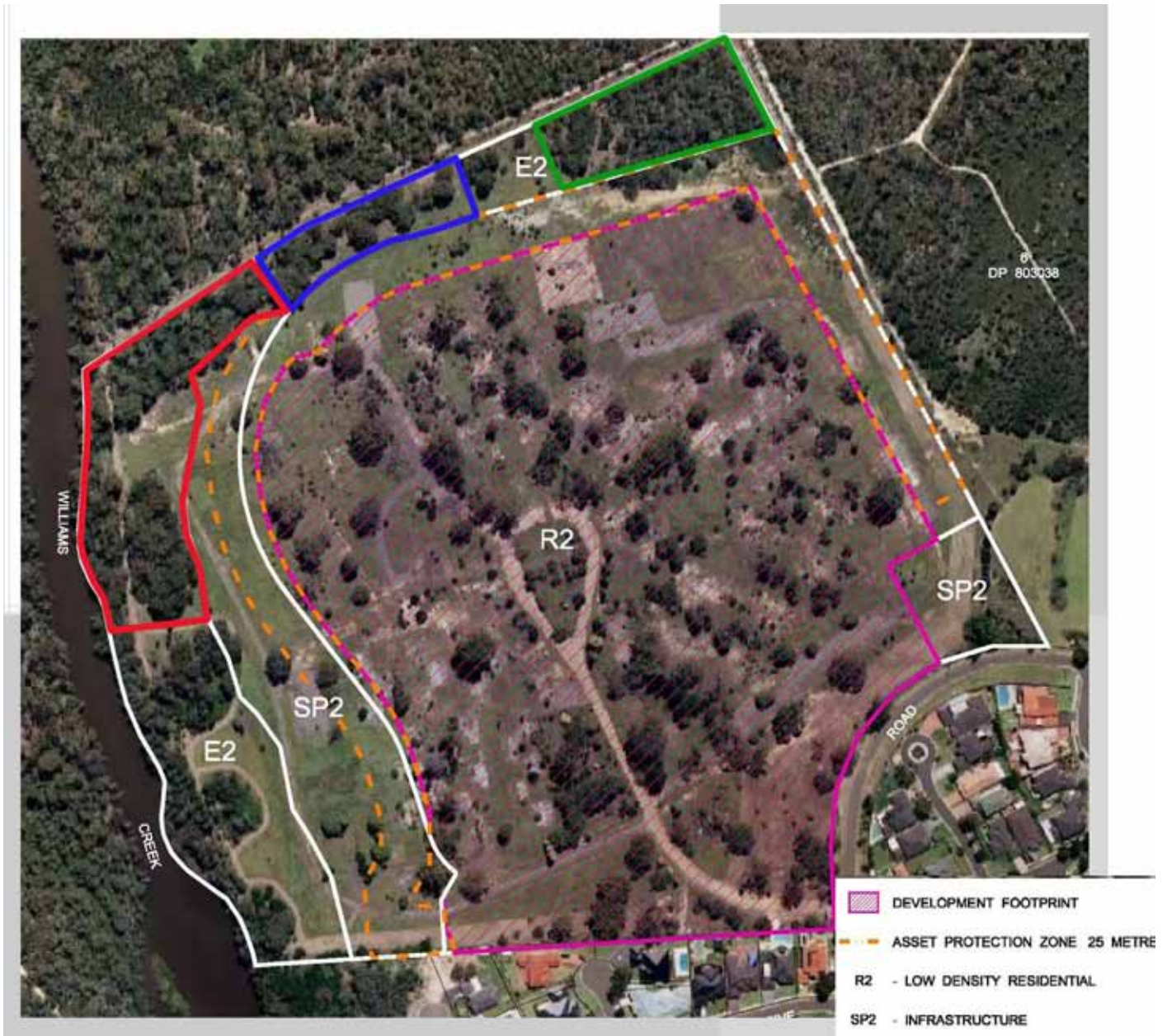


- LOT AREA 450 m<sup>2</sup> - 500 m<sup>2</sup>
- LOT AREA 500 m<sup>2</sup> - 550 m<sup>2</sup>
- LOT AREA 550m<sup>2</sup> - 600 m<sup>2</sup>
- LOT AREA 600 m<sup>2</sup> +
- LOT SUITABLE FOR DUPLEX



# Supplementary item 3

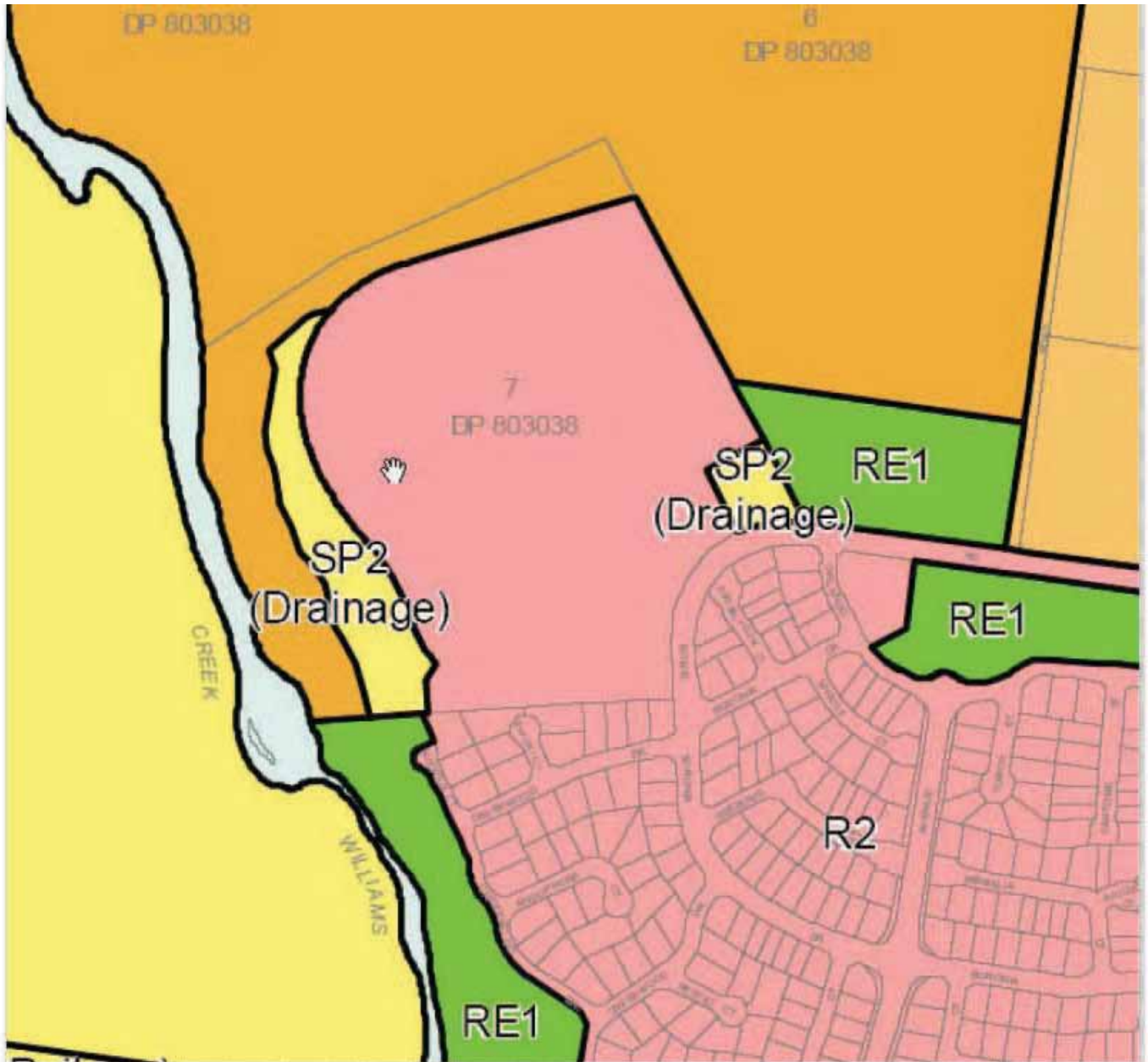
## Vegetation Management



- Narrow-leaved Apple - Scribbly Gum Woodland
- Forest Red Gum - Rough-barked Apple Open Forest
- Forest Red Gum - Narrow-leaved Stringbark - Red Mahogany Open Forest

# Supplementary item 4

## Zoning Map



SP2 - Drainage



RE1 - Public Recreation



R2 - Low density residential



E2 - Environmental conservation



# Supplementary item 5

## Letter from Director of Relocations & Housing



**Australian Government**

**Department of Defence**  
Defence Support Group

Directorate of Relocations & Housing  
Personnel Services  
Campbell Park Offices (CP3-7-035)  
CANBERRA ACT 2600  
☎: 02 6266 3543

Mr Peter Howman  
Chief Operating Officer  
Defence Housing Australia  
26 Brisbane Avenue  
BARTON ACT 2600



Dear Mr Howman,

**Voyager Point Development, Sydney.**

Thank you for your recent briefing presentation on the Voyager Point development. I strongly support the proposed plan developed by Defence Housing Australia (DHA) for Voyager Point, Sydney.

Housing is a critical issue for Defence in the Sydney area, with a high proportion of members forced to rent houses in the private market because of a shortage of DHA housing stock. This situation is undesirable as it requires members of the Australian Defence Force (ADF) and their families to occupy temporary accommodation while they search for suitable housing. Members may also be required to change rental accommodation during their posting tenure. This can be at considerable additional cost to Defence.

