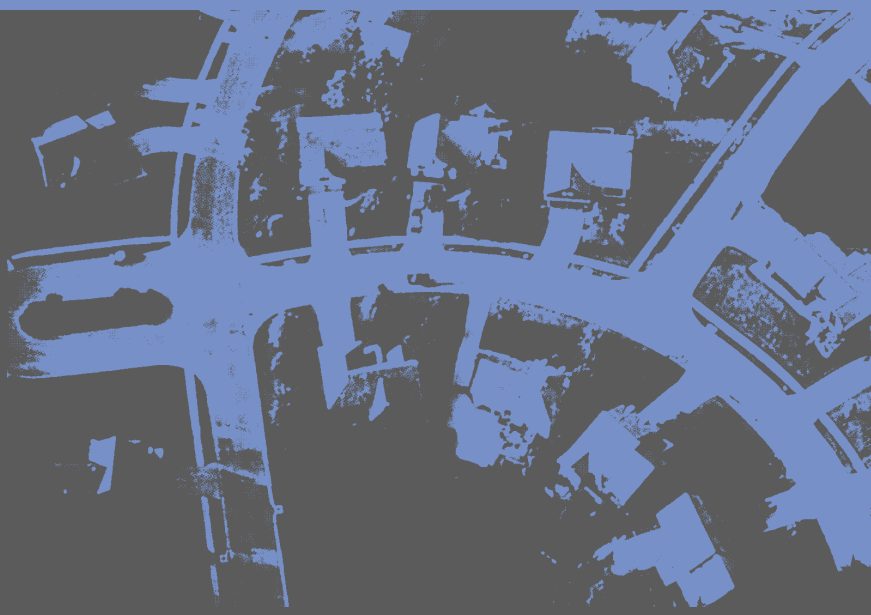
> INCLUDING THE CANBERRA RESIDENTIAL SUSTAINABILITY INDEX

Designing for High Quality & Sustainability



MOVING TOWARDS HIGH QUALITY OUTCOMES→

Designing for High Quality & Sustainability

> INCLUDING THE CANBERRA RESIDENTIAL SUSTAINABILITY INDEX

Additional diagrams sourced from AMCORD: A National Resource Document for Residential Development.

Contents

Foreword

The quality of the buildings and landscape we live in and use can make a big difference to the quality of our lives. A high quality environment can add to our comfort, safety and pleasure as well as add value to the locality and, ultimately, the city as a whole.

We each may have different ideas of what high quality design is. For example, our dream home would reflect our individual choices, tastes and needs. Furthermore, what we need from our homes will change at the different phases of our lives.

This booklet respects and encourages those differences in that it does not promote any one kind of development as being 'the best'. Rather it seeks to ensure that development applications represent quality design and also minimise harmful impacts on the environment, during construction and through a property's life cycle.

This booklet contains a step-by-step guide to a new process for considering development proposals and introduces new assessment tools. The new process includes a different, and partly mandatory, approach to the ACT's pre-application processes. The aim is that designers consult with Planning and Land Management (PALM), Local Area Advisory Planning Committees (LAPACs) and neighbours during the site analysis and preliminary design stage, rather than only when the design is finalised, to ensure that the proposal responds to all relevant concerns.

Applicants will be required to prepare site analysis and concept plans and reports that address Quality Design Indicators and, for residential development, a Sustainability Index. Residential buildings that meet the standards set by the Index will be considerably cheaper to run and should more rapidly increase in value as markets come to demand buildings that are both high quality and environmentally sound. More immediately, Development Applications that meet these standards become eligible for a range of rebates and other incentives. The role of the Design Review Panel in providing advice on the quality of the design concept and suggestions for possible improvements is confirmed.

The measures introduced, which will apply to development applications received from 1 July 2001, are designed to ensure that as Canberra develops its unique character is preserved and enhanced. At the same time, a small step will have been taken towards making our city sustainable. This recognises that the health of Canberra overall will be determined by the health of all of its parts.

This is not to suggest that new building construction is going to be solely responsible for making Canberra sustainable – other areas, including existing residential buildings and the Government itself, can and will be expected to do their bit. Nor is it suggested that Canberra's environmental impact comes only from buildings. The cars we drive, the goods we purchase, the waste we produce and many other features of the lives we lead all present their different challenges. Whilst these are sizeable challenges, and ones we will not overcome in one go, this booklet assumes that, given the will, the vision, and the sense of shared responsibility, we can work towards a high quality, sustainable future for Canberra.

Lincoln Hawkins
Executive Director
Planning and Land Management
June 2001

New Assessment Tools & Processess

The ACT Government has adopted new tools and assessment processes for development in the ACT and introduced revised pre-application processes effective from 1 July 2001.

Site Analysis Guidelines

Proposals for development will need to address the **Site Analysis Guidelines** from the earliest stages, focusing on the locational context of the proposed development.

Together the Guidelines and the Quality Design Indicators (see below) promote high quality design outcomes. They encourage buildings that imaginatively reflect the character of an area, including by taking this local character to new but sympathetic directions.

See page 7 for further details.

Quality Design Indicators

Proposals for development will need to address the **Quality Design Indicators** from the earliest stages. The indicators are not intended to spell out what a building should look like, rather they point to the sorts of things that need to be considered in order to produce a high quality building.

In addition to the building itself, the Guidelines encourage quality landscaping, outdoor living areas and, for commercial buildings, exciting public spaces.

See page 10 for further details.

Residential Sustainability Index

Proposals for residential development are encouraged to address the **Residential Sustainability Index.** The Index focuses on three major areas of environmental impact that new buildings can cause:

> energy that the building will use during its operation, and the greenhouse gases that much of that energy will produce;

> water usage within the home and garden, and the stormwater that flows off the building and land; and

> construction materials.

See page 12 for further details.

