



ACT Planning &
Land Authority

Crace Concept Plan

Addendum for Concept Plans

This concept plan was originally adopted as a Guideline under the Territory Plan. These original content of the plans have not been amended since their adoption, but are included in the new Territory Plan and have statutory effect.

Under the *Planning and Development Act 2007*, a concept plan:

- applies the principles and policies in the structure plan, to future urban areas (formerly know as defined land); and
- is a precinct code in the Territory Plan.

A concept plan is used to guide the preparation and assessment of estate development plans (which are development applications), and can also be used to assist in the assessment of development when an area ceases to be a future urban area.

In this Concept Plan, any references to Land use Policies should be read as a reference to zones.

Consistent with the ACT Government's Affordable Housing Action Plan, the Concept Plan is amended to require that a minimum of 15% of all dwellings in the suburb be affordable housing product.

To provide diversity in affordable land and housing products to meet the Government's requirement, the controls for blocks up to 250m² have been incorporated into Residential Zones Development controls, which need to be considered during the subdivision design.

To give effect to the Government's Affordable Housing Action Plan, this Concept Plan is further amended to specify the following locational requirements for Compact Blocks:

- compact blocks must be located opposite high quality open space. If this is not possible, then located within the vicinity of 100m from high quality open space or parkland or alternatively adjacent to a wide verge with high quality landscaping and medium sized street trees;
- if the compact block is accessed from the front, the block should be located on an internal local road and not fronting a main collector road;
- if the compact block is accessed from the rear, the blocks can be located fronting a collector road;
- compact blocks may be suitable for corner blocks and section ends but may also facilitate a narrower section depth.
- compact blocks and the adjacent public realm are required to be integrated so that a high quality streetscape is provided for the residents, which includes on-street parking (as required), street trees, verge crossings, services, footpaths and garbage collection points.

Estate Development Plans prepared under this concept plan must have regard to these requirements. Any amendments to the concept plan other relevant codes within the Territory Plan in order to give effect to these requirements, will be undertaken in accordance with section 96 of the Planning and Development Act 2006. That section requires the Authority to vary the plan once and estate development plan is approved, to remove the Future Urban Area overlay and identify the zones to apply to the land consistent with the estate development plan. Section 96 also enables the Authority to incorporate any other element of the estate development plan that should be ongoing, such as the identification of compact blocks (if necessary).

Table of Contents

1	INTRODUCTION	1
1.1	Site Description	1
1.2	Landscape and Views	1
1.3	Geotechnical Assessment.....	1
2	VARIATION TO THE TERRITORY PLAN NO.257	3
3	CRACE CONCEPT PLAN	4
3.1.1	Sustainability Objectives	4
3.1.2	Urban Design Objectives	4
4	CRACE INDICATIVE SUBDIVISION PLAN	4
5	INDICATIVE LANDSCAPE MASTERPLAN	5
6	IMPORTANT PLANNING REQUIREMENTS	13
6.1	Housing Policies (Small Scale Blocks)	13
6.2	Housing Mix	13
6.3	Commercial centres	14
6.4	Community Facilities	17
6.5	Open Space Provision	17
6.6	Environment	17
6.6.1	Ecological Values	17
6.6.2	Tree Protection	17
6.7	Heritage	18
6.8	Contamination Assessment.....	18
6.9	Bushfire Risk Assessment.....	18
6.10	Road Network/ Hierarchy	19
6.10.1	Road Cross Sections.....	19
6.10.2	Road Intersections.....	19
6.11	Pedestrian and Bicycle Network.....	20
6.12	Public Transport.....	22
6.13	Noise Assessment	22
6.14	Section Planning	22
6.14.1	Access	22
6.14.2	Block Orientation and Sizes	22
6.14.3	Car Parking/Car Courts	23
6.15	Urban Edge Treatment.....	24
6.16	Indicative Development Staging.....	24
6.17	Engineering Services Master Planning.....	27
6.17.1	Water Supply	27
6.17.2	Sewer Management	27
6.17.3	Stormwater Management	27
6.17.4	Other Infrastructure	28
6.18	Works Associated with Development	28
6.19	Summary of Further Investigations	28
6.19.1	Final Tree Management Plan	28
6.19.2	Heritage:.....	28
6.19.3	Sewer Vent.....	28

6.19.4	Geotechnical	28
6.19.5	Stormwater	28
6.19.6	Older Persons Housing Requirements	29
6.19.7	Fire Assessment.....	29

FIGURES

Figure 1	Crace Locality Plan	2
Figure 2	Crace In Metropolitan Context.....	3
Figure 3	Crace Concept Plan	7
Figure 4	Indicative Subdivision Plan.....	9
Figure 5	Indicative Landscape Masterplan.....	11
Figure 6	Important Planning Requirements Plan.....	15
Figure 7	Cycleway Network.....	21
Figure 8	Indicative Development Staging - Crace	25

TABLES

Table 1	Block Size/ Dwellings Mix	13
Table 2	Minimum Block Dimensions by House Type.....	23

1 INTRODUCTION

The Crace Concept Plan Report outlines the planning objectives, principles and important planning requirements, which will inform more detail future planning and development of the suburb. The Concept Plan has been adopted as a Guideline under the Territory Plan. As such, the Concept Plan guides planning decisions and is required to be taken into consideration in development and land use proposals.

More detail planning analysis and additional background information on this estate is contained in the Crace Concept Plan Background Report (December 2006). Reference to this Report is necessary to understand the basis of the Concept Plan and Indicative Subdivision Plan.

Crace has been unable to be developed to date because it has been used until recently by the CSIRO as a field research station. The ACT Government purchased the site from the Commonwealth in 2004. The CSIRO has vacated the area and the land is now available for release and development.

1.1 Site Description

The site is bounded on the south by the Barton Highway, Gundaroo Drive to the west, Nudurr Drive to the north and Gungahlin Nature Reserve in the east (see Figure 1). Across the bordering roads, the site has an interface with the suburbs of Palmerston and Giralang (although the separation distances are significant) as well as the Ginninderra Creek/Percival Hill Nature Park.