The proposed development at Voyager Point will be ideally suited to house members posted to Holsworthy. It is a short distance to the base and has easy access to community facilities like schools, shops and public transport.

DHA propose to construct 59 Service Residences (25 free-standing and 34 duplexes) on this site, with the majority of the housing being 3 bedrooms and in the lower Rent Band range that make them suitable for couples and small families.

I am confident that the accommodation DHA proposes to construct will be very popular with ADF Members and their families who work in the Western Sydney area. It will greatly assist Defence meeting its obligations to provide community standard housing for Defence families

Yours sincerely



**Alan McClelland**  
Director Relocations & Housing  
12 March 2010

# Supplementary item 6

## Letter from Defence Families Australia



Defence Families of Australia  
 CP2 - 1 - 11  
 Campbell Park Offices  
 Canberra ACT 2600

Mr Michael Del Gigante  
 Managing Director  
 Defence Housing Australia  
 26 Brisbane Avenue  
 BARTON ACT 2600

10 March 2010

**RE: VOYAGER POINT PROJECT**

*Dear Michael,*

Thank you for the presentation on the Voyager Point project from your project Director, Mr. Vy D'Arcy. It is clear that the project is a promising development supported by dedicated DHA staff and contractors.

I am advised that the homes to be built on the Voyager Point Estate will be contemporary open plan designs that support the lifestyle of modern families. The Voyager Point location offers large beautiful homes for families choosing to live there, which is why it is important for DHA homes to reflect this community standard.

Whilst the project is sound in principle, DFA asks DHA to be cautious in the introduction of duplex houses, as these may be regarded as not in keeping with the other housing types on the estate.

DFA recognises that land is difficult to source in the Liverpool area, and especially so close to the army bases at Moorebank and Holsworthy. My concerns for this location lie in relation to limitations of local area bus transport, walking and cycling options. These should be overcome by DHA approaching local council to ensure adequate access such as footpaths and local buses in the area.

In general, Defence Families Australia supports the Voyager Point project, and would appreciate updates on its progress, as well as being kept informed on other projects being planned by DHA.

Yours Sincerely,



Julie Blackburn  
 DFA National Convenor  
 Ph: 0410 626 103  
 Email: [julie.blackburn1@defence.gov.au](mailto:julie.blackburn1@defence.gov.au)



Defence Families of Australia



CP2 - 1 - 11, Campbell Park Offices, Canberra, ACT, 2600



1800 100 509



[www.dfa.org.au](http://www.dfa.org.au)





# Supplementary item 7

## House Typologies








# Supplementary item 8

## Stormwater Management Plan



**Legend**

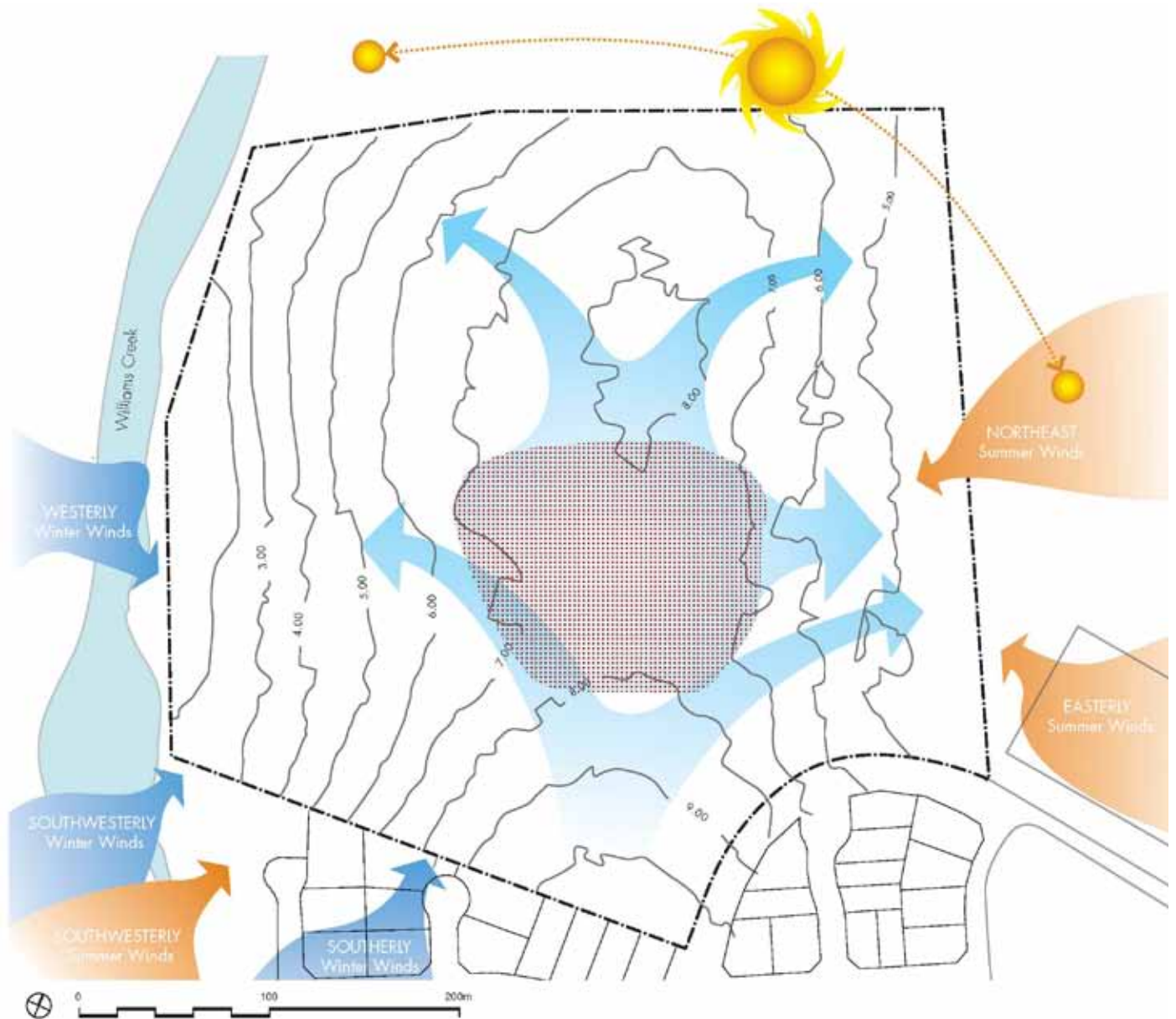
-  DEVELOPED CATCHMENT BOUNDARY
-  GROSS POLLUTANT TRAP
-  OUTFALL LOCATIONS
-  PROPOSED DETENTION / WATER QUALITY BASINS
-  PROPOSED CONCEPTUAL STORMWATER NETWORK










# Supplementary item 10

## Microclimate



-  PREVAILING WIND DIRECTION (Summer)
-  PREVAILING WIND DIRECTION (Winter)
-  HIGH POINT
-  NATURAL DRAINAGE
-  SITE BOUNDARY