Design Review Panel (DRP)

Referral to the **Design Review Panel** is mandatory for all proposals for multi-unit development of more than five units and non-residential development of gross floor area 1000m^2 or greater. The Panel provides advice on the quality of the design concept and suggestions for possible improvements.

The panel comprises the:

> Manager, Urban Projects, PALM

> Manager, Coordination and Quality Development, PALM

> Urban design specialist(s) appropriate to the type and scale of development.

Other expertise may be sought for certain types of projects (eg. subdivision design in estate implementation plans). The DRP meets fortnightly and considers at the earliest possible stage in the design process the design concept (including site analysis and preliminary sketch plans). Advice from the panel is provided to applicants by letter and

through PALM's normal pre-application meetings, together with input from other agencies and areas of PALM. A development proposal may be referred back to the panel for further advice as it is refined.

Proposals considered by the Design Review Panel to be exceptional will receive accelerated assessment at the application stage (see below for details). This recognises that time saving and certainty are the greatest incentives to development proponents.

Design Response Report

Proposals will need to be accompanied by a **High Quality Sustainable Design Response Report** that must be acceptable to and accepted by PALM before the Development Application can be lodged.
See page 10 for further details.

Rewards and incentives

Incentives have been introduced with the aim of further encouraging applicants (designers and owners) to address high quality design and sustainability issues.

> **Badging of high quality design and sustainability**
Proposals recognised by PALM as being of high quality – they have responded to the Quality Design Indicators, the Residential Sustainability Index (where applicable) and the advice of the Design Review Panel – will be promoted with the design and development sectors and the general community.

In time proponents who achieve a consistently high standard will be entitled to display a 'Canberra Quality Design' logo on their advertising or promotional material. This award will be sponsored in part by PALM and conferred during annual industry award nights.

> **Accelerated Assessment, Guaranteed Approval Times and Feebates**
Incentives for high quality outcomes will occur at various levels.

> Where PALM, on advice from the Design Review Panel, determines that an application displays exceptional high quality design, the application will be given **accelerated assessment**, subject to the normal public notification and appeals processes.

> Applications which achieve an exceptional level of design, determined by the Design Review Panel and PALM, will also receive a **feebate** (rebate) on the current charges for the lodgement of a Development Application.

> Purchasers of residential developments which fall into the 'exceptional design' category will also receive an incentive. Details of the feebate and purchasers' incentives will be announced separately.

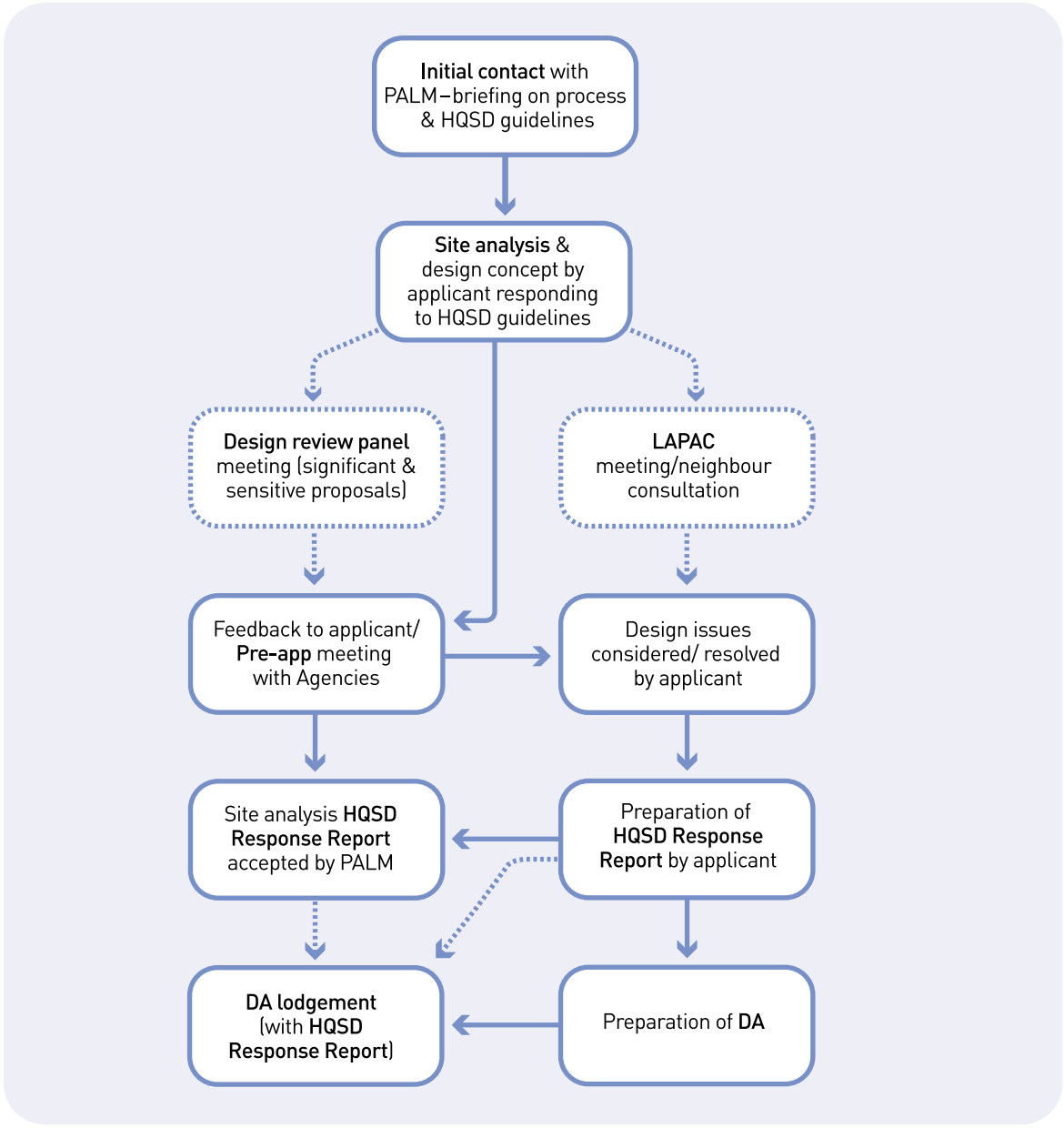
> Proposals which are fully consistent with section master plans, draw no objections and are assessed as being of excellent quality by the Design Review Panel and are agreed by the Executive Director, PALM, will receive a **written guarantee of an approval within 30 days.**

Figure 1 summarises the typical pre-application process.