Figure 2 shows Crace in the metropolitan context.

The site is generally undulating, with an elevated hilltop. Tree coverage ranges from sparse to large individual specimens and large clusters. There are several well-defined drainage depressions running east to west.

1.2 Landscape and Views

Crace is visible from the adjacent arterial roads (Gundaroo Drive and Barton Highway), as well as from surrounding hills. Percival Hill and Gungahlin Hill creates a sense of broad scale enclosure, whilst longer views to distant mountains and ranges provide an opportunity to exploit these attractive vistas. The most prominent feature on the site is the shelterbelt plantation adjacent to the woolshed, whilst the undulating topography constitutes another significant and attractive feature. Tree re-generation in a gully and minimum rock outcrops are other visual features worthy of incorporation into any future development.

1.3 Geotechnical Assessment

A preliminary geotechnical desktop assessment has been undertaken. This was supported by a limited number of test pits and knowledge of various geotechnical formations. The site is therefore considered geotechnically stable and geotechnical conditions are typical of the area.

To properly assess the site conditions and to provide individual block site classifications, a detailed geotechnical investigation by test pits will be required to establish the necessary final

design parameters and construction recommendations for roads, bridges/culverts and bulk earthworks.

Figure 1 Crace Locality Plan



Figure 2 Crace In Metropolitan Context



2 VARIATION TO THE TERRITORY PLAN NO.257

The concept planning study has informed a concurrent Territory Plan variation process. Variation to the Territory Plan No. 257 - Suburb of Crace, dated 8 December 2006, redefines the basic land use policy framework and introduces a greater level of detail for the suburb. The Variation also introduces Defined Land provisions under the *Land (Planning and Environment) Act 1991*, by setting out a series of principles and policies that reflected the planning intent for the development of the future suburb.

Importantly, the Concept Plan is consistent with the principles and policies contained in Variation No. 257.

This Variation to the Territory Plan together with Variation No. 130 (North Gungahlin Structure Plan) and Variation No. 231 (East Gungahlin) now completes the strategic planning review for all future Gungahlin suburbs.

3 CRACE CONCEPT PLAN

The Concept Plan is shown in Figure 3, the main elements of which are discussed below. The Concept Plan is supported by the Indicative Subdivision Plan that shows a planning and engineering solution taking into account the identified constraints and opportunities.

3.1.1 Sustainability Objectives

Sustainability in economic, social and environmental outcomes is an ACT Government policy as outlined in "People Place Prosperity, 2001". The Concept Plan responds to the objective requiring all design decisions to be actively considered and able to be justified for a positive contribution to sustainable neighbourhoods.

3.1.2 Urban Design Objectives

Achieving good urban design facilitate high quality living environment and amenity. The following site-specific urban design objectives are identified for Crace and incorporated into the Concept Plan.

Character and Identity – Sense of Space

The existing landscape of the enclosing ridges and Percival Hill are distinctive qualities. These landscape and topographical components are defining elements that contribute to the identity of Crace. As such they have been preserved through vistas and open space spines through the suburb.

The extent and treatment of the retention basins and waterways, urban edges and buffer spaces shape the landscape character of the neighbourhood and inform the design response of the landscape master plan.

The hierarchy of open spaces, including linkage spaces, are important to define effective understanding of each space's function and the extent of development together with maintenance regime. Sporting facilities and small community facilities should be located in these open spaces where appropriate.

4 CRACE INDICATIVE SUBDIVISION PLAN

An Indicative Subdivision Plan is shown at Figure 4 that provides a suburb wide solution to the planning for Crace. The detail shown demonstrates that the Concept Plan is a practical solution using the Important Planning Requirements and other information contained in the Background Report to arrive at a water sensitive, ecologically sustainable and liveable urban environment.

The plans embody the principles and objectives, and are based on the assessment of a range of alternative solutions for both the pattern of residential subdivision and the location of the commercial centre.

5 INDICATIVE LANDSCAPE MASTERPLAN

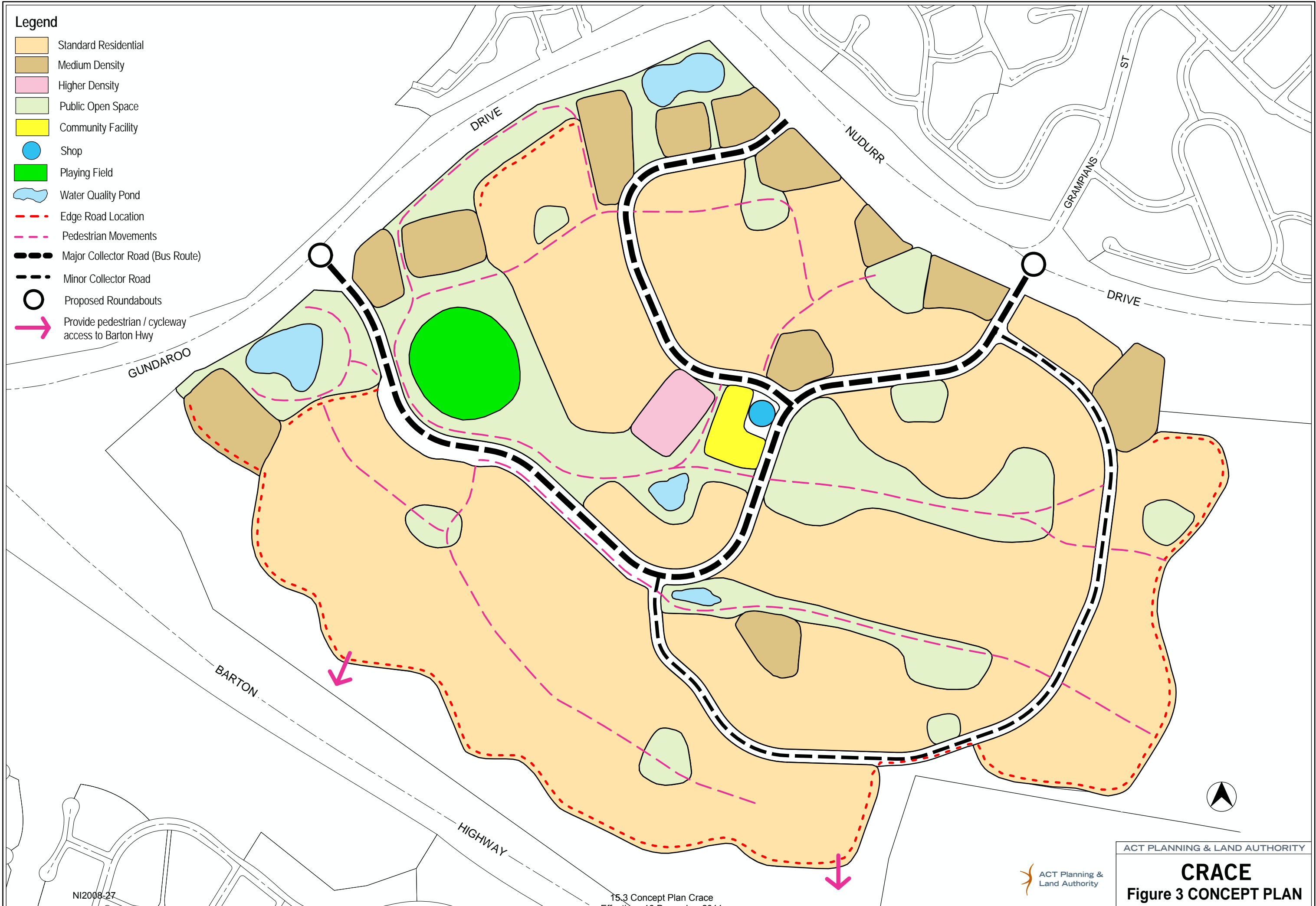
The Landscape Master Plan recognizes and responds to the general planning objectives and principles of the Crace Concept Plan and the Gungahlin Landscape Policy Plan (1996). The site has been extensively modified over time through clearing and little remains of the original natural woodland vegetation. It is proposed that all new tree planting shall be predominately native species.

