



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

**PROPOSED CONSTRUCTION
OF
HOUSING FOR DEFENCE
AT
MUIRHEAD, NORTHERN TERRITORY
- STAGE 1 DEVELOPMENT PROPOSAL**



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List of Abbreviations and Acronyms

AAPA	Aboriginal Area Protection Authority
ADF	Australian Defence Force
ARI	Average Recurrence Interval
DA	Development Approval
DCA	Development Consent Authority
DCC	Darwin City Council
DCP	Developer Contribution Plan
Defence	Department of Defence
DHA	Defence Housing Australia
DHF	Defence Housing Forecast
EER	Energy Efficiency Rating
IEAUST	Institute of Engineers Australia
JV	Joint venture
MDA	Marshall Day Acoustics
MOU	Memorandum of understanding
MWD	Members with dependents
NatHERS	Nationwide Housing Energy Rating Scheme
NHCP	Housing Classification Policy
NTG	Northern Territory Government
PPP	Public private partnership
PWC	Parliamentary Standing Committee on Public Works
RA	Rent allowance
SD23	Specific use Darwin 23
SLB	Sale and lease back
SMEC	SMEC Urban Australia Pty Ltd
STP	Sewerage Treatment Plant
TTM	TTM Group (traffic consultants)
UXO	Unexploded ordinance (
WSUD	Water sensitive urban design
WELS	Water Efficiency Labeling and Standards

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 the first stage of a 167.6 ha site in the Darwin suburb of Muirhead, Northern Territory. See Location Map at Supplementary Item 1.
- 1.2** The immediate objective of the Project (Stage 1) is to provide 166 lots on which DHA will build 50 modern community standard dwellings, in part satisfaction of the immediate housing requirements of Australian Defence Force (ADF) members serving in the Darwin area. The project is subject to a memorandum of understanding (MOU) between the Northern Territory Government (NTG) and DHA, outlined in paragraph 9.1.2.
- 1.3** Subsequent stages of the project will develop the remaining land, possibly through a joint venture. These future stages will be included in a separate submission to the PWC. This submission focuses only on Stage 1. The rationale for the staged approach is outlined at paragraph 12.

2 HISTORICAL BACKGROUND

- 2.1** The Muirhead site was previously used as a World War II signalling station with a series of aerial structures radiating out from the former compound. In more recent times, the signalling station has been decommissioned and all structures have been removed or are no longer required. The site was purchased by DHA in two parcels, one in April 2006, the other in January 2010. An aerial photograph of the site is at Supplementary Item 2.

3 THE NEED

- 3.1** Currently about 4500 Defence personnel reside in the Darwin area, of whom about 1800 are members with dependents (MWD). To satisfy the MWD

housing requirement, DHA manages 1816 dwellings in and around Darwin. A total of 729 houses are located on the Australian Defence Force (ADF) bases; Larrakeyah Barracks, RAAF Base Darwin and Defence Establishment Berrima. The remaining houses are located in the suburbs of Darwin.

3.2 In July 2007, Defence introduced its New Housing Classification Policy (NHCP) with an increased minimum standard. A large number of houses in the Darwin area, both on and off base, do not meet the new standard. To replace or upgrade these houses, together with the replacement of houses for which leases will expire, DHA has programmed 553 constructions over the financial years 2009/10 to 2013/14.

3.3 Table 1 summarises DHA's estimated capital investment and residential construction program for the Darwin area. The majority of these constructions (456) will be off-base in the new suburbs of Lyons and Muirhead.

Financial Year		09-10	10-11	11-12	12-13	13-14	Total
Defence Housing Forecast (DHF)		1815	1639	1695	1757	1780	—
OPENING STOCK		1811	1843	1755	1679	1650	—
Subtract lease expiries & disposals of sub-standard stock		308	257	355	222	215	1337
New housing	New direct leases	12	8	10	15	15	60
	Conversions and options on existing leases	144	84	141	73	123	565
	Direct purchase of existing properties	11	0	0	10	0	21
	Constructions off-base	173	63	45	95	80	456
	Constructions on-base	0	14	83	0	0	97
	Total additions	340	169	279	193	218	1199
CLOSING STOCK¹		1843	1755	1679	1650	1653	—

Table 1 : DHA Housing Requirements for Darwin

¹ 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.

- 3.4** The development of the site and ultimate construction of about 330² dwellings for ADF personnel on Muirhead is an essential part of meeting the new constructions target for the next 8 – 10 years.