"The ACT Government has adopted new tools and assessment processes for development in the ACT and introduced revised pre-application processes effective from 1 July 2001."

Figure 1: Pre-Application Process

Following is more detailed information about key stages of the pre-application process:



THE MANDATORY STEPS FOLLOW:

The Pre-application Process

Stage I:

Site Analysis Plan (responding to the Site Analysis Guidelines) is to be submitted as early as possible in the design process (ie. well before Development Application stage), and soon after initial contact with PALM.

MANDATORY FOR:

- **All new multi-unit development including dual occupancies**
- **All replacement houses in established areas**
- **Extensions of gross floor area 100m² or greater to any existing residential building, including single houses**
- **All non-residential development in residential land use policy areas**
- **Non-residential development elsewhere of gross floor area 1000m² or greater.**

Stage II:

Design concept submitted, including the following:

> **Development Concept Plan**

> **Landscape Concept Plan**

> (If applicable) **additional information for urban renewal sites in established areas** (eg. coloured sketch elevation or photomontage of the streetscape(s), focused around the proposal and extending for at least two properties on either side of the development site. A scale model can be useful in design and presentation).

MANDATORY FOR:

> **For all of above prior to lodgement of a DA.**

The proposal should be presented to any **Local Area Planning Advisory Committee (LAPAC)** at the earliest possible opportunity.

Most proposals will need to be presented to any **neighbours** who may be affected at the earliest possible opportunity.

MANDATORY FOR:

> **All new multi-unit development other than dual occupancies. All non-residential development.**

PALM may also discuss a proposal with the Commissioner for Land and Planning.

Stage III:

Design Review Panel reviews the site analysis and development concepts.

PALM convenes a pre-application meeting to discuss proposal with proponents and other agencies and to provide feedback from Design Review Panel.

MANDATORY FOR:

> **All multi-unit development of more than five units**

> **Non-residential development of gross floor area of 1000m^2 or greater.**

Stage IV:

The proponent must submit a **High Quality Sustainable Design Response Report** that describes how the design responds to:

> the site analysis

> the Quality Design Indicators

> the Residential Sustainability Index (where applicable)

> comments of the Design Review Panel (where required)

> comments of LAPAC (where required)

> comments of neighbours

> issues raised in pre-application meetings or correspondence from PALM.

MANDATORY FOR:

> **All new multi-unit development including dual occupancies**

> **All replacement houses in established areas**

> **Extensions of gross floor area 100m^2 or greater to any existing residential building, including single houses**

> **All non-residential development in residential land use policy areas**

> **Non-residential development elsewhere of gross floor area 1000m^2 or greater.**

Stage V:

Manager Coordination & Quality Development, Planning and Land Management, provides written acceptance of the site analysis and the **High Quality Sustainable Design Response Report**

MANDATORY FOR:

> **All of above prior to lodgement of a DA. This enables 'in principle' acceptance of design concept prior to DA lodgement, subject to public comment, detailed assessment and final decision.**

The Assessment Tools for High Quality Design & Sustainability

Site Analysis Guidelines

Site analysis is an essential step in the design process for a successful development. It enables designers and assessors to appreciate more clearly the development context and the issues to which the design must respond. It assists in identifying the relationship of the site to adjacent properties and in testing whether the proposed development recognises any constraints that may apply.

The site analysis is to comprise plans and a report. It is to address:

- relevant planning controls and guidelines;
- relationship to the local community, including Community Value Statements;
- access to neighbourhood facilities and movement networks;
- relationship to the character of the street and adjacent properties, and potential impacts on these; and
- characteristics of the site (slope, views, trees, etc).

As noted in the AMCORD 95 '...a site analysis should not be a standard exercise and a responsible authority should exercise its judgement about the extent of information required'.

For PALM's part we will require the extent of information provided to reflect the location, size and sensitivity of the proposal. As much as possible of the contextual information should be shown graphically on the site analysis plan (normally to 1:200 scale) to explain:

- the key influences on the design (opportunities and constraints);
- how the proposed dwellings will relate to each other and to the immediate surroundings; and
- how the design minimises negative impacts on the amenity of adjoining developments and complements neighbourhood character.

The following information from AMCORD 95 (pp63-64) 'Development Context and Site Analysis' shows a typical Site Analysis Plan (in this case for an infill housing project). The extent of information it proposes is what is required in the ACT.

"Site analysis is an essential step in the design process for a successful development. It enables designers and assessors to appreciate more clearly the development context and the issues to which the design must respond."

2.4 Development Context and Site Analysis

Need

One of the most effective ways of improving the quality of housing projects is to establish its development context before the site planning and design phase. Too often development projects are submitted to planning authorities without a detailed analysis of how the new development relates to its context. As a result, neighbouring property owners are often unnecessarily adversely affected.

The development context involves four aspects:

- planning and development intentions for the site;
- the relationship of the site to the local community;
- the relationship of the site to adjoining properties;
- physical characteristics of the site.

Planning Intentions
AMCORD encourages local authorities to clarify the strategic planning and development intentions upfront so that the development context and hence appropriate housing is developed. Part 1: Setting the Context provides information on matters to be addressed.

Local community
Upfront planning should also provide information relevant to the local community. Issues include the locality's identity and character, the streetscape, and the relationship of that site to local movement and social networks.