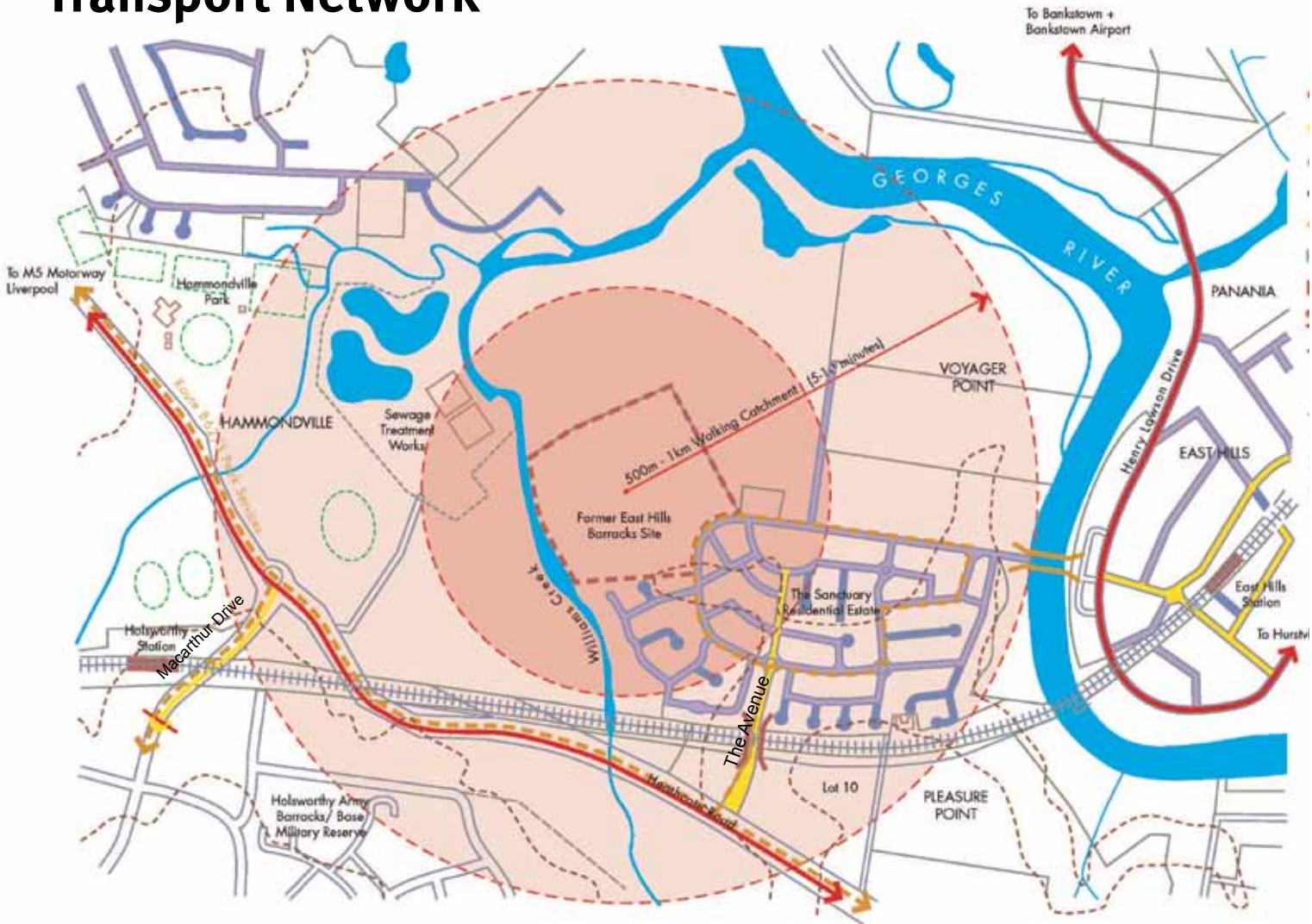
# Supplementary item 11

## Lot Orientation



# Supplementary item 12

## Transport Network



**Vehicle + Transport Networks**

-  Highway/ Main Route
-  Secondary Access Roads
-  Local Residential Access Roads
-  Cul-de-sacs
-  "Transit First" Peak Bus Service
-  East Hills Railway Line
-  Rail Station
-  Former East Hills Barracks Site
-  Contours
-  1-in-100 Year Floodline
-  Recreational Areas
-  Pedestrian only bridge
-  Vehicular Bridge

# Supplementary item 13

## Bushfire Protection Plan



**LEGEND**

**BUILDING CONSTRUCTION LEVEL STANDARDS**

- LEVEL 3
- LEVEL 2
- LEVEL 1
- ASSET PROTECTION ZONE



# Supplementary item 14

## Landscape Plan





# Supplementary item 15

## Performance and design requirements



### **DESIGN AND CONSTRUCTION SPECIFICATION FOR DHA RESIDENCES**

Version 3.3 Aug 2009

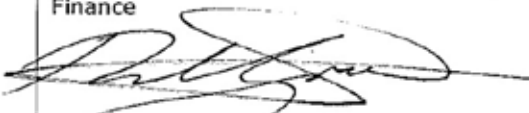


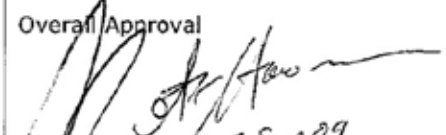
#### Introduction

This document contains the guidelines and requirements for construction of houses in standard (low) and medium density developments. This document does not address project specific requirements, which are addressed in Tender documentation.

**Design and construction specification for DHA residences**

VERSION	RELEASE DATE	NOTES
Version 1.1	October 2007	Original
Version 2	January 2009	Corrections and revisions
Version 2.1	February 2009	Amended for clarification page 21 Garage and Storage
Version 2.2	February 2009	Amended for clarification (various clauses)
Version 3.0	April 2009	General review all clauses
Version 3.1	April 2009	Re-added regional requirement Darwin, Tindal and Alice Spring eaves increased to 900 mm
Version 3.2	June 2009	General revision following review of version 3 within DHA and by builders
Version 3.3	Aug 2009	Reorganise content, revise document name (Document was "Performance & design requirements for construction of DHA residences"), content also modified.

**Approvals**

<p>Finance</p>  <p>Robert Groom Chief Financial Officer</p>	<p>Marketing</p>  <p>Tony Winterbottom General Manager-Sales and Marketing</p>
<p>Service Delivery</p>  <p>Steve Peddle General Manager-Service Delivery</p>	<p>Overall Approval</p>  <p>Peter Howman Chief Operating Officer -7 Sep 09</p>

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**Design and construction specification for DHA residences**
**1000 PRELIMINARIES**
**1010 DEFINITIONS - ROOMS, AREAS, SPACES**

The definitions of rooms, spaces or areas are listed in the chart below. Requirements that vary by regional location are noted; refer to section on mandatory regional requirements.

BEDROOMS	
Bedroom 1	largest bedroom
Other Bedrooms	bedrooms numbered 2, 3, etc.
LIVING AREAS	
Kitchen	separate room, can be open plan with Dining or with Meals
Meals	open plan area adjacent to Kitchen
Family	separate from Dining and Lounge rooms, can be open plan with Meals
Dining	separate room, can be open plan together with Kitchen and Lounge
Lounge	separate room, can be open plan with Dining
Entry	entry space from front door not opening directly into living areas
Hallway	internal access and circulation space
Study	separate room or alcove
Rumpus (Games)	separate room, in addition to other living areas
WET AREAS	
Bathroom	separate room with bath and separate shower recess, hand wash basin in vanity unit, close to bedrooms
Ensuite	separate room directly accessible from Bedroom 1
Powder Room	separate room with a toilet and wash basin provided in two storey houses
Toilet	separate room for toilet only, adjacent to bathroom
Laundry	space for washing machine, tub, dryer and cupboard
STORAGE	
Garage	fully enclosed secure area for car parking
Carport	under cover area for car parking, may be secured, may be partially enclosed
Shed	waterproof, lockable, located in secured Fenced Yard
Storage	secure area within Garage where a Garage is included, or secured area adjacent to Carport where a Carport is included

**Design and construction specification for DHA residences**

OUTDOORS	
Front Yard	area facing the address or side street(s), with main pedestrian and vehicular entries and driveway with plant beds (garden)
Covered Outdoor Area (COA)	paved area accessible from daytime living areas, behind fences
Fenced Yard	contiguous area secured behind fences and gates, with COA, location for utilities, with plant beds (garden), but excludes services, and Shed (where provided).

### **1020 STANDARDS**

The Contractors must comply with all applicable national, state or local requirements. All design and construction activities must comply with, but are not limited to, the requirements of:

- Building Code of Australia (BCA) and the Deemed to Satisfy provisions;
- Australian Standards (AS and ASNZ) relevant to the work;
- State or Territory, Local Authority and Statutory Requirements;
- House Building Certification Fund, owners and Contractors contributions;
- National code of practice for the Construction Industry;
- Building and Construction Industry Improvement Act 2005
- Utility companies – power, water, gas, telecommunications; and
- Specific estate design guidelines, encumbrances and covenants.

All houses must achieve a minimum 5 star Energy Efficiency Rating (HER) as certified by an independent accredited assessor, using AccuRate (NatHERS replacement) or other equivalent method (e.g. state systems such as BERS Pro), or where permitted, BCA Deemed-to-Satisfy Provisions.

### **1030 HOUSE LAYOUT**

Rooms, spaces and areas must be oriented and connected to allow their most functional and efficient use. The spatial arrangement of rooms and their fit-out must also ensure ease of furniture removal, particularly for large items (beds) in double storey houses.

### **1040 MINIMUM SIZES - ROOMS, AREAS AND SPACES**

The rooms, areas and spaces or their components that have mandatory minimum

**Design and construction specification for DHA residences**

sizes are listed in the following tables.

**All dimensions in this section are measured internal plate to plate unless otherwise stated.**

**1041 MANDATORY REQUIREMENTS LOW DENSITY**

NAME	REQUIREMENT(S)	MIN DIMENSION (mm)	MIN AREA (m <sup>2</sup> )
<b>BEDROOMS</b>			
Bedroom 1	must fit a queen size bed & side tables (area is exclusive of BIR or WIR)	none stated	15
Wardrobe Bedroom 1	hanging depth hanging length (refer Appendix 1 for details)	700 3000	none stated
Other Bedrooms	must fit single bed & side table (area is exclusive of BIR)	none stated	9
Wardrobe Other Bedrooms	hanging depth hanging length (refer Appendix 1 for details)	600 1500	N/A
<b>LIVING</b>			
Kitchen	refrigerator space clear of all obstructions e.g. skirtings	W 1000 H 2000	Not stated
Dining	Must fit a table and seating for at least 6 people	none stated	none stated
Lounge	Must enable seating for at least 5 people plus entertainment unit and coffee table	none stated	none stated
Study	Must fit a (computer) desk, chair and bookshelf	none stated	none stated
<b>STORAGE</b>			
Garage single	1 car space	D 6000	21
Garage double	2 car space inclusive of Storage Distance from wall to wall Distance from wall to engaged pier Depth	W 6000 W 5890 D 6000	36
Carport single (Darwin only)	1 car space	D 6000	21



**Design and construction specification for DHA residences**

Storage	-function obvious.	none stated	9
<b>OUTDOORS</b>			
Fenced Yard	measured from house wall to boundary line, excludes sheds and services nominated locations in Sydney	2000	35
		2000	25
Covered Outdoor Area (COA)	must fit table and chairs for 4 to 6 people plus BBQ. -in locations south of Tropic of Capricorn -in locations north of Tropic of Capricorn	none stated	15
			20
Driveway	Minimum area to enable safe access to the garage door(s) and must accommodate 1 (one) car parked on the driveway within the block.	none stated	none stated

**1042 MANDATORY REQUIREMENTS MEDIUM DENSITY**

Requirements for low density apply, with the following changes:

NAME	REQUIREMENT(S)	MIN DIMENSION (mm)	MIN AREA (m <sup>2</sup> )
<b>OUTDOORS medium density</b>			
Covered Outdoor Area (COA)	Must fit table and chairs for 4 people plus BBQ	Not stated	10
<b>STORAGE medium density</b>			
Utility Cupboard(s)	Replaces Coat cupboard and has multiple uses (coats, brooms)	W 800	Not stated
Storage near car accommodation	Shed or fully secured, waterproof area with lighting and lockable gate	Not stated	9

**1043 MANDATORY REQUIREMENTS ON MILITARY BASES**

Requirements for low density apply, with the following changes:

**Design and construction specification for DHA residences**

NAME	REQUIREMENT(S)	MIN DIMENSION (mm)	MIN AREA (m <sup>2</sup> )
<b>LIVING</b>			
Lounge	Lounge must enable seating for at least 5 people plus entertainment unit and coffee table.	Not stated	Not stated
Dining	Dining must fit a table and seating for at least 6 people	Not stated	6
Lounge/ Dining combined	Combined room must fit lounge furniture and dining furniture as detailed above	Not stated	21
Meals	Meals must fit a table and seating for at least 6 people	Not stated	5.7 (but not >15)
Study	Must fit a (computer) desk, chair, cabinet and bookshelf	none stated	none stated
Family	Family room must fit lounge seating for four people and television contained in a medium sized wall unit	Not stated	11
Family/Meals combined	Combined room must fit Meals furniture and Family furniture as detailed above	Not stated	15

Notes to this table:

Add 1m<sup>2</sup> to minimum area requirements for each entrance into a room.