4 DESCRIPTION OF THE PROPOSAL

- 4.1** As Muirhead is a large site, it will be developed in stages over 8 – 10 years to match the capacity of the housing construction industry and the Defence demand for new housing.
- 4.2** The Stage 1 proposal is to develop 18.4 ha of the site to produce 166 building lots, 12 of which can be duplex lots. From these lots, DHA will construct 50 dwellings, offer 25 lots to the NTG as affordable and community housing lots, and sell the remainder to the general public.
- 4.3** Stage 1 of the project is shown in relation to the full extent of the project on the Site Master Plan at Supplementary Item 3. Further details of the proposal are found in the second part of this submission under the heading 'Technical Information'.

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.
- 5.2** On-base housing has historically formed a high proportion of the Defence housing provided in Darwin. Most of this housing is now old and in need of replacement or refurbishment. Because of its proximity to flight path noise exclusion zones, Defence will progressively replace most of this housing over the next eight years with off-base housing in suburbs such as Muirhead. This is part of a larger strategy to ensure that the future housing needs of the ADF in Darwin are met.

² The actual number of ADF dwellings is limited by the MOU with the NT Government, outlined in paragraph 9.1.2. The total number of dwellings on the site will be determined by the final number of duplexes built, however, 330 would represent about 30 per cent of the total Muirhead constructions.

- 5.3** With the increase of Defence personnel in Darwin over recent years, there has already been a move of accommodation off bases. This includes 675 houses at Palmerston, which is near Robertson Barracks. Ongoing construction in the suburb of Lyons and the proposed development of Muirhead will yield another 700 homes.
- 5.4** 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 provision for only 21 direct purchases.
- 5.5** The great majority of DHA's leased properties have been built and funded through the Sale and Leaseback (SLB) program. Other rental properties in Darwin to the standard required by Defence are in very short supply. A realistic expectation is that only 60 new direct leases will be available over the five years from 2009/10 to 2013/14 inclusive.

6 REASONS FOR SELECTING THE PREFERRED OPTION

- 6.1** Land is in critically short supply in Darwin. Muirhead is one of the last remaining areas in Darwin's northern suburbs, and represents a rare opportunity for DHA to undertake a major development that will help satisfy Defence housing needs in Darwin for the next 8 – 10 years.
- 6.2** In locations such as Darwin where there is a high level of Defence demand, constructed housing delivered through bulk procurement contracts is a 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 facilitates and provides greater assurance that DHA will deliver housing that is geared to Defence requirements, in terms of the house specification and delivery time. The five year program has 553 constructions, including the 50 dwellings planned for Stage 1 of Muirhead.

7 ENVIRONMENTAL CONSIDERATIONS

- 7.1 Existing vegetation.** The site has been previously disturbed and there is not considered to be significant vegetation present on the property requiring retention. Nonetheless, a stand of vegetation located in the southern portion of the site is proposed to be incorporated within the development where practicable.
- 7.2 Waterways/wetlands.** There are some significant ecosystems in the general vicinity to the subject land. These include the Casurina Coastal Reserve to the west and the Buffalo Creek Management Area to the east. Neither are considered to be adversely affected by the development. However, the Buffalo Creek area is a known source of biting insects and a breeding ground for mosquitoes. Appropriate control measures have been designed to effectively mitigate impacts arising from residential development in proximity to these areas. These measures, which relate to future stages of the Muirhead development, are addressed further under 'Technical Information' in the second part of the submission.
- 7.3 Unexploded Ordinance.** Mapping available on the NTG website does not annotate the Muirhead site as having unexploded ordinance (UXO). A site assessment undertaken by G-Tek in 2006 on behalf of the Department of Defence as part of the preparation of the site for sale, concludes that the likelihood of UXO being remnant on site is considered negligible. Accordingly, the NTG has rezoned the site for residential use.

8 HERITAGE CONSIDERATIONS

- 8.1 Aboriginal Heritage.** The Aboriginal Area Protection Authority (AAPA) has advised that there are no registered or recorded sites within the project area. An AAPA Certificate has been issued for the development on the (normal) condition that, should human skeletal remains or artefacts be found, work must be suspended until authority to continue is issued by the AAPA. A copy of the AAPA certificate is at Supplementary Item 4. It should be noted that the AAPA Certificate will lapse on 13 March 2011 and will need to be renewed if work is not commenced by that date.

8.2 European Heritage. As there are no facilities remaining on the site, there are no remnants of European use of the site that would be of heritage interest.

9 STAKEHOLDER CONSULTATION

9.1 Planning Authorities.

9.1.1 Extensive consultation with the various development authorities and stakeholders has been undertaken regarding the overall Muirhead plan and Stage 1 application, including a Whole of Government Workshop in April 2008. It is considered that an optimal plan has been developed that addresses the various development issues associated with the site. These issues include biting insect restrictions, odour buffers, storm water management, acoustic and traffic management controls together with market needs and requirements. Further details on these aspects is included under 'Technical Information'.