Neighbouring properties
The relationship of the proposed development to its neighbours is of critical importance. When housing is to be built among existing dwellings, the design must take into account factors extending beyond the site.

Site characteristics
The arrangement of buildings and spaces on a site is also part of the development context and will influence the quality of the residential environment. Issues include the building 'footprint', private open space, semi-public open space (setting for the dwellings), setbacks for amenity, street appearance, access and parking, and services and facilities.

Site Analysis

The site analysis establishes the development context, identifying and explaining graphically:

- the key influences on the design;
- how the proposed dwellings will relate to each other and to the immediate surroundings.

It shows the uses of neighbouring sites, and potential constraints relating to overlooking, overshadowing, view retention, building bulk, landscaping and screening between the development and adjoining sites.

An analysis of the street character may also be necessary. It can provide clues for successful integration, and may influence site layout, landscape, alignment of buildings and the design of the proposed development in relation to the streetscape.

A separate Site Analysis Plan is recommended as part of the approval process for larger developments. For smaller projects, the site analysis information can form part of the Site Development Plan.

It is worth noting that a Site Analysis Plan is not a document where unimportant detail should override its purpose, that is, to explain the relationship of proposed dwellings with each other and with the environment.

A site analysis must be to scale and should identify development opportunities and constraints. It should influence the design to minimise negative impacts on the amenity of adjoining developments and to complement neighbourhood character.

A site analysis should not be a standard exercise, and a responsible authority should exercise its judgement about the extent of information required. At its most exhaustive, a site analysis would document the site in terms of:

- contours;
- existing vegetation;
- buildings (including any that could be retained);
- views to and from the site;
- access and connection points;
- drainage and services;
- orientation, microclimate and noise sources;
- where relevant, any contaminated soils and filled areas;
- fences, boundaries and easements;
- any other notable features;

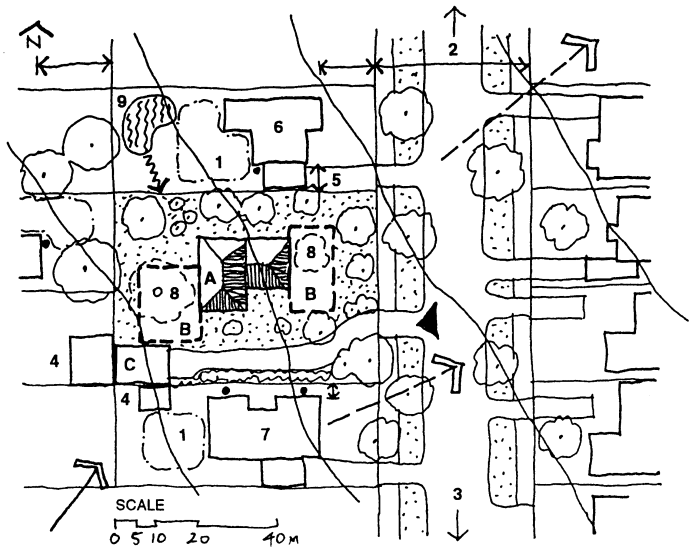
and the surrounds in terms of:

- the location and use of adjacent and opposite buildings and out-buildings;
- abutting private open spaces and habitable room windows which have outlooks towards the site, particularly those within 9 m of the site;

- views and solar access enjoyed by adjacent residents;
- major trees on adjacent properties, particularly those within 9 m of the site;
- location and height of walls built to the site's boundary;
- characteristics of any adjacent public open space;
- street-frontage features such as services poles, street trees, kerb crossovers, bus stops, services;
- the built form and character of adjacent and nearby development, including characteristic fencing and garden styles;
- direction and distances to local shops, schools, public transport, parks and community facilities;
- the difference in levels between the site and adjacent properties.

Explanatory Statement

It is clearly not sufficient to prepare a Site Analysis Plan and then ignore it during the design process. It is therefore recommended that a written statement be prepared by applicants of housing development projects explaining how the design has responded to the Site Analysis Plan. Such a statement, to form part of the material required for an application, would greatly assist the design and assessment processes, and is likely to result in a significant improvement in the quality of infill housing. Such an approach is likely to reduce the number of complaints arising from neighbours following lodgement of applications for proposed infill housing projects, and should also reduce associated delays in the approval process.



Key

Prevailing winds

Views (eg to hills or city skyline)

Existing trees to be retained

Neighbourhood windows facing site

Noise (eg from pool area)

Vehicular site entry

Contours

A *Existing two-storey dwelling to be retained*
B *Proposed additional units*
C *Existing garage*
1 *Secluded private open space*
2 *Public transport 200m*
3 *School 500m*
4 *Garden shed*
5 *Carport*
6 *Two-storey dwelling*
7 *Single-storey dwelling*
8 *Trees on site to be removed*
9 *Swimming pool (or other external active recreation area)*

Figure 7: Typical Site Analysis Plan for an infill housing project.

Quality Design Indicators

The Quality Design Indicators that PALM uses in its initial (and subsequent) appraisal of the Development and Landscape Concept Plans follow. These *Indicators* will be used as a reference by the Design Review Panel and PALM assessment officers in discussions over design concepts. Proponents will be required to demonstrate how, through plans and the subsequent High Quality Sustainable Design Response Report, they have responded to each quality criterion.