Add 1m<sup>2</sup> to minimum area requirements to any room with wall mounted heaters.

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## 2000 DESIGN GUIDELINES

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**In this section, design guidelines are set out. Design guidelines are items that are preferred by DHA, but not obligatory.**

### 2010 HOUSE LAYOUT

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#### South of Tropic of Capricorn

- main daytime living areas oriented towards the north to allow maximum sunshine penetration in winter and summer shade. [COA] should not compromise the sunshine into indoor living areas;

### Design and construction specification for DHA residences

- western walls are shaded and west facing windows are avoided or shaded; and
- Fenced Yard receives sun and or shade as necessary for optimum use throughout the year.

#### **North of Tropic of Capricorn**

- minimise sun into interiors and onto house walls with eaves, awnings, covered outdoor area and plants;
- maximise natural cross ventilation with design and placement of windows;
- ensure landscape treatments promote breezes into the house; and
- Fenced Yard to receive shade as necessary for optimum use throughout the year.

COA design and materials should ensure:

- sunlight (light and heat) is not obscured from interiors;
- design / ventilation prevents heat build up under roofing;
- lighting is adequate for cooking and dining.

Internal spaces should take advantage of any views and vistas. The landscape should enhance any existing views and create outlooks from each daytime living room.

#### **2020 HOUSE ORIENTATION**

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Placement of the house on the site should consider:

- the most efficient and functional use of the site for provision of required internal and external spaces;
- suit the local climate, and property microclimate;
- minimise earthworks (cut and fill) and avoiding cut to export soil; and
- minimise the need for active heating and cooling systems;
- harmony with existing street and locality setbacks;
- front entry forward of the garage wherever possible;
- visual privacy to indoor spaces, COA and Fenced Yard;
- solar access internally and to outdoor living areas, with overshadowing of or by neighbouring development avoided where possible; and
- plant root zones with sufficient space for trees in each block.

#### **2030 FENCED YARD**

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Fencing should provide visual privacy and does not adversely impact solar access

### Design and construction specification for DHA residences

to adjacent properties. The visual impact of fences should be minimised with plants in beds beside fences.

If services are located externally they should be collocated and placed to minimise sound and visual impact to the household and neighbours.

#### 2040 STREETScape

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Individual house frontage and garden design should meet the following general requirements:

- contemporary in style -not have faux, 'add-on' or 'period' features;
- keep with the architectural expression in the locality;
- building scale and mass suitable to the street and neighbourhood;
- letterbox should suit the house, and where possible conceal services;
- landscape setting to be dominant over the pavements or the garage; and
- trees to give shade and character.

Multiple house construction within a street should have variation in:

- built form
- exterior façade
- textures, colours and materials used.

Variation of the street facade may be achieved through expressed structures, feature windows, shading elements, front verandahs and entry porches.

#### 2050 LANDSCAPE

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The landscape design should meet the following general requirements:

- compliment the architectural style of the house;
- enhance the front entry area;
- contribute to the streetscape;
- low water use plants for regions south of Tropic of Capricorn;
- integrate with existing neighbouring properties;
- ensure clear lines of sight from the house entry to the street;
- reduce overlooking into adjoining properties;
- screen fences with plants;
- screen utility areas;
- provide trees to give shade; and
- allow winter sun in southern climates to children's play/lawn area.

## Design and construction specification for DHA residences

### 2060 SUSTAINABILITY

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Contractors are encouraged to adopt as many principles of sustainable design as possible. Some methods in building in an energy efficient house are:

#### **Heating/Cooling**

All elements of the design and construction (layout, orientation, interiors and landscape) should be integrated and suited to the site to minimise the need for active heating and cooling.

#### **Insulation**

Insulation to wall and ceiling cavities and slab or sub-floor spaces along with draught exclusion.

#### **Thermal mass**

In cool climate regions, select areas of floor and wall surfaces can act as thermal 'banks' to provide thermal stability and in cooler localities can absorb and re-radiate solar energy in the cooler months. The placement of windows and shading devices as well as the selection of interior materials and finishes can be designed to enable this effect.

#### **Shade**

The eaves overhang can be constructed to admit winter sun into the house while excluding summer sun. Pergolas or trees can reduce heat gain in summer but permit light all year round.

#### **Ventilation**

Maximise cross ventilation to ensure breezes flow through the house by locating operable windows to capture prevailing breezes. This is particularly important in the tropical regions.

#### **Light**

Maximise natural day light into the house and minimise the use of artificial lighting during the day by location and size of windows. Use low wattage light fittings.

#### **Water**

Sustainable use of water means reducing the use of potable water and facilitating water to soak into the ground (gardens and lawns) wherever possible.

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### 3000 TRADES SECTION

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All preliminary tasks, such as site works and provision of temporary power or water, are to be undertaken without additional costs to DHA. The Contractor is expected to be familiar with the site physical conditions and subsurface conditions.

**Design and construction specification for DHA residences**

Temporary fences must include the adjacent public land (verges) except where they have been developed (paths and landscape works) or they are required for public access. The work site is to be securely locked at all times when workers are not present. All activity and all materials storage must be within the fenced area.

**3010 SITE CONSTRUCTION****3011 GROUNDWORKS**

The Contractor must not disturb or damage any land outside the block boundaries. Healthy existing trees on the block that have been retained as part of the estate development should be retained wherever possible.

Excess earthworks are to be avoided. The Contractor is expected to strip and stockpile, for later re-use, the existing site topsoil as part of the site works and remove vegetation from the topsoil prior to both earthworks and prior to re-use.

Following execution of site works, access to the site for all construction works is restricted to the location of the driveway, unless otherwise agreed by DHA and local authorities.

**3012 FOOTINGS**

Contractor must design all required footings, nominate type. The depth and extent of all site works must be sufficient to prepare the house and driveway 'platform' to suit the site's geotechnical conditions and consequent design.

**3013 FLOORS**

Contractor to nominate type.

**3014 DETAILED EXCAVATION (CUT AND FILL)**

The levels of the house and adjacent landscape surfaces must be designed to ensure that water drains away from house sufficient to avoid flooding in storm events.

The Contractor must complete the following earthworks as part of the Lump Sum:

- all clearing and grubbing of the site;
- all bulk earthworks required to achieve benching levels including landscape surface levels (allowing for topsoil refilling); and

### Design and construction specification for DHA residences

- o all detailed excavation associated with retaining walls and to achieve the nominated fall requirements.

All contaminants, debris and rubble to be removed prior to site shaping and other works. Contractor's rubble and debris must not be buried or covered over on the site.

All external spaces and surfaces must meet the following different gradients (slopes):

- o Fenced Yard 1:6 maximum to 1:50 minimum;
- o Garage finished floor level (FFL) slopes from back to front (street) with a fall of 1:100;
- o driveways 1:6 maximum;
- o plant (garden) beds 1:4 maximum to 1:100 minimum;
- o pavements (pedestrian): 1:6 maximum (short runs only) to 1:100 minimum with crossfall of 1:33 maximum.

Sloping blocks must be terraced with retaining walls and associated steps.

Shaping to be undertaken prior to other exterior and landscape works, with placement of SW systems and retaining walls/steps. Leftover spoil must be disposed by the Contractor at their cost.

#### **3015 STORMWATER**

The treatment of stormwater within the block must be designed to suit the climate, soils and local Authority requirements. Stormwater system must have grated pits, soakage drains or other piped systems to ensure no flooding of house. All systems elements, i.e. soakage drains, grated pits and pipes must be adequately sized for purpose and local conditions.

Where it is required by local authorities, all roofs must have gutters that are connected to the stormwater system and/or to water tanks.

No sumps to be installed within gardens. Covered Outdoor Area design and materials must be integrated with SW drainage.

#### **3015 (A) DRAINAGE**

Surface flows must be diverted away from the house and off paved areas onto garden beds and lawn areas. Excess stormwater runoff must not be directed onto

**Design and construction specification for DHA residences**

adjoining properties. On site temporary (i.e. two hours) ponding of rain is acceptable where it is a deliberate detention area with suitable disposal of overflow stormwater.

A grated drain connected to the stormwater system must be installed at the garage opening where the driveway slopes towards the garage.

Retaining walls to have suitably placed agricultural drains behind walls with geotextile fabric to back of wall.

**3015 (B) IRRIGATION**

Irrigation systems will be installed only in locations where nominated in regional requirements or to meet estate covenants.