9.1.2 It should be noted that the project is being undertaken under the auspices of an MOU between the NTG and DHA that was executed on 28 October 2009. This MOU, which was a requirement of the Minister of Planning prior to her consenting to the rezoning of the site for residential uses, delivers the following key outcomes to the parties:

- Not more than 30 per cent of total lots are to be for the construction of DHA service residences.
- Sufficient lots to accommodate 15 per cent of total dwellings are to be offered to the NTG for Affordable Housing and Community housing purposes.
- The remainder of the lots will be offered for sale to the general public.
- DHA will be offered not less than 15 per cent of serviced residential lots at all future NTG land releases and sponsored land developments.

9.1.3 A Northern Territory Development Consent Authority (DCA) hearing on the project is expected to be conducted in April 2010 and with formal Development Approval (DA) expected in June 2010.

9.2 *Aboriginal Community.* DHA has held informal meetings with the Larrakeyah Community regarding the development proposal and the potential to create a formal agreement to employ indigenous tradespersons and trainees on the site, similar to the successful agreement that was negotiated for the Lyons development, which saw indigenous people actively employed in construction and landscaping.

9.3 *General Community.*

9.3.1 Community consultation was undertaken as part of the exhibition phase of the rezoning process, including notification in the local print media and the holding of a public meeting.

9.3.2 Additional to the normal Territory Government consultation processes, DHA has scheduled a public information forum over two days on 10–11 April 2010. Significant outcomes from that evening will be presented to the PWC at the public hearing if required.

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 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.

TECHNICAL INFORMATION

11 LOCATION

- 11.1** The Muirhead site is a 167.6 ha greenfield site in the northern suburbs of Darwin, approximately 14 km north of the Darwin CBD. The site, identified as Lot 9737, Town of Nightcliff from plan L2001/071, is a former Defence communications station.
- 11.2** The site is bound by the Casuarina Coastal Reserve to the north, the Leanyer Sewerage Treatment Plant to the east, Fitzmaurice Drive to the south and Lee Point Road to the west. The site is north of the existing suburbs of Leanyer, Woodleigh Gardens and Wanguri, and east of the soon to be completed suburb of Lyons³.
- 11.3** Stage 1 will develop an 18.96 ha site located along Lee Point Road on the western side of the larger site, as shown in the Site Master Plan at Supplementary Item 3. Site location maps are at Supplementary Item 1.

12 PROJECT SCOPE.

- 12.1** As the Muirhead development is a large undertaking, DHA has considered taking a joint venture (JV) partner to share the risks and capital involved. A call for expressions of interest (EOI) was advertised on the 28 January 2010 with a closure date of 12 March 2010. Submissions were sought for either the role of a Project Manager or for an equity partner incorporating project management responsibilities. Submissions are currently being evaluated.
- 12.2** Meanwhile, in order to deliver new houses to Defence in accordance with our Darwin delivery plan, DHA proposes to commence the first stage of the development in parallel with consideration of options for future stages.
- 12.3** Irrespective of final approach taken, the size of the undertaking mandates a staged approach over a number of years. The site for Stage 1 makes it an ideal first stage as its topography enables the use of spare capacity in the existing Lyons catchment area for drainage and sewerage (see paragraph 14.1).

³ The Lyons development is a DHA – CIC Australia Ltd. Joint Venture

- 12.4** The scope of Stage 1 of the project is to develop the 18.96 ha site to produce 166 building lots. DHA proposes to build 50 three and four-bedroom detached dwellings, with limited opportunities to build some duplex units. As noted at paragraph 9.1.2, DHA will make 25 blocks available to the NTG and proposes to sell the remaining 91 lots (together with any lots not taken up by the NTG) to the general public.
- 12.5** Subsequent stages of the project will be subject to a separate development (including the submission of a separate application for DA) that will be brought to the PWC in due course. The MOU requirement to limit DHA's take-out to 30 per cent of the lots, make 15 per cent available for affordable housing and sell the remainder to the general public applies to all stages of the development.

13 SITE SELECTION

- 13.1** The site was acquired by the purchase of surplus Defence land, and is one of the last remaining areas available for development in the northern suburbs of Darwin. Its location is close to the Casuarina Shopping Centre and provides reasonable access to Darwin city, Larrakeyah Barracks, the RAAF Base and Robertson Barracks, where ADF personnel in Darwin are employed. Land for housing development is very short in Darwin, and there are currently no other sites in the area capable of providing the numbers of houses required by Defence over the foreseeable planning timeframe.