Figure 5 shows the Crace Indicative Landscape Masterplan. This plan shows the broad landscape intentions.

The buffer between the suburb and the Barton Highway is to be predominately native landscaping and strengthened with plants of local provenance. Landscaping of this area is to be considered in the context of bushfire risk in the further bushfire risk assessment.

Legend

- Standard Residential
- Medium Density
- Higher Density
- Public Open Space
- Community Facility
- Shop
- Playing Field
- Water Quality Pond
- Edge Road Location
- Pedestrian Movements
- Major Collector Road (Bus Route)
- Minor Collector Road
- Proposed Roundabouts
- ➔ Provide pedestrian / cycleway access to Barton Hwy



NI2008-27

15.3 Concept Plan Crace
Effective: 16 December 2011

Authorised by the ACT Parliamentary Counsel—also accessible at www.legislation.act.gov.au















ACT PLANNING & LAND AUTHORITY

CRACE
Figure 3 CONCEPT PLAN












LEGEND












-  Standard
-  Medium Density
-  Higher Density
-  Urban Open Space
-  Childrens Playgrounds
-  Playing Fields
-  Community Facilities
-  Commercial
-  Landscape Buffer Areas
-  Water Quality Control Ponds
-  Area identified for possible Aged Persons Facilities
-  Provide on and off street parking for higher density housing



LEGEND:

-  EXISTING TREES TO BE RETAINED
-  PROPOSED DECIDUOUS PLANTING
-  PROPOSED NATIVE PLANTING
-  LOCAL CENTRE / VILLAGE
-  OPEN SPACE / PARK
-  BUILDING
-  POND
-  PLAYGROUND / SEATING AREA
-  PEDESTRIAN / CYCLE PATH
-  SWALE

PROPOSED PLANTING:

-  **ARTERIAL** - Gundaroo Drive - To be consistent with existing planting - Back row planting of *Eucalyptus rossii*/native shrubs, kerb row of *Zelkova serrata*. Nudurr Drive - buffer planting of *E. rossii*/native shrubs.
-  **MAJOR COLLECTOR** - Strong formal avenue planting of medium to large deciduous, Category 1 trees @ 13m spacing, e.g. *Ulmus parvifolia*, *Liquidamber styraciflua*, *Fraxinus pennsylvanica* 'Climmzam'.
-  **MAJOR ACCESS** - Formal avenue planting of medium sized deciduous Category 1 trees, e.g. *Fraxinus americana* 'Chamdeli', *F. pennsylvanica* 'U', e.g. 'banite', *Gleditsia triacanthos* 'Shademaster'.
-  **ENTRY NODE** - Where space permits, entries to have strong formal plantings of trees with autumn colour or flowering spp. with the inclusion of built elements/signage. Suggested species: *Acer rubrum* 'Autumn Glory', *Pyrus calleryana* 'Bradford', *Malus spectabilis*.
-  **ACCESS ROAD** - Evenly spaced 1 to 2 trees/block depending on block size. Small to medium sized deciduous trees for solar access and autumn colour, e.g. *Pyrus calleryana*, *Pyrus ussuriensis* 'Winter Glow', *Liquidamber styraciflua* 'Palo Alto', *Acer buergerianum*.
-  **EDGE STREETS** - Native species on open space side of street e.g. *Eucalyptus mannifera*, *E. melliodora*, *E. rossii*.
-  **LANEWAYS/MEWS** - Small deciduous trees e.g. *Pyrus calleryana*, *Malus floribunda*, *Malus spectabilis*.
-  **LOCAL CENTRE** - Deciduous trees with strong autumn foliage to reinforce centre as focal point. e.g. *Acer rubrum* 'Autumn Glory', *Acer x. freemanii* 'Autumn Blaze', *Zelkova serrata* 'Green Vase'.
-  **LOCAL PARKS** - Predominantly native species with some large deciduous trees to be used as place making elements, e.g. *Eucalyptus mannifera*, *E. dives*, *E. melliodora*, *E. rossii*, *Liquidamber* spp., *Liriodendron tulipifera*, *Fraxinus oxycarpa* 'Raywood', *Ulmus parvifolia*.
-  **OPEN SPACE** - Native species consistent with existing open woodland e.g. *Eucalyptus melliodora*, *E. bridgesiana*, *E. rossii*. Fire abatement requirements for planting to apply in open space interface along Barton Highway.
-  **SWALES/RETENTION PONDS** - Native trees, grasses and shrubs. Inclusion of rocks, boulders and pedestrian bridges where appropriate.