**3016 ROOFING & ROOF PLUMBING****3016 (A) FASCIAS & GUTTERS**

Sheet colour bonded metal, colour to coordinate with, or match, roof and or walls

**3016 (B) DOWNPIPES**

Sheet colour bonded metal or PVC, colour to coordinate with, or match, roof and or walls. COA roof plumbing must be connected to storm water.

**3017 DRIVEWAYS**

Driveways must be impermeable pavements constructed from unit pavers or reinforced, uncoloured concrete, unless otherwise required in specific estate covenants or local Authority regulations.

The driveway must stop at the property boundary so that any installed public footpath is continuous and not cut by the driveway. Vehicle access over the verge to the kerb crossing, if installed as part of the scope of work, is to match the driveway and any local Authority requirements.

**3018 PAVEMENTS**

Impermeable pavement surfaces with subsurface preparation and base course as required for:

- o Minimum 800 wide pedestrian access linking front entry to driveway and letterbox; and
- o access from the laundry to the clothesline (a path to the clothes line as a continuous pavement with no steps).



## Design and construction specification for DHA residences

Use of permeable pavements is preferred wherever practical in any other areas where necessary. No mowing strip or pedestrian pavements around the house perimeter are required.

The path to a rotary hoist clothes line must be a minimum 800mm width and extend past the post. Wall attached clothes lines and extended clothes lines must have pavement underneath the lines and the pavement must extend 600 mm past the side furthest from the wall and the side adjacent to the path. Clothes line to have minimum 1 metre clearance to any obstruction.

### **3019 FENCING & GATES**

Fenced Yard must meet the following requirements, unless other requirements are nominated in estate covenants or local Authority requirements:

- minimum one pedestrian (single), gate may be increased to double gate where specified by estate guidelines;
- all gates constructed to swing open to a minimum of 90 degrees;
- gates must not obstruct services;
- no side boundary fence forward of the wing fences, or the front building line;
- wing fences and gates located behind meter boxes;
- completed height 1.8m maximum (1.5m minimum) when measured from the adjacent finished ground levels; and
- base of the fence clear of ground surfaces, including mulch materials, for its entire extent, with a bottom gap no greater than 50mm.

Fences and gates must be designed with materials as per local conditions and practices. If timber is used, it must be durable and treated. Metal components must be galvanised or zinc and or powder coated e.g. steel posts, bracket fittings and nails. Posts and stays must have concrete footings designed to suit site specific conditions and functional requirements.

Fences and gates must be designed and constructed to last at least 15 years.

### **3020 CONCRETE WORKS**

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#### **3021 CONCRETE SLAB FINISH**

Brickwork must extend to ground level with no slab edge shown.

**Design and construction specification for DHA residences****3022 TERMITE TREATMENT**

A physical barrier system in addition to BCA requirements, compliant with relevant Australian standards. Liquid chemical treatments prohibited unless mandated by local Authority. Top-up systems not required, unless mandated by Local Authorities.

**3023 UTILITIES**

Concrete pads must be placed under the hot water system, water tanks, air conditioners and other externally located utilities.

**3024 COVERED OUTDOOR AREA**

Design and materials integrated with house, SW drainage and impermeable pavements. **Refer to regional requirements for where COA must be placed under the house roofline.** Where COA not under the house roofline, provide an impermeable roof. Finished surface pavement is impermeable with 1:100 slope away from the house (minimum standard is in-situ concrete with light broom finish).

**3030 MASONRY**

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**3031 RETAINING WALLS**

Retaining walls must be included as part of the works where necessary to ensure outdoor spaces are functional and meet the gradient requirements detailed elsewhere. Retaining walls to be designed to AS 4678 - Earth Retaining Structures. Retaining wall materials must be robust masonry.

Retaining walls must have steps incorporated except when the upper area is not a children's play area and the wall is a crescent shape to allow access via the sides. The maximum is 5 risers per flight. Walls over 1.0m height must be certified by structural engineers and are to have integrated child safety barriers or handrails. Nominate location, construction details and top and bottom levels of walls and slopes. The use of natural stone (rocks) to form retaining walls is permitted. The materials must be finished in a colour to match the walls of the house or in an earth or vegetation colour.

The materials and construction must last at least 20 years.

**Design and construction specification for DHA residences**

**3040 CONSTRUCTION SYSTEMS**

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**3041 WALL FRAMING AND FACADES**

Contractor to nominate wall framing system .

**Some regions specify ceiling heights, refer to regional requirements.**

Garage exterior construction must be same materials as house; fully enclosed and secured. Garage interior construction may be either timber stud walls or engaged piers. Carport (where specified) must be attached to house.. Carport materials same as house.

Any façades must be consistent within the street but having diversity between each house.

**3042 ROOF TRUSSES**

Contractor to nominate type.

**3043 ROOFS**

Sheet colour bonded metal or tile.

**3044 EAVES**

Eaves minimum plate to fascia width of 450mm, or to meet local Authority and estate requirements. Materials, finishes and colour to coordinate with walls.

**Some regions specify greater fascia widths, refer to regional requirements.**

**3045 THERMAL INSULATION**

Insulating sheet materials and or batts as required to meet statutory energy and fire rating requirements.

**3046 WATERPROOFING/ WET SEALING**

Waterproofing required in all wet areas, in accordance with BCA. An accredited waterproofing contractor must be used.

There must be a minimum 7 year warranty on products and workmanship.

**3050 JOINERY**

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**3051 (A) KITCHEN**

Maximise storage and bench space, include cupboards overhead and under bench,

**Design and construction specification for DHA residences**

3 x cutlery drawer, no bulkhead to overhead cupboards required.  
Separate pantry (cupboard) in or immediately adjacent to kitchen.  
Bench tops: minimum standard laminate with edges pencil round or post formed.  
Cupboard doors and drawers: minimum standard laminate with rigid thermoplastic (ABS) 1-2mm edge.  
Cavities required for dishwasher, microwave (over bench), refrigerator (vented).

**3051 (B) VANITIES**

Bathroom vanity unit: minimum 900 mm length, with hand basin and storage cupboards underneath, all constructed of high moisture resistant sheeting/materials. Vanity unit with integrated basin is acceptable.  
Ensuite: All inclusions as for Bathroom EXCEPT no bath, vanity nominal 900mm length.

**3051 (C) WARDROBES****Bedroom 1**

Wardrobe built-in (BIR) with sliding doors or walk-in (WIR) with either swing or sliding doors. Dimensions: hanging depth 700mm (plate to plate), hanging length 3000mm min, maximise full height hanging. Include shelf over head, plus minimum 2 x 4 shelves located in wardrobe. Refer to diagram in Appendix 1 for details.

**Other bedrooms**

Wardrobe built-in (BIR) with sliding doors, hanging depth 600 (plate to plate), hanging length 1500 min. maximise full height hanging. Include shelf over head, plus minimum 1 x 4 shelves located in wardrobe. Refer to diagram in Appendix 1 for details.

**3051 (D) CUPBOARDS & MISC JOINERY**

Linen cupboard must have a minimum of four shelves. Minimum width 1500 mm.  
Coat cupboard must have a hanging rail, plus shelf over rail. Minimum width 700, minimum depth 600 mm.  
Utility cupboard (where required) must have a high shelf. Minimum width 800mm.  
Broom cupboard is to be located in Laundry, with high internal shelf. Minimum width 600mm. A dryer support board also to be provided in Laundry, W 800mm x H 800mm x D 19mm, high moisture resistant board sheeting screw fixed to wall, painted to match wall.

**3060 DOORS & WINDOWS**

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**3061 (A) DOORS**

Internal: Swing doors, hollow core. Sliding doors: internal cavity sliders with jump proof roller track.

External: Solid core for all doors. Weather seal to bottom of doors only.

Door between garage and house is a solid core door. Door between garage and Fenced Yard is a weatherproof door. Where door from house to Fenced Yard is glazed, External sliding doors must be powder coated aluminium frame.

**3061 (B) DOOR SECURITY**

All doors leading from the house to the outside must have combined security / insect screens. Sliding doors must have powder coated aluminium frames fitted with interior expanded mesh.

**3061 (C) DOOR HARDWARE**

Solid core doors fitted with double cylinder deadlocks, all keyed alike.

Door between House and Garage fitted with double cylinder deadlock, keyed to solid core doors.

Security screen doors fitted with door closers, all locks keyed alike. No requirement for door closer on sliding doors.

Glass sliding doors, fitted with latch and double cylinder deadlock, all locks keyed alike.

Passage sets to all internal doors (no ceramic or sharp pointed handles).

Privacy sets to bathroom, toilet, powder room and Bedroom 1.

All doors with stops or hold open devices.

All hardware must have a minimum 5 year warranty.

**3061 (D) ROLLER AND PANEL LIFT DOORS**

Roller or panel lift doors must be powder coated sheet metal colour coordinated with and visually recessive to house, walls, and roof. Access to street: Minimum requirement is single roller door (not automated). If double roller door or panel lift doors are used, automate and provide two handsets.

**3061 (E) WINDOWS/GLAZING**

Windows fixed and opening must have powder coated aluminium frames. All

### Design and construction specification for DHA residences

opening windows must have insect screens to match security screens where security screens fitted.

Above Tropic of Capricorn, windows can be louvre style with built in insect screen and security bars, a proportion of powder coated aluminium louvres can be considered in lieu of glazing for privacy. Glazing above Tropic of Capricorn to meet WERS 2 stars cooling rating.