14 SITE DESCRIPTION

- 14.1** The Stage 1 site has an irregular oblong shape with a frontage to Lee Point Road, the main arterial road, as illustrated in the Site Master Plan at Supplementary Item 3. The size and shape of the Stage 1 site have been largely determined by drainage and servicing considerations and the capacity of the Darwin construction industry. The limitations on servicing are amplified at paragraphs 18.5 to 18.7 of the submission.

14.2 The total site is basically divided into three catchments. The northern part of the site forms the larger catchment falling to the northeast corner of the property. The southern catchment generally falls to the southeast corner, and a small section in the west of the site falls west to the existing drainage reserve within the Lyons Development west of Lee Point Road. The smaller catchment forms the site of Stage 1.

15 ZONING AND APPROVALS

15.1 The site was re-zoned *Specific use Darwin 23* (SD23) on 28 October 2009. This zoning provides for primarily low density residential development with a maximum of 10 houses per hectare and a minimum lot size of 450 sq.m. The zoning specifies a number of other restrictions, all of which can be accommodated in DHA's proposed land use.

15.2 The re-zoning application was submitted prior to settlement of the additional 15 ha site mentioned in paragraph 16.2. However, information supplied to the DCA in the re-zoning application included a proposed master plan for the whole site, and this was exhibited as part of the re-zoning process. Accordingly, DHA anticipates expeditious re-zoning of the 15 ha site when an application is submitted in due course. The 15 ha site is not part of Stage 1 of the proposed development.

15.3 An application for Development Approval has been submitted, and as noted at paragraph 28.2, extensive consultation has been undertaken with the approving authority, DCA, as well as the NTG and Darwin City Council (DCC). DHA considers that all requirements of SD23 have been met with the exception of the building setback requirement. However, DHA believes its "breezeway lot design" meets or exceeds the objective of the specified setbacks and produces a superior outcome. The issue will be fully discussed at the DCA meeting noted at paragraph 9.1.3 and is not expected to delay DA.

15.4 While formal DA will not be issued before June 2010, DHA expects to receive, by the date of the PWC public hearing, a letter of comfort from the NTG indicating its intentions regarding the Muirhead project.

16 DETAILS OF LAND ACQUISITION

- 16.1** In 2006, Defence sold DHA the majority of the subject site to DHA under the Priority Sales provisions of the Services Agreement⁴. The area of the site was approximately 152 ha, with Defence retaining a 15 ha site in the south-western corner of the larger land parcel.
- 16.2** Recently, Defence determined that the retained 15 ha site would not be required for its purposes, and it was also offered to DHA on a Priority Sale basis. The purchase of the second parcel was concluded in January 2010, providing a total land area of 167.6 ha.
- 16.3** The purchase prices are included in the confidential costing information.

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** Civil works and all building construction requiring certification will be undertaken by qualified and approved Private Certifiers.
- 17.3** As required, all contractors used for civil works and construction of houses will be accredited by the Federal Safety Commission under the Australian Government Building and Construction OHS Accreditation Scheme, and compliant with the National Code of Practice for the construction Industry.

18 PLANNING AND DESIGN CONCEPTS

- 18.1** *Design Philosophy.* DHA's vision is that "*Muirhead will be an economically viable, diverse and sustainable yet affordable master planned community*". To achieve this vision, and to deliver building sites that respond to Darwin's

⁴ 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.

tropical climate and lifestyle attributes, the development will incorporate the following design features:

- lot layouts that are best suited to catching prevailing breezes;
- wide reserves for local streets that enable groupings of large street trees in public space and smaller trees in front yards;
- dwellings constructed within specified envelopes so as to have sufficient area to provide for the dwellings, vehicle access, parking and ancillary structures;
- homes that have porches and decks as living spaces that are designed to encourage activation of, and overlooking of, streets and public spaces;
- a mix of heavy and lightweight elements in the front façade of the building;
- breezeway separations between buildings, generally not less than six metres, created through individual envelopes developed for each lot; and
- housing that promotes cross ventilation through building orientation and layout, with extended roofs and overhangs for additional shade and weather protection.

These features have influenced the design of the lot layout and are discussed further under 'Master Planning Considerations' at paragraph 21.2.

18.2 Structure, Materials and Finishes. Dwellings will be constructed by local contractors engaged through a 'Design and Construct' request for tender. Contractors will be expected to submit 'project home' designs using materials that are durable and robust and which do not require regular maintenance such as painting.

18.3 Subsurface Conditions. A geotechnical survey has been carried out by consultants, Douglas Partners. Their advice is that the site has some areas that will require drainage and sub-soil remediation by excavating and

stockpiling the topsoil, replacing underlying loose silty sand subsoils with 'select' fill and then respreading the topsoil. The additional works required are not considered to be unusual and have been allowed for in the cost estimates for operational works.