[This diagram is available in looseleaf form from PALM]

1. (a) Is the design in character with existing local high quality townscape and landscape, in terms of:	
> building height	
> building bulk/scale	
> roof form and pitch	
> external materials and colours	
> proportions of building front and use of elements such as porches, verandahs	
> locations and size of windows on building front	
> siting and design of garages, carports, walls, fences, waste storage enclosures and other minor structures	
> appropriate use of signage	
> landscape character, such as retention of existing trees	
> driveway character such as materials and width	
1. (b) Alternatively, if the local character is not distinctive, or the existing environment is not of high quality, does the development establish a high quality benchmark for the desired future character?	
> Specify how it establishes such a benchmark	
2. Does the design ensure the quality and comfort of the public domain through providing:	
> attractive and safe public spaces and routes	
> legibility of address and access	
> ease of access (lack of barriers)	

> visible activity and opportunities for surveillance of street/s	
> active frontages	
> visual variety and interest	
3. Is the design well related to its site and its immediate surroundings, in terms of:	
> orientation and layout for best solar access	
> relationship of indoor to outdoor spaces	
> retention of existing vegetation	
> minimising cut and fill	
> ensuring visual and acoustic privacy	
> minimising hard paved areas	
> safe and convenient pedestrian and vehicular access	
> minimising effects on neighbours including overshadowing, loss of privacy and views	
> types of trees	
4. Is the proposed open space on site:	
> clearly identified and appropriately designed as to its function (ie. either public, communal or private)	
> located for adequate privacy and minimal overshadowing	
> appropriately screened/enclosed	
> well proportioned (not tall narrow spaces)	
> surfaced attractively and comfortably	
> equipped with appropriate lighting and furniture	
> contributing to the building setting	
5. Does the proposed planting:	
> complement the scale and functions of buildings	
> provide visual interest and overall harmony	
> soften and naturalise outdoor areas	
> complement existing landscape in the area	
> provide for good solar access and appropriate shading	

Sustainable Development Index for Residential Development

The construction and use of residential buildings consumes substantial quantities of materials, water and energy. In order for the ACT to move towards becoming a sustainable society it must reduce the consumption of these resources. The *Residential Sustainability Index* encourages energy and water conservation measures and the more suitable use of building materials. The measures in the Index are designed to reduce the impact of a proposed development by:

- minimising the use of materials from scarce or environmentally sensitive resources;
- using materials that do not take excessive amounts of energy to manufacture;
- reusing and recycling materials;
- using materials in a way that others can easily reuse them later;
- reducing peak stormwater discharge;
- minimising the wasteful use of drinking-quality water;
- designing buildings that work with, not against, the natural features of the landscape;
- using passive solar design principles;
- minimising heat loss in winter and heat gain in summer;
- maximising the use of natural daylight and ventilation; and
- reducing greenhouse gas emissions.

These measures will deliver buildings that are cheaper to run and more pleasing to live in. As well, less pressure will be put on the environment than is the case with an older-style building.

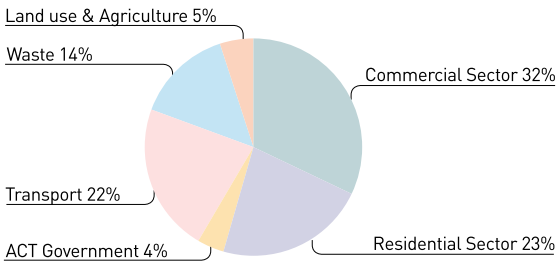
The Index is only one aspect of the Government's overall drive towards ecologically sustainable development. It is part of the ACT's commitment to the Intergovernmental Agreement on the Environment which states that 'the concept of ecologically sustainable development (ESD) should be used by all levels of Government in the assessment of natural resources, land use decisions and approval processes'. Details of the measures follow. Appendix A (**The Residential Sustainability Table**) is required to be submitted with your **High Quality Sustainable Design Response Report.**

Energy

The Index seeks to reduce the amount of energy consumed by a house, much of which currently comes from the burning of fossil fuels (a limited resource and a major cause of greenhouse gases).

In 1990, some 3,900,000 tonnes of greenhouse gases were produced in the ACT. The Government has set the target of stabilising greenhouse gas emission at those levels by 2008 and then to reduce them by a further 20 per cent by 2018. In 1997, the contribution the various sectors made towards the ACT's total greenhouse emissions was estimated as follows:

ACT – Total emissions and the residential sector's share



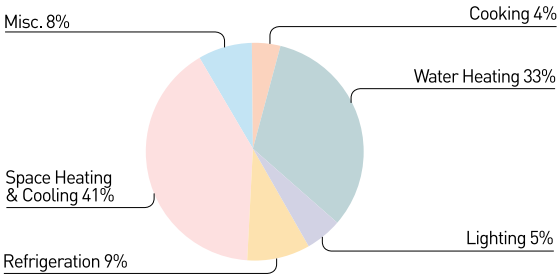
Source: ACT Greenhouse Strategy

The ACT's total reduction targets will only be met if every sector reduces its emission appropriately. If the residential sector's share remains at 23 per cent of the whole, the appropriate share will be 897,000 tonnes by 2008 and 717,600 tonnes by 2018. The share per individual house will depend a little on the total number of houses in the ACT in 2018. Current estimates put this at around 140,000 dwellings. If this is so, then by 2008 each house, new and old, will need to have limited its emissions to just over 7.5 tonnes, and by 2018 to be further limited to 5.1 tonnes a year.

The Index is designed to encourage homes with an emission profile of between 5.1 to 7.5 tonnes.

Sources of greenhouse gas emissions within a house

The Australian Greenhouse Office has recently identified the typical source of these emissions within a house as follows:



Source: Adapted from Australian Greenhouse Office to reflect ACT conditions

As it is restricted to the Development Application process, the Index only covers emissions from cooking, water heating, lighting and space heating and cooling. These account for 80 per cent of the home's total emissions. The Index makes a nominal allowance of 1.75 tonnes for the areas it cannot cover (essentially refrigeration and other electrical appliances) and then seeks to keep the following areas to within the target range of 5.1 to 7.5 tonnes.

Calculating Your Home's Typical Emission Profile

Cooking

Cooking appliances have been calculated to have the following annual emission profile.