Obscure glazing minimum to all laundries, front door side panels, ensuite and bathroom. Where obscure glazing is used then window coverings are not required except in the ensuite and bathroom. No glazing for garage or garage door to Fenced Yard, unless security screens fitted as well.

#### 3061 (F) WINDOW FURNISHINGS

All external glazing (except side windows to front door) to have blinds in light, neutral colours for privacy and light control, mounted internal to window reveals where possible. Maximum light block for bedrooms.

Wet areas: slim line (mini) Venetians, fixed at base.

All other areas must have Vertical blinds, polyester, rated at 100% block out, child safe chords and chainless bottom, with weights sewn into each blade.

#### 3061 (G) WINDOW SECURITY

All opening windows to have either:

- security screens with powder coated aluminium frames with interior expanded aluminium mesh, or
- window locks (all keyed alike). Where evaporative cooling is installed, windows should be lockable in an open position.

**Refer to regional requirements as to which option applies.**

#### 3070 APPLIED FINISHES

All external materials and finishes must be durable, robust and well constructed and not requiring regular maintenance such as painting. Interior design schemes must be with materials and finishes that are robust to ensure reduced costs over the whole lifecycle of the house.

#### 3071 PLASTERING

Affix plaster board internally to stud wall and ceiling batten system and or single

**Design and construction specification for DHA residences**

skin masonry as per manufacturer's specification, then sealed by paint systems. For all internal wet areas the minimum is water resistant plasterboard with paint systems.

Install plasterboard sheeting on all stud walls within garage.

**3072 EXTERNAL RENDER**

Patch coat and top coat with mineral/polymer based system applied as per manufacturers recommendation with texture finish minimum of 1.5mm thick, then sealed with paint system.

**3073 CERAMIC TILING**

Ceramic Tiles - non porous, non slip with coloured sealant as necessary to joints with kickboards and skirtings + metal join strips to adjoining surfaces if levels are not flush.

Skirtings:

- Bathroom & ensuite: skirting 150mm
- Baths 600 mm above the top of the bath.
- Shower recess: 2000mm minimum.
- Toilet: skirting 150mm minimum.
- Laundry: skirting 150mm and over tub 450mm minimum.

Laundry, Bathroom, graded to floor waste with grate to meet BCA requirements

**3073 (A) NORTH OF TROPIC CAPRICORN**

Ceramic floor tiles to all bedrooms, living areas, and wet areas.

**3073 (B) SOUTH OF TROPIC CAPRICORN**

Ceramic floor tiles to all areas except bedrooms and separated Dining, Lounge, and COA.

**3073 (C) SPLASHBACKS**

Kitchen splashback (from bench to underside of over head cupboards), either ceramic or glass tiles or stainless steel.

Bathroom, Ensuite, and Powder Room splashbacks must meet mirror.

**Design and construction specification for DHA residences****3074 PAINTING****3074 (A) INTERNAL**

The pallet of interior colours, materials and finishes should be contemporary and timeless in style with an emphasis on neutral tones to accommodate the furnishings of tenants. Coloured paints must be prepared by the manufacturer from a recognised colour pallet, and as per the colour schedule approved for the contract. Excessive use of grey tones should be avoided. No mixing of colours on-site.

Paint system is primer/undercoat plus 2 coats. Coats to be applied as per manufacturer's directions to achieve recommended dry film thickness. If paints are applied by spraying, the top coat must be rolled.

Ceilings – white, flat.

Walls – wash and wear low sheen.

Trims & architraves – gloss or semi gloss.

Doors – gloss or semi gloss to all vertical surfaces; top & base to be primer plus minimum one coat.

Wet areas (including their ceilings) – wash and wear semi gloss.

**3074 (B) EXTERNAL**

External high quality domestic systems fit for purpose, with primer/undercoat plus 2 coats.

Walls – matt or low sheen; doors and trim – gloss.

**3075 CARPET AND UNDERLAY**

Carpet only installed South of Tropic Capricorn to all areas not tiled. Carpets must be a minimum four star rating (residential) as set out the Australian Carpet Classification System (ACCS). Underlay to be minimum 7.5mm thick for rubber, 9mm thick for foam.

Carpet and underlay must have a minimum 5 year warranty.

**3080 SPECIALTIES**

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**3081 WHITE GOODS**

Cooktop - 4x positions, mandatory gas where gas is reticulated.

Overhead range hood with exhaust fan and light that is directly externally vented.



**Design and construction specification for DHA residences**

Electric oven: 600mm width with minimum 55 L capacity. Must, as a minimum, have timer and fan forced cooking mode.

Appliances must have a minimum 2 year warranty, access to spare parts and warranty service is crucial.

**3082 TOILETS**

Toilets required for Toilet, Ensuite and Powder Room (when Powder Room is specified). Dual flush 6/3 litre cisterns.

All toilets must have a minimum 2 year warranty.

**3083 SHOWER**

Separate recess min. 900 x 900mm. Screen frame chrome / powder coated metal, with pivot door.

**3084 TAPWARE**

**Kitchen:** Stainless steel sink 1080 nominal length, one and half bowls, single side drainer, plug, single flick mixer tap.

Cold water connection to dishwasher, include capped perforations to carcass panel to facilitate service connections.

**Laundry:** Swivel spout, separate hot and cold water taps outlets to wash tub and separate connections for washing machine. Wash tub in a cabinet, 70 L (45L in medium density) capacity, washing machine by-pass drain, and plug.

**Shower:** Contractor to nominate tapware; no sharp edges.

**Bathroom:** Bath min. 1500mm long. contractor to nominate tapware.

**When Powder Room specified:** Provide hand basin with plug, (vanity unit with integrated basin is acceptable).

Contractor to nominate other tapware not detailed. All tapware must be minimum 3 star WELS rating with a minimum 2 year warranty.

**3085 MISC SANITARY FITTINGS**

Bathroom & Ensuite towel rail(s): Double rail, chrome or powder coated metal, min. 900mm length (to fit 2 large towels).

Towel ring for Ensuite, and Powder Room (when Powder Room specified).

Materials: chrome or powder coated metal.

Soap holder/recess for Bath and Shower.

Toilet roll holder for every toilet installed. Materials: Chrome or powder coated metal to match bathroom fittings. Plugs required for all sinks.

**Design and construction specification for DHA residences****3086 MIRRORS**

Bath & Ensuite mirror: Placed above vanity, sized to be full width of vanity and height aligned with top of shower screen.

Bedroom 1 mirror: Minimum width 400mm x height 1200mm.

When Power Room is specified, place mirror over hand basin.

**3087 CLOTHESLINE**

The clothes line should not be visible from the street and must be near as practicable to the laundry door. The clothes line should receive sunlight for most of the day in temperate climates, and be shielded from the sun in tropical climates.

Clothesline must have minimum 33 lineal metres of unobstructed hanging length, Contractor to nominate type of line (rotary hoist preferred where space allows).

**3088 LETTER BOX**

The letterbox must be directly accessible on pavements from the front door and or driveway. Australia Post approved type and position of letter box (located on the street address side of the house and just inside property boundary), sturdy construction and have large metal number(s) fixed to street face. As a minimum, must have provision for a padlock.

**3089 STORAGE SHED (WHEN PROVIDED)**

A storage shed must be provided when storage is not provided in the Garage or Carport. Storage shed must be powder coated sheet metal, waterproof, with access door that has provision for a lock, located within Fenced Yard. The shed must be fixed down to a rebated concrete slab or footings to local requirements.

**3090 MECHANICAL SERVICES**

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**3091 HOT WATER SYSTEMS**

Natural gas should be used where reticulated. Install one of the following:

Instantaneous gas system sized for house (locations with reticulated gas);

Gas –min storage 135L (locations with reticulated gas);

Gas/solar hybrid- min storage 180L (locations with reticulated gas);

Solar –min storage 300L with electric booster (locations without reticulated gas);

Solar – heat pump, min storage 250L.

**3092 HEATING**

The requirements for active (powered) heating vary around Australia.

**Refer to regional requirements as to which option applies.**

Where heating is specified and rooms and specific rooms are not nominated, all Bedrooms, Living Areas, Wet Areas (except the Laundry) are to be heated.

Where placement of the units and the enclosure is in a constructed housing or within wing walls, the location of units and the enclosure must be marked on the house plans to be submitted to council. If mechanical units are located within the roof space, the Contractor must provide a suitable platform/walkway and a light for ease of maintenance.

All units must comply with noise level restrictions applicable in the jurisdiction.

All systems must be a minimum 5 star energy rating. All products and systems must be selected to be robust, with minimum 5 year warranties, and have maintenance service (call out) available in that location.

**3093 COOLING**

**Refer to regional requirements for cooling systems applicable.**

Systems serving bedrooms must have a minimum five star rating for cooling. Reverse systems dedicated to shared rooms must be a minimum of five stars for cooling except where such units are not commercially available, and then a minimum energy rating of four stars for cooling applies (there is no relaxation of the requirement on the overall house energy rating as a result). All units must comply with noise level restrictions applicable in the jurisdiction.

Warranty to be a minimum of three years on parts.

**3094 WATER TANKS**

Water Tanks are not a mandatory item. If nominated in the house configuration, supply and install as a minimum:

- 5000 litre plastic tank with colour to match house;
- first flush diverter, stopcock fitted to tank base and upturned; and
- pump, with pump guard

Catchment to be a minimum of 35% of roof area.

**Design and construction specification for DHA residences**
**3095 HOSECOCKS**

Install 2 wall mounted taps (hosecocks), with 1 per yard area.

**3100 ELECTRICAL SERVICES**

Provide all electrical works necessary with installation by certified installer.