Note: All new tree planting to be predominantly native species



CRACE
LANDSCAPE CONCEPT PLAN
Effective: 16 December 2011

Figure 5

DATE: MAY 2005
SCALE: 2500@A1
5000@A3

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GUNGALIN HILL
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6 IMPORTANT PLANNING REQUIREMENTS

This section outlines the important planning requirements from the Crace Concept Plan to inform future planning for the suburb that is the estate development planning process.

6.1 Housing Policies (Small Scale Blocks)

At the present time there are no policies in respect to Small Scale Blocks. These are blocks that are under 500m² in area and for various reasons cannot conform to the Residential Codes under Appendix III of the Territory Plan.

The housing types are typically terrace and row housing on separate blocks with normally one or both sides having zero or reduced building side setbacks. Vehicle access, due to the small width of the block, requires rear laneway/car-court access. Table 2 and Clause 6.14 Section Planning sets down some principles when designing a subdivision pattern that creates small scale blocks. The main concern centres on long lengths of straight laneways dominated by garage doors that results in less than desirable urban design outcomes.

Figure 6 shows the Important Planning Requirements for the Crace Concept Plan.

6.2 Housing Mix

The Indicative Subdivision Plan at Figure A5 proposes a dwelling yield of 1,200 dwellings and the mix of block sizes as shown in Table 1.

Table 1 Block Size/ Dwellings Mix

BLOCK SIZE	DWELLINGS NUMBER	%
251 - 350m ²	90	7%
351 - 450m ²	45	4%
451 - 650m ²	810	68%
650m ² +	100	8%
Multi Unit - No	155	13%
Total	1,200	100%

The gross residential/urban area of the suburb is 92 Ha. The total number of dwellings is 1200 resulting in a dwelling yield of approx 13 dwellings per hectare. Development within the suburb shall provide:

- A mix of block sizes as shown in the 'Indicative Subdivision' design;
- A mix of small scale blocks (e.g. terrace housing) and multi unit dwellings to be located around the water quality control ponds and the Local Centre;
- To have higher densities along the Nudurr Drive frontage where access to the existing facilities located in Palmerston are within walking distance; and
- Areas are to be set aside for visitor car parking both on street and off-street adjacent to the small scale and terrace housing blocks.

6.3 Commercial centres

The Concept Plan proposes one centrally located local centre in Crace at the location shown on the Crace Concept and Important Planning Requirements Plans. The gross floor area of the retail component of the local centre shall be in the order of 500m². Effective pedestrian and bicycle access will be integrated with the proposed local centre development, as will strong public transport links. Crace Local Centre provides for opportunities for the co-location of urban housing (i.e. medium density multi-unit residential developments) to encourage an effective mixed-use character in accordance with the "urban village" concept or shop-top housing.

The local centre may include other small-scale retail, office and personal service tenancies, as well as allowing for community facilities, and may include residential development at the upper floor level. The centre shall be designed to be flexible to accommodate the changes in community demands over time and should be supported by concentrations of adjacent medium density housing which will foster the mixed-use characteristics of the area.

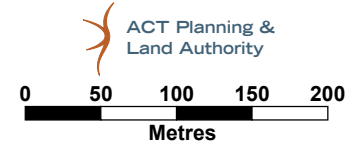


- LEGEND**
- ➔ Major access road connection
 - XXXX Rear fences not permitted
 - Water quality control ponds
 - Higher density housing
 - Shop site
 - Community facility site
 - Playing field
 - Edge Roads
 - Hilltop reserve
 - Open space to protect high value trees
 - Playgrounds
 - Provide on and off street parking for higher density housing
 - ➔ Floodways

Bushfire - Outer Asset Protection Zone (40 m)

Bushfire - Inner Asset Protection Zone (20 m)

Level 1 Building Construction Standards required within this 100 m zone



ACT Planning & Land Authority

CRACE

Figure 6 IMPORTANT PLANNING REQUIREMENTS PLAN

6.4 Community Facilities

The Concept Plan identifies a community facility site adjacent to the local centre which provides good access to public transport, open space and reinforces a sense of community for the local residents. The site area of the facility will be approximately 6,000m². The actual size and use of this community facility site will be determined at a later stage, associated with estate development planning. The use of this site will be consistent with those permitted uses identified in the Territory Plan for Community Facilities Land Use Policy areas.

In addition, other possible community facility sites may be identified within the open space system for those facilities requiring a smaller land take, such as scout and community halls. Demonstrated demand for the development of these sites will be established in later detailed planning stages and will need to be consistent with the Territory Plan.

6.5 Open Space Provision

The Crace Concept Plan contains a hierarchy of open spaces totalling about 48Ha serving different purposes. The spaces are to be provided/ located generally in accordance with Important Planning Requirements and the Concept Plan.

A neighbourhood playing field (basic sports unit) is also to be provided within the suburb and form part of the open space network. The location of the playing fields is shown in the Important Planning Requirement plan.

6.6 Environment

6.6.1 *Ecological Values*

Crace contains remnant Yellow Box and Red Gum trees, but the understorey is entirely exotic and has been significantly modified by past agricultural activities. As such, it does not meet the definition of the endangered ecological community, although the trees themselves are of habitat and aesthetic value. Wherever possible these trees have been retained in open space, parks or roadside reserves or as part of the landscape setting for community purposes or other less intensive land uses. Conservation of these trees will be addressed during the detail planning stage.

The planning principles for Crace respect and recognise the importance of the urban interface with the Gungaharra Grasslands Nature Reserve and will incorporate requirements for edge roads and stormwater measures to protect this area as required by the Important Planning Requirements Plan.

6.6.2 *Tree Protection*

A detailed tree survey and assessment was undertaken for the site and identified individual trees and tree groups.