18.4 Erosion and Sediment Control.

18.4.1 Bulk earthworks are required for sub-soil remediation and to re-profile the site for drainage purposes. Earthworks will seek to follow the natural contours to minimise cut to fill volumes. Where possible, fill material required to re-profile the development will be sourced from within the site. Generally lots will be shaped so that properties fall towards the road reserve.

18.4.2 The earthworks required will be a potential source of stormwater pollution. Accordingly, erosion and sediment controls will be established and maintained in accordance with the Stormwater Management Plan prepared by consultants SMEC Urban Australia Pty Ltd (SMEC) and as documented on the approved Operational Works drawings for the project. During earthworks operations, sediment fences, sediment traps, check dams, runoff diversions and other erosion measures will be used to minimise soil erosion and to retain all sediment on site. (See Supplementary Item 7). Dust emissions will be controlled by sprinkling from a water truck, and by minimising site disturbance.

18.4.3 On completion of the earthworks, the subject areas will be stabilised by respreading stockpiled topsoil, hydromulch stabilisation or landscaping.

18.5 Water supply.

18.5.1 Power and water Corporation has advised that the current 300mm water main that services the caravan park to the north of the site has insufficient capacity to service the total Muirhead development, and upgrade of the existing water supply will be required. However, preliminary assessment has revealed that the existing trunk mains can accommodate Stage 1.

18.5.2 The design and construction of the water supply within the site will be undertaken in accordance with the standard requirements of Power and Water Corporation.

18.6 Drainage.

18.6.1 A preliminary design assessment of the natural drainage watersheds has been undertaken for the whole of the Muirhead development site by SMEC. The resultant Stormwater Management Plan prepared by SMEC is consistent with sustainable surface water management and will ensure that downstream discharges are limited to the existing (pre-development) flows. Features of the plan include:

- Maximising on-site storage and recharge of surface runoff into existing aquifers.
- Filtration of runoff through enhanced natural vegetation and storage systems,
- Providing erosion and sediment control measures during construction
- Constructing permanent sediment basins at outlets to natural waterways.

18.6.2 For major roads within the development, a road side swale will be installed incorporating a low flow pipe system to best convey the stormwater flows. This will encourage the road drainage to discharge and be conveyed by the swale, reducing the pipe sizes needed, and in-turn increasing the overland flow capacity of the road reserve.

18.6.3 Design of the stormwater drainage system and structures will be in accordance with the requirements of the Australian Rainfall and Runoff (IEAUST) and the DCC's Development Guidelines.

18.6.4 A schematic of the drainage system is at Supplementary Item 8. Note that the topography of the site has determined the size of Catchment C which in turn has determined the size of Stage 1 of the development.

18.7 Sewerage.

- 18.7.1** Assessment and preliminary design of the sewerage infrastructure has been carried out by the SMEC. The internal sewer mains servicing the individual lots will be constructed in accordance with Power and Water Corporation guidelines and standard drawings.
- 18.7.2** SMEC advises that the current sewer trunk main has insufficient capacity for the proposed development, and that Power and Water Corporation has approved another trunk main that will service the Muirhead development as well as the remaining parts of Lyons. This new main is under construction by the Lyons Development Corporation and is expected to be completed in the first half of 2010, when it will become a Power and Water asset.
- 18.8 *Electrical Services.*** As the development is adjacent to an existing supply, it is expected that the supply of electricity will be readily available. Power and Water will confirm the supply once DA is received. Electricity supply to dwellings on site will be delivered by means of underground cable, installed to the requirements of Power and Water.
- 18.9 *Broadband/Telecommunications.*** It is proposed to install optic fibre via the 'Telstra Velocity' program or an equivalent if available. This service is likely to be an extension of the infrastructure within the Lyons development. 'Telstra Velocity' is Telstra's optic fibre to the home solution offering state of the art telecommunication services including high speed broadband and digital free to air TV.
- 18.10 *Mechanical Services.*** All houses will be air conditioned in accordance with Defence policy, which for the Darwin area requires the installation of refrigerated air conditioning (split systems) plus ceiling fans to all bedrooms and living rooms.

19 ACOUSTICS

- 19.1** Acoustics consultants Marshall Day Acoustics (MDA) were commissioned late 2009 to perform an acoustic assessment of road traffic noise from Lee Point Road in relation to the proposed Muirhead development. The MDA assessment considered increases in road traffic that would be generated by

DHA's Muirhead site as well as from and other future developments to the North.