Gas stove	Electric stove	Gas hob/ electric oven
0.190 tonnes	0.633 tonnes	0.413 tonnes
Insert your total below:		

Lighting

A typical house lit by standard incandescent globes uses around 600 kWh/year, producing some 560kg of emissions. Environmentally friendly compact fluorescent lights consume just 20 per cent of this. Do not confuse the environmentally friendly *low wattage lamps* with *low-voltage lamps* (such as quartz-halogen) as the *low-voltage lamps* are relatively inefficient, and the Index counts them as the same emission as for a standard globe.

Calculate your emissions from lighting using the following table.

% standard globe or quartz-halogen globes (multiply by .560 tonnes)	% low-wattage or compact fluoro globes (multiply by .112 tonnes)	Your total
	+	=

Water Heating

The emission profile of your hot water system depends on a number of factors. Many of these cannot be controlled by actions under the Index (eg. the length and number of showers per household, how well your pipes and heaters are lagged, and whether you have water-efficient shower heads). However, any reductions made to your consumption levels will reduce both your bills and the

"Unless special conditions apply every new dwelling in the ACT must have at least a 4-star energy rating. A 4-star home requires 255 megajoules to heat and cool per square metre per year"

Hot water system	Tonnes emission per year	Your usage
Gas boosted solar	0.5	
Five star gas	1.3	
Two star gas	1.6	
Electric boosted solar	1.9	
Electric	4.8	
	Your total emissions	

environmental impact. For a typical 200 litre a day hot water system, the greenhouse tonnages at left can be taken as indicative.

Space Heating and Cooling

Unless special conditions apply every new dwelling in the ACT must have at least a 4-star energy rating. A 4-star home requires 255 megajoules to heat and cool per square metre per year (a megajoule is a unit of energy). Naturally, the larger your house the more energy you will use to heat and cool it. Aside from the very significant dollar cost to you, the 'cost' of this energy, in terms of greenhouse gas emissions, is further multiplied by what sort of energy you are using. This table below provides a guide.

	Total floor area (m^2)			
	150	200	250	Your house
Primary heating source				
Standard electric*	5.642	7.522	9.561	
Gas (no pilot light)	1.113	1.484	1.892	
Heating oil	1.512	2.017	2.571	
Electric reverse cycle	1.880	2.507	3.187	
Wood – closed heater**	0	0	0	
Secondary heating source				
Standard electric	2.821	3.761	4.796	
Gas (no pilot light)	0.556	0.742	0.946	
Heating oil	0.756	1.008	1.2857	
Electric reverse cycle	0.940	1.253	1.599	
Air conditioning	1.5	2.0	2.5	
Total emissions				

**'Standard Electric' refers to radiators, fans, oil-filled heaters and off-peak heating devices such as heat banks and slabs.*

***Wood is carbon neutral if grown, harvested and burnt in accordance with the ACT's Solid Fuel Strategy. The Index assumes this legal requirement is met.*

Note: All figures used in the index reflect the best information currently available. This may change over time in light of further testing.

Benefits of Being Better than 4 star

The total emissions figures generated using the above data indicate the average heating energy required for a 4-star house, the legal minimum for the ACT. The emissions figures can be reduced if the house is better than 4-star, reducing at a rate of approximately 10 per cent per half star rating.

4 star (insert emission figure estimated above)	4.5 – reduce by 10%	5 star reduce by 20%
Insert your total below:		

Design features that go towards determining your star rating include the following:

> Orientation of residence
  > ideally, north facing

> Insulation (with appropriate R-ratings)
  > concrete slab edge
  > walls
  > ceilings
  > under floor

> Air leakage
  > around fireplaces, windows and doors

> Design features
  > ceiling height
  > north facing windows in living areas

> Floor type
  > slab (on-ground or suspended) or timber

> Glazing
  > double or tinted
  > % facing to the north

> Thermal mass
  > floors, fireplaces and internal feature walls

> Size of eaves
  > differing widths for various aspects

> Cross ventilation
  > reduces residual heat in summer
  > reduces fungi and bacteria

> Common walls
  > especially in multi-unit or townhouse developments

(ACTCODE is the reference for *Setbacks and Related Items for Construction*. Any queries should be directed to the Residential Development Unit in ACT Planning and Land Management.)

These features directly relate to the money you will spend on your energy bill, as well as your contribution to the ACT's greenhouse profile. With growing public awareness of the comfort and cost-savings of energy-efficient homes these features may add to the retail value of your home as well. All homes being offered for sale in the ACT must disclose their star rating. For these reasons you are strongly encouraged to seek the highest possible standard from your developer, designer and builder.

Only qualified Accredited ACTHERS Assessors can rate your house. A list of current Assessors is available from the Planning and Land Management shopfront, or can be found on the web at www.palm.act.gov.au

Calculate Your Total

RefrigeratorI	1 tonne*
Other non-assessable appliancesI	.750 tonne*
Cooking (bring in from previous calculations)	
Lighting (bring in from previous calculations)	
Hot water heating (bring in from previous calculations)	
Space heating/cooling (with reduction for above 4 star) (bring in from previous calculations)	
Total emissions	

*Typical allowance, assuming 4 star appliances

If your total is substantially above the target range of 5.1 to 7.5 tonnes, then you are strongly encouraged to discuss with your designer measures that can reduce your energy consumption to more acceptable levels.

"Canberra has already gone a long way towards reducing its consumption of fresh water. This has reduced the need for new dams, as well as reduced impact on wildlife and recreational uses of our rivers."

Water

Canberra has already gone a long way towards reducing its consumption of fresh water. This has reduced the need for new dams, as well as reduced impact on wildlife and recreational uses of our rivers.

The Index seeks to further build on these achievements by reducing household water consumption. It sets a target of 33 per cent less water used in each type of building, which is typically 300 litres a day less per detached house or a total consumption of 600 litres per day.