The Crace Concept Plan and Indicative Subdivision Plan have endeavoured to maximise the number of trees to be retained on site, commensurate with the need to meet residential block yields and other government planning objectives including an efficient pattern of urban development. In particular, it is essential to retain all exceptional classified trees on public land

(in urban open space or road reserves) as these are large mature eucalypts are not suitable to be retained on residential housing blocks.

The Tree Protection Unit (Territory and Municipal Services) has reviewed the tree assessment and survey and their comments incorporated into the documentation. A draft Tree Management Plan based on the Indicative Subdivision Plan has received in-principle support from the Tree Protection Unit.

6.7 Heritage

A cultural and heritage assessment was undertaken for the Commonwealth prior to sale of the land to the ACT, followed by further investigations during 2006 by the Territory. These comprised a field survey, documentary review, salvage collection of registered Aboriginal sites, recovery, assessment of Potential Archaeological Deposits through a program of subsurface testing. Consultations has occurred with ACT Heritage Unit, ACT Heritage Council, Environment ACT, Ngunnawal Local Aboriginal Land Council, Buru Ngunawal Aboriginal Corporation, and Ngunnawal Aboriginal Corporation.

As a result of the further investigation, the sites of Aboriginal cultural heritage significance are protected in the Concept Plan within Urban Open Space.

6.8 Contamination Assessment

Phases 1 and 2 Contamination Assessment of Crace have been undertaken. The Environment Protection Authority has reviewed and endorsed the findings of an independent environmental audit for the site in July 2006. The audit found that the site was suitable for it's permitted uses under the Territory Plan.

6.9 Bushfire Risk Assessment

An bushfire risk assessment was undertaken for Crace. The recommendations from this assessment required bushfire risk mitigation measures to be incorporated into the development of Crace are shown on Figure 6 and are:

- Outer Asset Protection Zone (IAPZ) – 40 metres
- Inner Asset Protection Zone (OAPZ) – 20 metres
- House Asset Protection Zone (HAPZ) (buildings to comply with Level 1 construction under AS3959) – 100 metres into the suburb. (Note: Emergency Services Authority has recommended, given the knowledge of the ACT fire climate and the degree of risk involved, to reduce the depth of Level 1 construction to 50 metres along the eastern edge).

To ensure optimum mitigation against the threat of the bushfire, a further bushfire risk assessment is required at the estate development planning stage. This assessment is also required to specifically reassess the location and width of the outer asset protection zone, which currently encroaches (minor) into Gungaharra Nature Reserve to ensure that the Reserves' biodiversity values are protected.

6.10 Road Network/ Hierarchy

Overall Crace has ready access to existing transport services which will be progressively improved as Gungahlin continues to grow. The position in respect of each element of the transport system is as follows:

- Crace is well located with direct access to the arterial road network and consequently good accessibility to all the major centres and the rest of metropolitan Canberra. Accessibility will be further improved with the construction of the Gungahlin Drive extension.
- The road network and hierarchy within the suburb is designed to provide accessibility, connectivity and legibility. The layout of internal road network has been designed to encourage and direct internal traffic to the major collector road, thereby helping to reduce the traffic volumes and rat-running on the internal roads. The collector roads provide good coverage with the vast majority of residents being within 400 metres of a bus route. A combination of on road cycle lanes and off road-shared paths provides for pedestrians and cyclists.

6.10.1 Road Cross Sections

Following on from the road hierarchy, road cross sections have been prepared and included in the background report. Generally these cross sections follow Territory requirements. There are however some special features such as:

- Swale drains as part of implementing water sensitive urban design to be incorporated into local streets where practical and where existing ground slopes do not exceed 5%;
- The (bushfire) edge road around the perimeter of the suburb and with the open space includes a 20-metre wide IAPZ. Specific features of this zone include low fuel loads (mown or heavily grazed) consistent with Strategic Bushfire Management Plan with vehicle accessible slopes (e.g. maximum butter slope of 1 in 4) for fire fighting purposes, where necessary. This IAPZ is required not only to provide a buffer between a fire and residential properties but also shelter and provides a safe operating area for fire crews.

6.10.2 Road Intersections

Existing key intersections in the area were assessed for their ability to accommodate expected 2011 and 2021 traffic volumes, with and without Crace. Of particular interest were the intersections of:

- Gundaroo Drive / Gungahlin Drive;
- Barton Hwy / Gundaroo Drive / William Slim Drive; and
- Nudurr Drive / Gundaroo Drive.

Each of these intersections is assessed in more detail throughout the Traffic Assessment Report. Planning to date for the new suburb has included a detail traffic analysis study and a review of traffic related issues associated with Gundaroo and Nudurr Drives and the wider road network. In

the short term, traffic generated by the suburb will have minimal effect on the wider road network. This is because the development of the suburb will be staged over a number of years. The Government has committed to review the wider road network in Gungahlin in mid to late 2009 following the completion of all stages of Gungahlin Drive Extension to determine the need and timing for any upgrade of Gundaroo Drive and extension of Nudurr Drive as well as improvements to the Gundaroo Drive and Barton Highway intersection. Improvements will be subject to future capital works funding.

6.11 Pedestrian and Bicycle Network

Pedestrian and off-road cycling facilities are required to be implemented in accordance with the Master Plan for Trunk Cycling and Walking Path Infrastructure 2004 – 14 (Roads ACT, September 2004) and the Background Report to the North Gungahlin Structure Plan review incorporated into Variation No. 130 to the Territory Plan.

Pedestrian paths shall be incorporated into the final design for Crace in accordance with current Government policies, standards and guidelines at the time.