**3101 POWER**

General purpose outlets (GPO) to be installed as listed below:

**Living:** Kitchen x2 plus 1 in either the kitchen island bench or kitchen return, dining x1, lounge x2, hall x1, study x1, meals x1, rumpus x2, family x2;

**Bedrooms:** Bedroom 1 x2, other bedrooms x2;

**Wet Areas:** Bathroom x1, Ensuite x1, Laundry x1, Powder room x1.

Cavities with power points for dishwasher, microwave (over bench), refrigerator (vented);

**External:** COA 'weather proof' x1, Garage or Carport x 1.

For any rooms not listed, install a minimum of one GPO per room.

All GPOs to be double, except appliances hardwired or requiring a dedicated GPO, including refrigerator, dishwasher, microwave, air conditioning, hall, HWS, garage door motors, water tanks, reticulation units and heating units.

**3102 EXTERNAL LIGHTING**

Lights suitable for external use (e.g. bunker style), with all components and switches, eaves or soffit mounted to provide adequate light levels to following minimum areas: 1x front door, 1x laundry door, 1X clothes line area. COA to have fluorescent lights.

**3103 INTERNAL LIGHTING**

All fixtures, fittings, levels of illumination and colour rendering to be fit for purpose for the size and function(s) of the room. Lights must be provided with batten holders and shades. Provide two-way switching where appropriate (hallways and living areas). Use only down lights (2 off) where ceiling fans to be installed (to avoid strobe effect).

**3104 VENTILATION**

Install 1x exhaust fan for both Bathroom and Ensuite. All exhaust fans separately

**Design and construction specification for DHA residences**

switched from lights unless required by BCA.

**Refer regional requirements for when ceiling fans are included.**

All ceiling fans to have variable speed control. Where COA requires a circulation fan, the ceiling and mounting height is to be min. 2700mm.

**3105 TV SYSTEMS**

Television: Minimum 2 outlets provided adjacent to GPOs in Lounge and Family, located to suit indicative furniture layout.

TV aerial (antennae): Installed and located to achieve good quality reception for all free air TV stations to suit both analogue and digital reception (gutter mounted aerials not permitted).

**3106 TELEPHONE SYSTEMS**

Contractor to connect telephone and pay all fees associated with connection, and minimum 2 phone outlets, provided adjacent to GPOs in Kitchen and Bedroom 1,

**3107 SMOKE DETECTORS**

Installed to meet Australian standards.

**3110 SOFT LANDSCAPING**

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**3111 GENERAL**

The landscape design documents must be prepared by a qualified landscape contractor. The Contractor must allow for the production of the landscape documents as part of the Lump Sum. The construction of the landscape works must be undertaken to meet industry standards by a qualified landscape contractor.

**The only earthworks to be undertaken as soft landscaping is the shaping and cultivation associated with plant beds and grass.**

**3112 GROUND PREPARATION**

Prior to undertaking any landscape works the block must be appropriately prepared for the intended surface treatments and plants. Where there is insufficient quality or quantity of stockpiled site topsoil, areas must have imported topsoil blended to make up quantities required. Prior to placement of soil additives or topsoil, all weeds must be sprayed or removed and the ground must then be

**Design and construction specification for DHA residences**

ripped and cultivated to achieve de-compaction to the depths to enable plant growth.

**3113 GRASS PREPARATION**

Remove or kill weeds and grasses on site prior to cultivation. Areas to be grassed to be ripped to minimum 150mm depth and rock picked.

Topsoil for grass - minimum 100mm depth, comprised of stockpiled site topsoil spread to 50mm depth if available, plus imported topsoil

Final shaping and cultivating to minimum 100mm depth with addition of soil additives prior to turfing, seeding or stolon sprigging.

**3114 GRASS**

Grassed areas to be turfed. Turf not mandatory outside the property boundaries. Nominate species and cultivar and provide certification for supply source.

Grass – species and cultivar plus method (turf, seed, stolons) to be nominated and provide certification for supply source.

All lawn grass species must suited to the climatic area. Summer active grass must be planted in summer; winter active grass must be planted in winter. Supply should be weed free. Area within property boundaries must be fully established on completion of the 4 weeks establishment period.

**3115 PLANTS**

**Preparation:** Areas to be planted to be ripped to minimum 150mm depth and rock picked. Stockpiled site topsoil or imported topsoil to be respread to minimum 300mm depth.

Plants must be resistant, native to the area, suitable for the soil type and climate, hardened off, of good form consistent with species or variety, free from disease and insect pests, with healthy roots and shoots and no evidence of having been restricted or damaged.

Plants that have a short life, less than 10 years, must be avoided or minimised. Climbing plants must not be planted against walls and fences. Plant beds must not be placed against house walls.

Spacing of plants must achieve a 'semi-mature look', ie fully covered plant beds, after five years growth and 'established look' after 15 years growth. Plants that

guidelines must be used.

Planting includes excavation of plant holes, placement of soil additives, staking and tying as required and construction of watering basins as part of backfilling.

### **3116 TOPSOIL**

Remove or kill weeds and grasses prior to respreading of stockpiled site topsoil to areas to be grassed and or planted. Certification of imported topsoils is required for supply source and composition. Fertilisers - type and quantity of soil additives are to suit site specific conditions and plants proposed, Nominate specific products such as fertilisers, composts plus additives such as water absorbing crystals, soil wetters and minerals.

### **3117 EDGE STRIPS**

Edge strips must be installed between lawn and plant beds, and between lawn and gravel pavements. All edge strips must be constructed to finish flush with surrounding surfaces and where adjacent to grass, must serve as a mowing edge and inhibitor of grass crossing into adjacent areas.

Edge strips – timber 50mm width x 75mm depth and or masonry (in-situ concrete or unit pavers on a mortar bed) 75mm width x 100mm depth. Edge strips to be constructed to finish flush with surrounding surfaces.

### **3118 MULCH**

All areas, except for lawns and pavements, must be mulched plant beds. Mulch must be placed as the finished surface treatment to all garden beds. Organic mulch products must be a weed free product. Inorganic mulches, such as washed gravel or pebbles may be used.

Mulched areas to be minimum 75mm thickness for wood based system, minimum 50 mm for gravel or pebble based system. Supply should be weed free, and provide certification as to type, supply source, composition.

will commence for plants and lawn. The Contractor must undertake all work during this Period to ensure the plants and lawn's healthy and continued growth.

This work may include, but is not limited to: replacement of dead/dying plants or lawn, topdressing, weeding, staking, pruning/ tying, mowing, fertilising and watering, all activities as relevant to the season. The Contractor must supply and apply at their cost adequate water to plants and lawns during the Period. All local water restrictions apply.

The Period continues for duration of four (4) weeks. If more than 20% of either the plants or the lawn is replaced within the first two (2) weeks of the Period, the Period will extend. The Period will extend until:

- 80% of either the plants or the lawn areas have been in place for four (4) weeks; and
- any replaced items have been in place for two (2) weeks.

No additional payment is due for any costs incurred by the Contractor for the extension of the Period.

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## **4000 PRACTICAL COMPLETION**

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At the Practical Completion inspection, the Contractor must have:

- the house and site cleaned (inside and out) to a standard sufficient for tenants to move in;
- all temporary fencing removed;
- any damage of public and/or private land/or property adjacent to the site repaired;
- any verge restoration (if required) completed;
- telephone connected and working; and
- all services including electricity, gas, water, sewer connected, approved and tested ready for occupation.



As part of the requirements for Practical Completion, the Contractor must provide to DHA the following documents and items:

- A 'folder' (to stay in the house) with appliance (or fittings) manuals and the house telephone number;
- Two (2) complete sets of keys each on three (3) separate key rings that have labels for purpose plus the address (lot and house number):
  - Key ring 1 all external doors including security screens
  - Key ring 2 all windows
  - Key ring 3 garage, letterbox (and any others); and
- Certificates and plans:
  - Occupancy Certificate from relevant body or approved Private Certifier
  - Building Certificate from relevant body or approved Private Certifier AccuRate (or equal) certificate
  - Termite treatment warranty and certificate
  - Truss manufacturer certificate
  - Structural Design compliance and inspections, incl. retaining walls if required
  - Plumbing and Gas certificate
  - Electrical certificate
  - Waterproofing certificate
  - "As constructed" version of plans for site, house, electrical, landscape
  - "As constructed" house survey ( house outline and block boundaries)
  - Glazing certificate
  - Insulation certificate (not applicable for Darwin)
  - Clean fill certificate

All requisite appliance guarantees / warranties (paper or electronic), must be filled in and nominating Defence Housing Australia as the beneficiary and must be dated as per day of installation (not purchase date).

Documents must be supplied in the handover folder and clearly labelled.

Upon Practical Completion certification, the telephone, electricity and gas accounts

**Design and construction specification for DHA residences**

must be terminated by the Contractor to allow connection by the tenant.

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**5000 DEFECTS LIABILITY**


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Within the Defects Liability Period, DHA will advise the Contractor of defects as they arise.

Defects affecting health, safety or security must be rectified within 24 hours and all other defects must be rectified within 10 business days.

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**6000 REGIONAL REQUIREMENTS**


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**6010 SOUTH AUSTRALIA**


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ITEM	REQUIREMENT
<b>Adelaide</b>	
Heating	RC gas ducted heating (minimum two zones). Ducted heating and ducted evaporative cooling may be provided as an equivalent alternative. For Bathrooms and ensuites, heating to be other than infrared lamps embedded within ceiling fans.
Cooling	Minimum ducted evaporative cooling. RC split system air conditioning may be provided as an equivalent alternative.
Security	Locks to all opening windows.
<b>Adelaide Hills</b>	
Heating and Cooling	Reverse cycle split system Bedroom 1 and living rooms plus ceiling fans to bedrooms and other living rooms. For Bathrooms and ensuites, heating to be supplemented via infrared lamps embedded within ceiling fans.
Security	Locks to all opening windows.