- 19.2** MDA have used the NTG noise policy associated with noise (Department of Planning and Infrastructure's Policy- Road Noise on NT Controlled roads 2006) in determining the noise criteria for the development.
- 19.3** The findings of the assessment are that dwellings in stage one which adjoin Lee point Road and are located within the prescribed building envelopes do not need any noise mitigating measures.
- 19.4** As development of Muirhead and other developments north of Muirhead occur in the future (say 8 – 10 years) it may be necessary to modify the road surface to an open graded porous asphalt. This new surface would then maintain noise levels to within the standards of the NT policy.
- 19.5** It is also expected that a development contribution scheme with DCC and other land owners will be established to deliver these future works if required. An allowance for the contribution scheme will be made in budgetary estimates for future stages.
- 19.6** Noise associated with construction work will be managed by ensuring contractors' equipment operates within specified noise levels, restricting contractors' working hours and notifying adjacent residents of the expected noise impacts. These matters will be covered in the Environmental Management Plan.

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, minimum Water Efficiency Labelling and Standards (WELS) ratings will be 4 star for tap ware and showers and 6/3L dual flush toilets.
- 20.2 Direct energy consumption.**

- 20.2.1** As outlined at paragraphs 21.2, building envelopes and house design will maximise the use of shade and prevailing breezes to achieve maximum cooling and therefore minimise air conditioner use.
- 20.2.2** All dwellings must comply with DHA's Performance and Design Requirements (see Supplementary Item 17). 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.

21 MASTER PLANNING AND DEVELOPMENT CONSIDERATIONS

21.1 Environmental Constraints.

- 21.1.1** The Muirhead site is bounded by the Casuarina Coastal Reserve and to the north-east and east. The Buffalo Creek area within the Casurina Reserve is a source of biting insects, in particular midges and mosquitoes. This issue is addressed by establishing a 1km urban biting insect buffer from the mangrove margin of Buffalo Creek, creating rural residential buffer lots, and incorporating an open grassland wind buffer, as shown on the site plan at Supplementary Item 3. These treatments have been endorsed by the Medical Entomology area of the NTG Department of Health and Families.
- 21.1.2** The Leanyer Sewerage Treatment Plant (STP) is located to the south-east. No lot is closer than the prescribed 700 metres from the primary settlement ponds of the STP.
- 21.1.3** The limitations on the site imposed by the biting insects and odour buffers are shown on the Site Master Plan at Supplementary Item 3.

21.2 Lot Arrangement.

- 21.2.1** The layout of the site has been planned to enable the maximum number of lots to be oriented within 30 degrees of north to capture the dominant breezes from the north. Lots that have a dominant east-west orientation are separated from dwellings to the rear by at least 6 metres. This

separation provides optimal conditions to capture cooling breezes. Supplementary Item 9 refers.

- 21.2.2** A standard suburban lot layout restricts the amount of cooling breeze available and is not suited to the Darwin climate and lifestyle. Muirhead lot layouts and individual building envelopes will position houses to provide adequate areas of private open space while maintaining breeze ways between buildings. The concept is to locate bedrooms, bathroom, laundry and garage on one side of the block, giving the key living area an outdoor feel.
- 21.2.3** The side yard is an important space for the Darwin lifestyle, allowing space to store boats, play cricket and football and plant shady trees, as well as allowing maximum air to circulate. The concept is shown in the diagrams at Supplementary Item 10. Lot layout and lot sizes are indicated on Supplementary Item 11.
- 21.2.4** DCC requires all lots to drain to the road reserve and to locate all services in the road reserve, thereby avoiding easements at the back of blocks. This requirement enables the back boundary to vary from lot to lot to present a more consistent and equitable street frontage independent of lot size, and maximises air circulation. This feature is apparent in the Stage 1 sub-division plan at Supplementary Item 11.
- 21.3 *Dwelling Types*** As noted at paragraph 18.2, prospective contractors will be invited to submit house designs through a 'Design and Construct' request for tender. The successful contractors will be those who use designs that reflect the Darwin lifestyle and residential character as reflected in the Muirhead Vision, outlined at paragraph 18.1. It is also intended that, through the use of different external materials and finishes, no two adjacent detached houses will look identical, but a diverse yet cohesive streetscape will be created. Supplementary Item 12 is an example of a house that responds to the Darwin climate and lifestyle.
- 21.4 *Recreation Area.*** The master plan created for Muirhead (Supplementary Item 3) provides a mixture of public open space areas providing opportunities for both active and passive uses. The quantum and type of

areas are considered to be in accordance with DCC regulations and guidelines.