The potential bicycle routes (refer to Figure 7) within the estate should be:

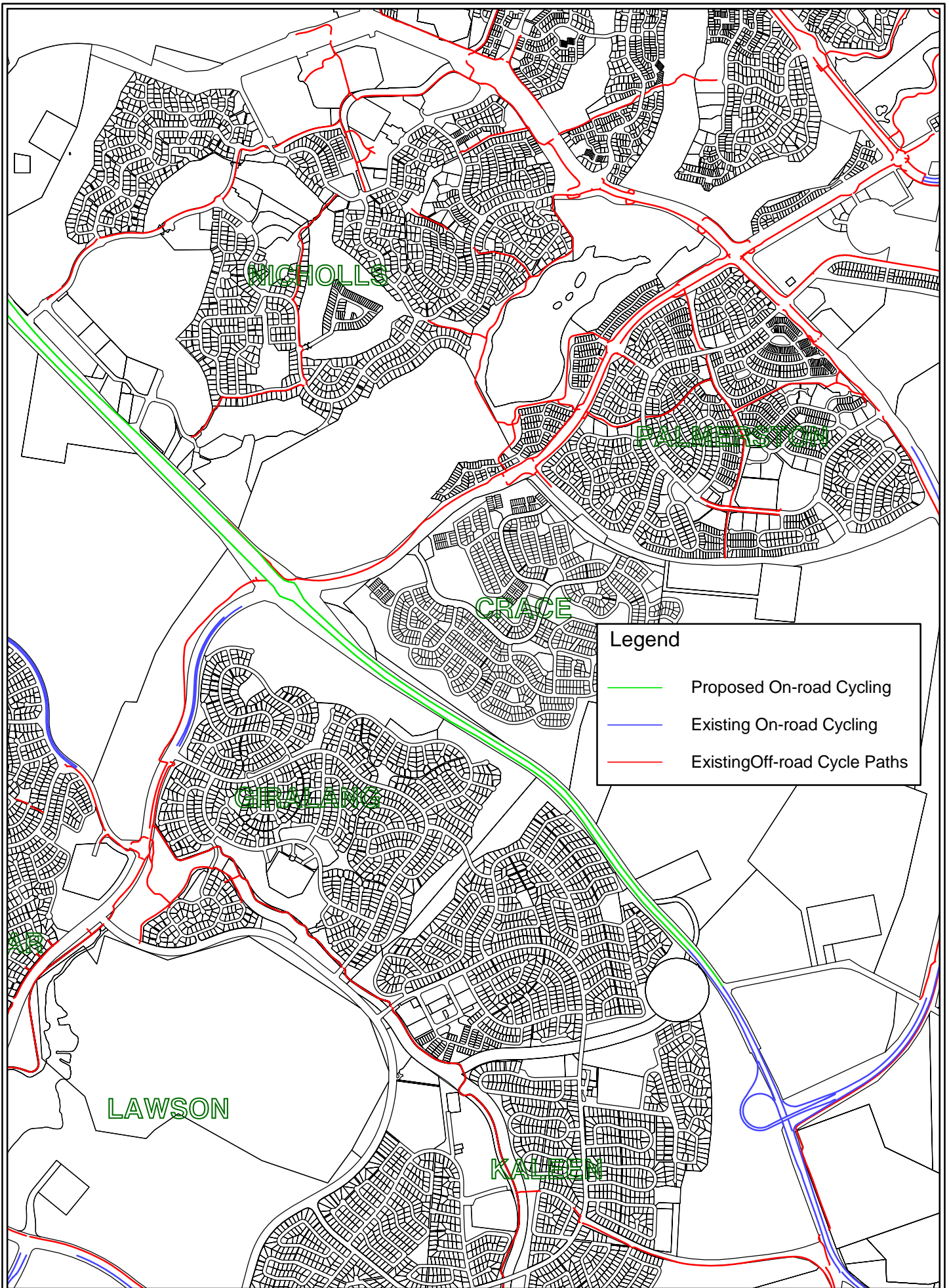
- On road cycle lanes for all Collector roads;
- Off road shaped paths, which follow Gundaroo Drive and Nudurr Drive.

The main features of the path system in the vicinity of Crace are:

- Major off-road wide paths along Gundaroo Drive to the Gungahlin Town Centre and via a wide path in the William Slim Drive/Ginninderra Creek system to the Belconnen Town Centre.
- Within Palmerston there is a largely grade-separated system which links with the Gundaroo Drive path and provides grade-separated crossings of both Gundaroo Drive and Gungahlin Drive.
- The path in the Ginninderra Creek corridor also links to a major path to the Giralang shops and school and the Kaleen Group Centre and schools.
- Palmerston, Kaleen and Giralang, all have path networks which serve the suburbs.

Crace therefore has a number of good opportunities to link into the existing path systems and achieve excellent pedestrian/cycle accessibility to both local and the major metropolitan facilities:

- Link to the Gundaroo Drive path which in turn provides connections throughout metropolitan Canberra.
- Link to Barton Highway in South East of site for commuter cyclists.
- Link via the existing wide path system in Palmerston to the retail and community facilities in Palmerston and, further to the north, to the Gungahlin Town Centre.
- Potentially a new link under the Barton Highway and, using the suburban narrow path system, providing reasonably direct access to the shops and community facilities including primary and high schools in Giralang and Kaleen.



Legend

- Proposed On-road Cycling
- Existing On-road Cycling
- Existing Off-road Cycle Paths

6.12 Public Transport

Overall there is potential for good public transport services to and from Crace. The Crace Concept Plan makes provision for a central bus route through the suburb, generally meeting the 400m walking distance criteria for over 95% of all housing in the suburb. See Figure 3.

The proposed bus routes through Crace would provide an efficient service via a relatively direct route through the suburb and would directly link to the commercial and community facilities at the Local Centre.

6.13 Noise Assessment

A Noise Impact Assessment has been undertaken as a part of the Traffic Study, which identifies certain recommendations to mitigate the impact of traffic noise generated from surrounding roads (Barton Highway, Gundaroo Road and Nudurr Drive) on the suburb. The assessment concluded that Nudurr Drive would not create any significant noise and minimal noise mitigation measures were required. Whereas residential development near the Barton Highway and Gundaroo Road will require noise mitigation measures to ensure internal noise levels met the Authority's Draft Noise Management Guideline.