**6020 VICTORIA AND TASMANIA**


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ITEM	REQUIREMENT
<b>Melbourne, Sale, Frankston, Queenscliff</b>	
Heating	Ducted heating. RC split system air conditioning may be provided as an equivalent alternative. For Bathrooms and ensuites, heating to be supplemented via infrared lamps embedded within ceiling fans.
Cooling	Ceiling fans to bedrooms and living rooms. Ducted evaporative

**Design and construction specification for DHA residences**

	cooling may be substituted in place of ceiling fans to all bedrooms and living areas.
Security	Locks to all opening windows.
<b>Puckapunyal</b>	
Heating	Ducted heating. RC split system air conditioning may be provided as an equivalent alternative. For Bathrooms and ensuites, heating to be supplemented via infrared lamps embedded within ceiling fans.
Cooling	Ducted evaporative cooling. RC split system air conditioning may be provided as an equivalent alternative
Security	Locks to all opening windows.
<b>Tasmania</b>	
Heating and Cooling	Minimum reverse cycle split system to living rooms plus panel heating to bedrooms.
Security	Locks to all opening windows.

**6030 ACT**

ITEM	REQUIREMENT
<b>Canberra &amp; Queanbeyan</b>	
Heating	Ducted heating. RC split system air conditioning may be provided as an equivalent alternative. For Bathrooms and ensuites, heating to be supplemented via infrared lamps embedded within ceiling fans.
Cooling	Minimum ducted evaporative cooling. RC split system air conditioning may be provided as an equivalent alternative.
Security	Security screens to all opening windows.

**6040 NSW**

ITEM	REQUIREMENT
<b>Armidale &amp; Tamworth</b>	
Heating	Ducted heating. RC split system air conditioning may be provided as an equivalent alternative. For Bathrooms and ensuites, heating to be supplemented via infrared lamps embedded within ceiling fans.
Cooling	Minimum ducted evaporative cooling. RC split system air

**Design and construction specification for DHA residences**

	conditioning may be provided as an equivalent alternative.
Security	Security screens to all opening windows.
<b>Hunter &amp; Northern NSW</b>	
Heating/Cooling	Reverse cycle split system Bedroom 1 and living room plus ceiling fans to bedrooms and other living rooms.
Security	Security screens to all opening windows.
<b>Nowra</b>	
Heating	1x relocatable 25mj gas heater with bayonet connections to living rooms (Incl. associated GPO).
Cooling	Ceiling fans to bedrooms and living rooms.
Security	Locks to all opening windows.
<b>Riverina</b>	
Heating	Ducted heating. RC split system air conditioning may be provided as an equivalent alternative. For Bathrooms and ensuites, heating to be supplemented via infrared lamps embedded within ceiling fans.
Cooling	Minimum ducted evaporative cooling. RC split system air conditioning may be provided as an equivalent alternative.
Security	Locks to all opening windows.
<b>Sydney &amp; Blue Mountains</b>	
Heating/Cooling	Reverse cycle split system Bedroom 1 and living rooms plus ceiling fans to bedrooms and living rooms.
Security	Security screens to all opening windows.

**6050 SOUTH EAST QUEENSLAND**

ITEM	REQUIREMENT
<b>Brisbane &amp; Ipswich</b>	
Heating/Cooling	Reverse cycle split system Bedroom 1 and living rooms plus ceiling fans to bedrooms and living rooms.
Security	Security screens to all opening windows.
<b>Toowoomba</b>	
Heating/Cooling	Reverse cycle split system Bedroom 1 and living rooms plus ceiling fans to bedrooms and living rooms.
Security	Locks to all opening windows.

**Design and construction specification for DHA residences**
**6060 NORTH QUEENSLAND**

ITEM	REQUIREMENT
<b>Townsville, Rockhampton &amp; Cairns</b>	
Ceilings	Internal ceiling height must be a minimum 2700mm.
Drainage	All down pipes to be directly connected to the stormwater system.
Cooling	Refrigerated air conditioning (central or split system) plus ceiling fans to bedrooms and living rooms.
Security	Security screens to all opening windows.
COA	COA to be placed under roofline. Circulation fan required.
Eaves (Soffit)	Eaves width minimum 900mm, plus to meet DHA shade expectations plus local Authority and estate requirements, with materials, finishes and colour to coordinate with walls.

**6070 WESTERN AUSTRALIA**

ITEM	REQUIREMENT
<b>Perth &amp; Geraldton</b>	
Heating	1x relocatable 25mj gas heater with bayonet connections to living rooms (Incl. associated GPO).
Cooling	Minimum ducted evaporative cooling. RC split system air conditioning may be provided as an equivalent alternative.
Security	Supply and fix security screens to all opening windows.
<b>Karratha &amp; NW Region</b>	
Ceilings	Internal ceiling height must be a minimum 2700mm.
Cooling	Refrigerated air conditioning (central or split system) plus ceiling fans to all bedrooms and living rooms.
Security	Security screens to all opening windows.
COA	COA to be placed under roofline. Circulation fan required.
Eaves (Soffit)	Eaves width minimum 900mm, plus to meet DHA shade expectations plus local Authority and estate requirements, with materials, finishes and colour to coordinate with walls.

**6080 NORTHERN TERRITORY**

ITEM	REQUIREMENT
<b>Darwin</b>	
Ceilings	Internal ceiling height must be a minimum 2700mm.

**Design and construction specification for DHA residences**

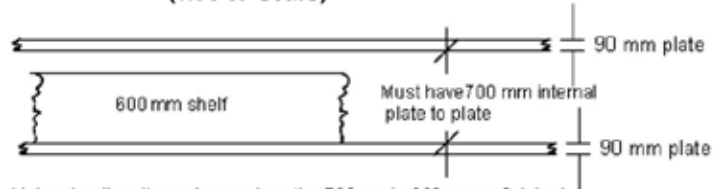
Drainage	Roof guttering over entry ways, with associated SW management. Any down pipes to be fitted with 2 x 45 degree elbows at the bottom to ensure SW is discharged with minimum 75mm clearance between elbow and surface of gully pits
Cooling	Refrigerated air conditioning (central or split system) plus ceiling fans to bedrooms and living rooms.
COA	COA to be placed under roofline. Circulation fan required.
Security	Security screens to all opening windows.
Eaves (Soffit)	Eaves width minimum 900mm, plus to meet DHA shade expectations plus local Authority and estate requirements, with materials, finishes and colour to coordinate with walls.
Carport and Storage OR Garage	Either carport with secured storage shed or a garage- provided that the garage sufficient ventilation to ensure temperature inside is not greater than ambient external temperature; with natural light including secure storage area.
<b>Katherine</b>	
Ceilings	Internal ceiling height must be a minimum 2700mm.
Drainage	Roof guttering over entry ways, with associated downpipes. All down pipes to be fitted with 2 x 45 degree elbows at the bottom to ensure SW is discharged with minimum 75mm clearance between elbow and surface of gravel filled soakage pits.
Cooling	Refrigerated air conditioning (central or split system) plus ceiling fans to all bedrooms and living rooms.
COA	COA to be placed under roofline. Circulation fan required.
Security	Security screens to all opening windows.
Eaves (Soffit)	Eaves width minimum 900mm, plus to meet DHA shade expectations plus local Authority and estate requirements, with materials, finishes and colour to coordinate with walls.
<b>Tindal requirements as for Katherine except</b>	
Security	Insect screens to all opening windows.
<b>Alice Springs</b>	
Cooling	RC split system air conditioning Bedroom 1 and living plus ceiling fans to all bedrooms and living rooms.
Security	Security screens to all opening windows.
Eaves (Soffit)	Eaves width minimum 900mm, plus to meet DHA shade expectations plus local Authority and estate requirements, with materials, finishes and colour to coordinate with walls.

Design and construction specification for DHA residences

APPENDIX 1 WARDROBE DETAILS

(not to scale)

Bedroom 1  
Built in wardrobe  
plan view

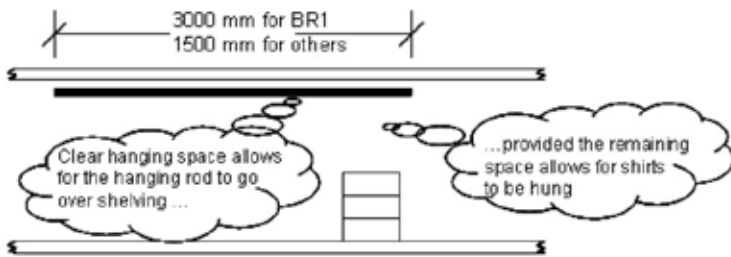


Note: sheeting dimensions reduce the 700mm to 680mm as finished

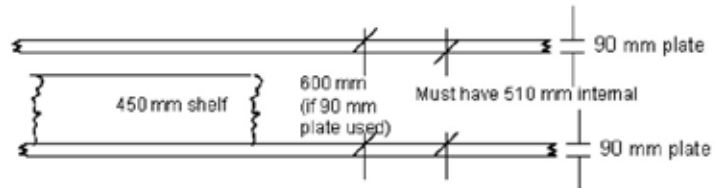
Bedroom 1  
Walk in wardrobe  
plan view



Bedroom  
wardrobe  
elevation



Bedroom 2,3,4  
Built in wardrobe  
plan view



Note: sheeting dimensions reduce the 510mm to 490mm as finished