21.5 Roads.

21.5.1 Connection to External Road Network.

21.5.1.1 Traffic consultants TTM Group (TTM) have determined that the proposed site development is expected to generate increased traffic volumes along Lee Point Road and Tambling Terrace. Owing to the proximity of the intersections of Tambling Terrace and Fitzmaurice Drive with Lee Point Road, these two intersections will require upgrading with coordinated traffic signals.

21.5.1.2 Stage 1 of the development will connect to the external road network via Lee Point Road at two intersections shown on the subdivision plan at Supplementary Item 11. The intersections will be designed to incorporate a right turn lane on the southern approaches (ie, for traffic turning into Muirhead from the south).

21.5.1.3 The development will be required to contribute to the cost of the upgrades outlined above, and this has been allowed for in the budgetary estimates. A Developer Contribution Plan (DCP) that is currently being prepared by DCC will allocate the cost of these traffic works on an equitable basis to the relevant parties in the catchment.

21.5.2 Internal Road Network.

21.5.2.1 The design intent for Muirhead is to create streets that are liveable spaces to be shared by a range of users not just car drivers. Accordingly, the street layout is designed to keep vehicle speeds sensibly low and to provide adequately for pedestrians, cyclists, landscaping and car parking. Street landscaping is addressed in paragraphs 27.3 and 27.4.

21.5.2.2 Generally the internal roads will generally be a 7.2m wide carriageway within a 20m wide road reserve. The exceptions are:

- The entry roads, which include a median strip in a road reserve of 25m, narrowing to a 10.4m carriageway incorporating parking bays;

- Shared zones and park edge streets, where traffic volumes will be negligible and parking demands low – these will have a 5.5m wide road in a 12m reserve.

The internal street layout for Stage 1 is illustrated at Supplementary Item 13.

21.6 Footpaths. Footpaths will be incorporated in the street layout in accordance with the DCC requirements, which generally require footpaths to be provided on one side of the street.

21.7 Car Parking. All roads are of a sufficient width that will enable street parking for visitors' vehicles.

22 PROVISION FOR PEOPLE WITH DISABILITIES

22.1 Disability Provisions

22.1.1 The current Defence policy is for Defence families with special needs to be accommodated by DHA by either modifying existing homes, or by securing properties that are already modified or that can be adapted to meet the particular requirements of the disabled party.

22.1.2 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 and will take 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 for allocation, houses with suitable disabled facilities at the time when they are required,

- the satisfaction of personnel without special needs being required to live in a home 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 house footprint and increased block size and the extra costs associated with the provision of specialist/non-standard fittings, and

22.1.3 Meanwhile, the Muirhead site will be developed to allow access through the estate for wheelchairs, and a significant number of lots will have topography and size that are conducive to building houses with disabled provisions.

23 HERITAGE CONSIDERATIONS

23.1 As noted in paragraphs 8.1 and 8.2, there are no registered or recorded aboriginal sacred sites within the project area. An AAPA Certificate has been issued for the development on the (normal) condition that, should human skeletal remains or artefacts be found, work must be suspended until authority to continue is issued by the AAPA. This requirement will be incorporated into the Environmental Management Plan being prepared for the site. A copy of the AAPA certificate is at Supplementary Item 4.

23.2 As there are no buildings remaining on the site, there are no remnants of European use of the site that would be of heritage interest.

24 COMMUNITY FACILITIES

24.1 Shops and Services. The site is served by the Casuarina Shopping Centre, a major shopping complex situated less than 2 km southwest of the site. The Royal Darwin Hospital is approximately 500m to the west of the site. The site is less than 500m from the Tracy Village Sports and Social

Cub in neighbouring Lyons. A map showing the relative locations of these services together with schools is at Supplementary Item 14.

24.2 Public transport. Discussions about future bus services for Lyons/Muirhead have been held with the Department of Transport and bus operators. Advice is that, while a bus route through Lyons and Muirhead will be established so that 90 per cent of dwellings will be within 400m of a bus stop, the final route has yet to be determined. Potential bus routes are shown on both Supplementary Items 14 and 15. Interim routes for Stage 1 may use part of Lee Point Road and other streets within Muirhead.

24.3 Education.

24.3.1 Primary Schools. The site is served by a number of schools in nearby suburbs, as outlined below:

- A government primary school and a Lutheran Primary School in the neighbouring suburb of Leanyer,
- Government primary schools in the nearby suburbs of Wanguri and Nakara.
- A Catholic primary school in nearby Casuarina.

At this stage the NTG has no plans to build additional schools in the area.

24.3.2 Secondary Schools. Dripstone High School in Nakara is the closest high school.

24.3.3 Tertiary. Charles Darwin University is approximately 2.5 kilometres southwest

24.4 Child Care Facilities. Long day child care facilities are located in the nearby suburbs of Tiwi, Casurina and Wanguri, and a new child care centre is currently being built in Lyons.