The Index also seeks to reduce the number and intensity of stormwater flows from individual properties by between 20 per cent and 50 per cent (by keeping more water within the boundaries of the property). This can be done by directing water away from the building's downpipes and into either garden soak-aways or communal landscaped ponds and wetlands, depending on the type of property. These treatments are not only better for the environment but also they can add value to the property because increasingly people are finding these features attractive.

Mains (drinking) water import reduction measures

A typical detached home and garden consumes 900 litres of water a day, with more than half of this used in the garden. Typically, the highest usage is in the summer, putting peak pressure on dams when little water is flowing inwards.

Area of usage	%	Total litres used (based on 900/day)
Toilet	14	126
Bathroom	16	144
Laundry	10	90
Kitchen	5	45
Garden	52	468
Other external	3	27

Source: ActewAGL

The Index encourages the following installations within the home. Properly used and used in combination with the outdoor consumption, they can reduce the above total to 600 litres a day. The Index does not expect all of these measures to be taken (although that would be good for the environment!) but those taken should sum to the target of no more than 600 litres.

Indoor consumption

Area of usage	Measure	If done	If not done	Your choice
Toilet	Dual flush (mandatory)	75 *	126	
Bathrooms & ensuites	Water saving shower heads	58	144	
Laundry	AAA washing machine**	63	90	
Kitchen	None suggested	45	45	
Total				

**You can flush your toilets with reclaimed bathroom greywater. If you install this feature, the demand for each of these toilets is zero and this should be recorded in the 'your choice column'.*

***You are encouraged to install AAA appliances.*

Outdoor consumption

The Index seeks to encourage the following water reduction measures in the garden. The Index works backwards from the typical water consumption of a high-demand lawn-based garden. You do not have to take all of the following steps to significantly reduce

your garden's water needs. However, you should seek to reduce your garden's water needs by at least one-third. For example, reducing a garden of 400m² from 400 litres a day demand to around 270 litres would be a good start.

Measure	Example	Your actual
Total non-paved garden area*		
Start by entering a figure of 1 litre irrigation water for every square metre of your non-paved garden area.	Garden is 400m² so starting figure is 400 litres per day	
Reduce lawn area**		
Reduce lawn area and replace with well-mulched or low water-demand plants. Minus two-thirds litre (666ml) per square metre converted. If unsure, assume 80% lawn.	Ratio is 80% lawn to 20% low-water shrubs. So 80m² needs only 333ml per m² (a reduction of 55 litres per day to 345 litres)	
Install automated irrigation		
Automated irrigation systems can reduce water demand by 33%. If installed, reduce your running total by 33%***	33% of 345 is 115, so water is reduced to 230 litres per day	
Install rainwater tanks		
A 5000 litre rainwater tank can supply 150 litres, so minus this from your running total	230 minus 150 = 80 litres	
Garden total	You can maintain this 400m² garden with an average of 80 litres day	

**You are not encouraged to reduce your garden watering area by increasing your paved area, as this will increase your stormwater flow – see next section*

***A well-designed xeriscape (low water demand) garden may need no watering at all. The Index assumes that watering will in fact continue, at half the rate of a high water demand.*

****A correctly used water irrigation system can reduce garden irrigation demand between 20% and 50%. However, automated systems should be turned off if the garden does not need watering.*

Greywater recycling, when delivered by ActewAGL through a water-reuse initiative, is both environmentally and economically advantageous for larger scale developments. Record all ActewAGL greywater schemes as a zero figure for drinking water demand. However, individual greywater recycling is not encouraged as significant health concerns may exist.

Your Total

Your indoor total	
Your outdoor total	
Grand total	

If your combined total is less than 600 litres per day, then you have successfully reduced your total water demand to a level which, if matched by others, will reduce the need for Canberra to increase its water extraction and storage.

Stormwater export flow reduction measures

The stormwater measures seek to reduce the peak volume of water leaving your property, with the water ebbing away over a longer period of time. There are two main reasons why this is important.

First, high volumes of water flowing off properties tend to carry large pollution loads, including rubbish and sediments; organic materials such as leaves and animal droppings; and poisons and chemicals, such as oils and excessive garden fertilisers. These all end up in the river system, where they present major ecosystem health problems. Second, the high volumes of water rushing into the river system can be a problem. The traditional system of putting in concrete storm channels and pipes is no longer considered adequate: river life cannot survive in these channels, and the water flowing through them is potentially extremely dangerous to people (children) who may be playing around them. Furthermore, when the waters reach the natural rivers they come in such enormous volumes that they tend to wash away plants and animals that do not have enough time to regenerate before the next storm comes along.

It is not feasible to have a city and for the river system to have the same characteristics as it had before the city was built. We can, however, work towards conditions that are much closer to how they were before, with resultant reduced impact on the rivers downstream, encouraged urban bio-diversity and more attractive and valuable features for our enjoyment.

The Index seeks to reduce the stormwater and pollution discharged by a property by 20 per cent where the property feeds into a larger system of stormwater control traps, ponds and detention basins (as it does in all new suburbs). In older areas where these features are not in place the reduction measure is 50 per cent.

For all properties there are two major areas of change that can deliver these targets:

> Limit the direct link between the property's stormwater drains (ie. downpipes) and the public drain by feeding the stormwater into a garden soak-away ('swale') or water infiltration trench. Ideally, the water should feed into a rainwater tank, reducing drinking water demand. However, as even large rainwater tanks typically overflow during prolonged storm events, a rainwater tank does not in itself reduce stormwater flows. A swale or infiltration trench is simple to construct and should cost no more then the cost of old-fashioned stormwater connections. For larger and higher density developments other options exist to produce the same outcome, including the construction of joint wetland features. Such development opportunities should be discussed with PALM.

> Reduce the area of impervious paving with mulched landscape or porous paving, such as gravel driveways. These areas have 70 per cent of the discharge of impervious areas.