A range of measures are available to mitigate against noise including mounding and landscaping in road reserves, fencing requirements, separation between noise source and residence, and/or specific design and construction requirements for dwellings including glazing to achieve internal noise levels which met the Authority's Draft Noise Management Guideline. The specific mitigation measures will be considered further as part of the detail design process to ensure that Authority's Draft Noise Management Guidelines are met.

6.14 Section Planning

6.14.1 Access

Access to private car parking for small-scale blocks having a frontage of less than 10 metres should be located primarily in rear access lanes or car courts. This is done to minimise the numbers of kerb crossings and driveways that would interfere with regular spacing of street trees, on street visitor parking and increase adverse impacts on the streetscape character of frontages incorporating garages.

6.14.2 Block Orientation and Sizes

Block sizes vary to provide for different housing types. The block sizes illustrated in the table below allow for generous habitable private open space to be located directly outside primary internal living areas. The orientation of blocks as shown in the Crace Indicative Subdivision Plan is designed to match the orientation with the house type accommodated whilst maximizing solar penetration to habitable spaces. The following table shows suggested minimum block dimensions for the various housing types:

Table 2 Minimum Block Dimensions by House Type

HOUSE TYPE	MINIMUM WIDTH (METRES)	MINIMUM DEPTH (METRES)	MINIMUM AREA M ²	SECTION WIDTH (METRES)
Terrace (access from laneway)	8	30	240	70
Courtyard (Access from laneway)	10	30	300	70
Courtyard (Access from street)	12	30	360	60
Semi Detached House	12	30	360	60
Standard Detached House	15	30	500	60

Accordingly townhouses and semi detached houses are oriented predominantly north south so that one primary facade can be oriented to catch the sun while courtyard houses take advantage of the open space within the block to open the house to the sun on an east west orientation.

The Concept Plan proposes a mixture of housing types including medium density housing up to two storeys. In addition an area of Residential B9 Area Specific Policy (under the Territory Plan) is located close to the Crace Local Centre. It is estimated that the medium and higher density areas will comprise up to 20% of the total housing in the suburb. Residential B9 may permit development up to 3 storeys where they have been provided for in an approved Estate Development Plan. This B9 provision also applies to parts of other new suburbs in Gungahlin.

6.14.3 Car Parking/Car Courts

Where car courts are proposed in the centre of the sections, deep-rooted areas of tree planting for shade and visual amenity should be provided. Habitable spaces and balconies should be oriented ensuring overlooking for passive surveillance and to provide active frontages to the car courts.

Additional car parking shall be provided for visitors both on street and off-street for small-scale blocks (450m² and under), including terrace-housing blocks that have laneway vehicle access, at the rate of 1 space per 4 dwellings. The Indicative Subdivision Plan at Figure A 5 shows possible visitor parking based on this subdivision design.

Crace Illustrative Section Plan



6.15 Urban Edge Treatment

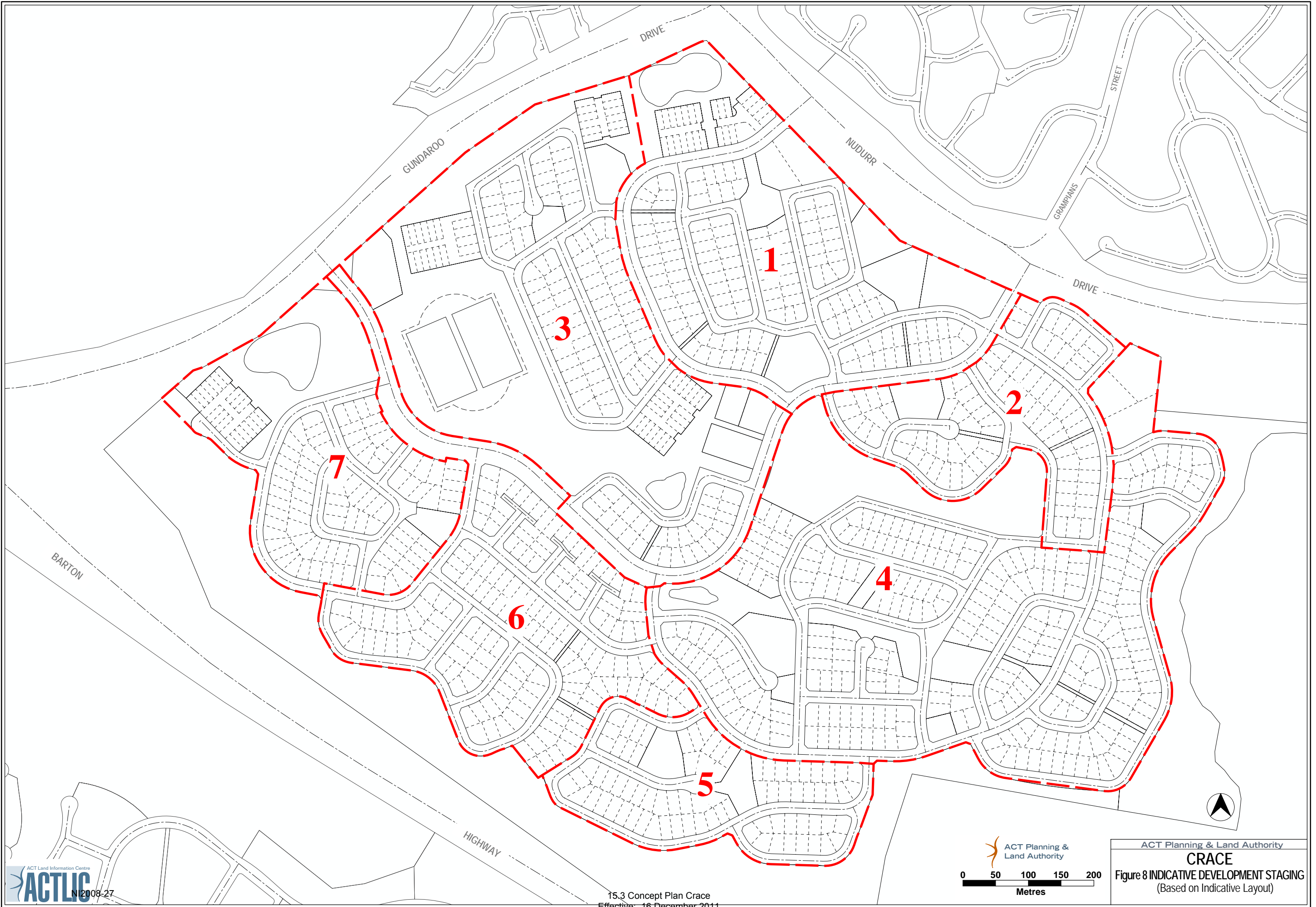
Edge Roads (roads around the perimeter of the suburb) within the Inner Asset Protection Zone shall be designed to accommodate emergency services vehicles for fire fighting purposes, and meet the following Emergency Services Authority criteria:

- A minimum un-obstructed sealed road width of 7.5m to allow for passing of two fire trucks;
- 7.5m verge adjacent to housing, with street planting on the house side only;
- A concrete edge incorporating a gutter with minimum 2m width on the fire edge of the road;
- The road shall be of sufficient strength to accommodate a 15 tonne load and allow for turning circles of a 12.5m truck; and
- Access to hydrants, including parking of emergency services vehicles, shall be provided and may include suitable access points to emergency services tracks, lay-by parking, and hardstand or reinforced ground areas for tanker filling at hydrants.

Bushfire mitigation measures will be confirmed through a further bushfire risk assessment associated with detail planning.

6.16 Indicative Development Staging

Figure 8 shows a suggested staging program for land release in the development of Crace. All areas of land can be developed with regard to available servicing infrastructure. All necessary infrastructure currently exists within close proximity. Therefore there is potential for areas of land within Crace to be released in a staged manner while the infrastructure required for further stages inside Crace is being constructed.



6.17 Engineering Services Master Planning

The Crace residential development conceptual hydraulic master plans are developed to assist in providing an indication of the hydraulic infrastructure required for the suburb.

The location and capacity of the existing hydraulic services adjacent to the site were investigated to determine the extent of infrastructure upgrades required (if any) to cater for the proposed development.

6.17.1 Water Supply

Crace is located within two water supply zones. The Low Zone is served from the Nicholls reservoir (TWL 652.5), with the Intermediate zone served from the Gungahlin Reservoir No. 1 (TWL 652.5).

Proposed connections to the existing water reticulation system are from the adjacent suburb of Palmerston and the trunk mains from Gungahlin No. 1 Reservoir.

6.17.2 Sewer Management

A trunk sewer (1050mm diameter) is located on the opposite side of Gundaroo Drive near Ginninderra Creek. The development of Crace can be divided into three main catchments, all of which drain west to the trunk sewer. There will be three main sewer connection points for Crace. All proposed connection points are of an adequate size and have sufficient capacity to service the anticipated peak wet weather flows. No pump stations will be required to service Crace.

6.17.2.1 Sewer Vent

Located near the intersection of the Barton Highway and Gungahlin Drive is a major mechanised sewer vent. This vent aerates the section of the Ginninderra Trunk Sewer between Gungahlin Pond and Chuculba Cres (Giralang). This is the largest vent in this catchment and is the only mechanically forced vent. The vent must be considered as a development constraint to the southwest corner of Crace. ActewAGL advised that the emissions from this vent are presumed to be low in strength due to the relative “fresh” sewage in this upstream system. There is requirement to ensure this issue is qualified prior to release of possibly affected land.

6.17.3 Stormwater Management

Stormwater drainage for the site is divided into two main catchments. These catchments generally drain towards Ginninderra Creek. Two water quality/detention ponds are located adjacent to Gundaroo Drive at the lower end of the site. A majority of the site drains to these water quality ponds. Gross pollutant traps are proposed upstream of the water quality to trap pollutants and sediments before they enter the ponds.

The concept planning outcome ensures that there is no stormwater drainage discharge into the Gungahlin Grassland Reserve.

6.17.4 Other Infrastructure

Provision of the normal utility services including electricity, gas, and telecommunications would be installed within Crace in accordance with agency specifications and design standards. High speed broad band is to be provided.

All residential streets will have street lighting to DUS/ActewAGL standard specifications in accordance with the road hierarchy. All internal electricity will be supplied via an underground reticulation network.

6.18 Works Associated with Development

The following works are associated with the development of the suburb:

- Two intersections with Nudurr Drive;
- One major intersection with Gundaroo Drive;
- Water Quality control Pond #1 adjacent Gundaroo Drive; and
- Water Quality control Pond #2 adjacent intersection of Gundaroo Drive and Nudurr Drive.

6.19 Summary of Further Investigations

Prior to development of the site, further detail investigations are required to be undertaken. These include:

6.19.1 Final Tree Management Plan

Final Tree Management Plan to be prepared for the Estate Development Plan.

6.19.2 Heritage:

All management recommendations specified in the Background Report must be implemented at the estate development plan stage.

6.19.3 Sewer Vent

Undertake the monitoring and then first-pass dispersion modelling of emissions of the sewer vent is required. If the initial assessment however shows potential impact on Crace then a mitigations options study will be required and expert consultants would need to be brought in.

6.19.4 Geotechnical

A detailed geotechnical investigation shall be carried out concurrently with detailed design of road and block layouts to ensure that subsurface conditions will not adversely affect the construction of infrastructure within the estate.

6.19.5 Stormwater

Water Sensitive Urban Design measures proposed within the site shall be investigated in detail to determine that the measures proposed shall not adversely affect any other infrastructure or private property, prior to finalisation of the road and block layout for incorporating into the Estate Development Plan.

6.19.6 Older Persons Housing Requirements

Clarification and assessment of the specific demand/need for Older Persons Housing facilities within Crace will be undertaken closer to the date of land release if required.

6.19.7 Fire Assessment

A further independent Bushfire Risk Assessment shall be undertaken at the preparation of the Estate Development Plan or detail design stage and the outcomes incorporated into the design to the satisfaction of the Territory.

This assessment is also required to specifically reassess the location and width of the outer asset protection zone, which currently encroaches (minor) into Gungaharra Nature Reserve to ensure that the Reserves' biodiversity values are protected.