25 FIRE PROTECTION AND SECURITY MEASURES

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

- 25.2** 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** As applicable, all DHA contractors to be used in the project will be accredited by the Federal Safety Commissioner.

27 LANDSCAPING

- 27.1** The master plan for the site includes two east-west linear parks that connect Muirhead to the adjoining suburb of Lyons and form part of an overall northern suburbs open space network. While there is not considered to be a high instance of faunal movement and activity in this locality, the greenspace corridors and retention of significant stands of vegetation can assist in providing corridors for any fauna to use and enable connection to habitat areas of Casuarina Coastal Reserve and Buffalo Creek
- 27.2** The linear parks incorporate water sensitive urban design (WSUD) stormwater drainage features. Existing vegetation will be retained in these areas where possible, augmented by native species suitable to Darwin.
- 27.3** Stage 1 incorporates a park located centrally at the end of the southern entry road, providing an eye-pleasing entry to the estate and a play and recreation area for residents. The park will be planted with shade trees.
- 27.4** The 'breezeway' layout of the building envelopes enables tree plantings down one side of each lot. Landscaping of the front yard of the houses will merge with the street footpath with a couple of shady trees, one inside the property boundary and one outside, with both located to accommodate driveways and kerbside parking, creating shady spaces along the street.
- 27.5** Landscaping within residential properties will include paved driveways, pathways and terraces, turf, low maintenance native gardens and timber yard fencing. Shrubs and trees will be used to reduce overlooking into adjoining properties, screen fences and provide shade. Turf areas will be

provided only in the private recreation spaces. All lawn grass species will be of a type suited to the Darwin area.

27.6 A landscape plan is included at Supplementary Item 16.

28 CONSULTATION WITH AUTHORITIES

28.1 Federal Government. A project briefing has been provided to the local Federal Member of Parliament, Mr Damian Hale, MP via the Minister for Defence Personnel Materiel, and Science.

28.2 Northern Territory Government. DHA and its consultants have consulted extensively with NTG, including briefings to government ministers, other members of parliament and discussions with the DCC.

28.3 Aboriginal Community. As noted at paragraph 9.2, the Larrakeyah community has been consulted regarding the overall development and potential employment and training opportunities for indigenous people. AAPA has also been consulted and a certificate covering the development has been issued (Supplementary Item 4).

29 IMPACT ON THE LOCAL COMMUNITY

29.1 General. The addition of a maximum of 178 homes in Stage 1 of the Muirhead development will have negligible effect on the local community of the northern suburbs of Darwin. In the longer term, any effect on schools and community facilities will need to be addressed by the NTG, but it is not expected to be large or one that cannot be accommodated by existing infrastructure. Any impacts on shopping areas will no doubt be taken up by the commercial enterprises involved.

29.2 Traffic. Traffic effects of the whole development have been assessed by TTM. As noted at paragraph 21.5, some upgrades to intersections will be required and are allowed for in costings.

29.3 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 50 new dwellings is not expected to affect either the sale or rental markets for residential accommodation in the local area.

30 PROJECT COSTS

- 30.1** The estimated cost for Stage 1 of the project is \$43,485 million, which includes an attribution for the cost of land, the construction of 50 DHA dwellings and the cost of all Stage 1 civil works. Confidential costing information will be supplied separately to the PWC.
- 30.2** The cost of the project will be funded by DHA and recovered through its Sale and Lease Back (SLB) program and sale of surplus lots.

31 PROJECT DELIVERY SYSTEM

- 31.1** Operational works will be contracted on a fixed price lump sum basis to a select panel of tenderers who will have been successful in addressing the selection criteria from a publicly advertised open call for expressions of interest.
- 31.2** Dwelling construction packages will be contract on a 'design and construct' basis. The successful tenderers will be required to comply with the DHA Performance and Design Requirements (Supplementary Item 17), and within architectural guidelines aimed at delivering homes that meet the Vision for Muirhead and design principles outlined at paragraph 18.1. Contractors will be required to deliver well constructed homes that conform to the project objectives and provide value for money.

32 PROJECT SCHEDULE

32.1 Subject to Parliamentary approval in or by June 2010, the significant milestones to achieve completion of Stage 1 of the project by the end of June 2012 are:

Activity	Start	Completion
<i>Preparation of detailed documentation for civil works</i>	July 2010	November 2010
<i>Civil works tender, evaluation and award</i>	November 2010	December 2010
<i>Civil engineering works</i>	March 2011	October 2011
<i>Construction of 50 dwellings</i>	October 2011	June 2012