In almost all cases these two measures are sufficient to produce the desired reductions in stormwater discharge. However, if the landscape features of your property prohibit the use of a soak away, or if the density of the block development prohibits the introduction of pervious areas, then you should discuss your options with PALM.

"The Index seeks to reduce the stormwater and pollution discharged by a property by 20 per cent where the property feeds into a larger system of stormwater control traps, ponds and detention basins (as it does in all new suburbs).

Building materials

Modern buildings often have a wide choice of materials for a given job. For example, a roof can be made of various metals, ceramic tiles, concrete, or organic materials including wood and straw. The choice of material will normally depend upon the job it is expected to do – such the load it has to bear, its price and availability, and the look or feel it gives to the building. The final selection of materials will normally rest upon the advice of professional builders and designers and the wishes of the people who are going to live in the building. This Index cannot substitute for the advice of a professional builder or designer, but it can encourage them to include environmental considerations in the advice that they give.

The checklist that follows is intended to make sure that your building minimises the impact it has on the environment. Key environmental considerations for the choice of building materials include:[1]

- How rare or common is the material
- Whether there is major environment damage caused by the growing, mining or manufacturing of the material
- Whether there are very large amounts of energy used in the manufacture or processing of the material
- Whether the material is likely to wear out and need replacing
- Whether the material needs frequent maintenance to keep it good condition, involving the use of other materials (eg. paints, which have their own environmental impact)
- Whether the material can be removed and reused or recycled once the building, or that part of the building, has reached the end of its life
- How far has the material been transported to get it to your site
- Whether the material is likely to have harmful impacts on the health of the occupants of the building ('sick building syndrome', suspected of being produced by volatile organic compounds found in certain paints and glues, and other known toxic or carcinogenic substances)
- Where the material cannot be reused or recycled, what problems it poses for waste-management.

Whilst some materials should be avoided altogether (eg. moulded wood products from tropical hardwoods) for others the choice is not so clear-cut. Often, where two or more materials are competing for the one task each will have its strengths and weakness, with the materials' points of environmental impact occurring in different places. A guiding question then, for any given task, is which material is most suitable? Ask these questions of your building designer in order to encourage suitable and responsible material usage:[2]

- Does your design avoid using excessive amounts of materials to perform each task?
- Have you only used very long-lived materials, such as steel, for areas that the occupant is unlikely to want to change during the life of the building?
- Is the building designed so that it can easily be adapted and upgraded, as the occupants' needs change?

1 This drawn in part from Lawson, 1996
2 This list drawn in part from Bell

> Have you avoided the use of paints and adhesives that are suspected of being harmful to those living in the building (eg. that give off high levels of volatile organic compounds)?

> Have you favoured materials with low embodied over high embodied energy, where either could adequately do the job? ('Embodied energy' means the total energy needed to obtain the raw material, process it, manufacture the product and deliver it on site.)

> Have you favoured the use of renewable materials, such as plantation timber, where appropriate?

> Have you favoured local products, which have not been transported vast distances, over overseas ones?

> What maintenance will the building require and what products will this involve?

> Have you considered using reused or recycled materials or components where they can perform as well as new ones?

> Have you designed the building so that the materials can be easily recovered at the end of its life?

> Have you given special attention to the environmental considerations of the components of the building that are likely to be refurbished during the life of the building?

> Have you sought building quotes from accredited green builders?

Other initiatives for improved sustainability

There are a number of additional areas that might increase or decrease the residential sector's environmental impacts. Whilst the Index sets no standards for these areas, you are encouraged to consider them. Identify any other innovation that you have included in your building design that will improve its environmental performance in the Appendix A summary which is to be submitted to PALM with your **High Quality Sustainable Design Response Report**.

Habitat

It is quite possible for the urban environment to be home to a wide range of native animals. You can encourage this by providing suitable food, shelter and breeding sites. Whilst exotic trees and shrubs can provide this habitat, local natives are particularly useful. Not only are they suited to the local climate and conditions, and so require less fertilising and watering, but also the local wildlife is adapted to live with them. As Canberra enjoys a magnificent system of bushland reserves birds and other native creatures will be readily attracted to your garden if you do provide suitable plants. Remember, a well-established garden with bird-attracting trees and shrubs can add considerable value to your home.

"As Canberra enjoys a magnificent system of bushland reserves birds and other native creatures will be readily attracted to your garden if you do provide suitable plants. Remember, a well-established garden with bird-attracting trees and shrubs can add considerable value to your home."

Solar photovoltaic cells

The use of home solar photovoltaic cells to generate your own electricity from the sun's energy delivers clean, indefinitely sustainable power, which is also cheapest in the long run. A limited amount of Commonwealth money is available to offset installation costs. You are encouraged to explore these options.

Car parking

The use of privately owned vehicles as commuter transport represents around a quarter of Canberra's greenhouse gas emissions. Whilst most houses will have off-road parking for one car, provision of additional parking spaces tends to lead to multiple car usage. As a result, having more than two covered car parking spaces per dwelling is not encouraged.

Provision of bicycle storage area

Using push bikes for local commuting, such as school trips, is a good way to reduce your car dependency. Providing secure covered bicycle storage is a good way of encouraging this.

Wheelie bin storage

Canberra enjoys a highly effective waste reclamation scheme. A designated area for convenient wheelie-bin parking with easy access to the kerb-side helps promote recycling.

Other

Use the space at the end of Appendix A to bring to PALM's attention any other environmentally friendly feature/s that you have installed.

Appendix A

Residential Sustainability Performance Guide

Refer to information provided in the Index and complete these tables. This information must be submitted with your Development Application (this form is available loose leaf from PALM).

Energy consumption

(target is between 5.1 and 7.5 tonnes)

Appliance or task	Emissions estimated
Refrigerator	1 tonne
Other non-assessable appliances	.750 tonne
Cooking	
Lighting	
Hot water heating	
Space heating/cooling (with reduction for above 4 star)	
Total emissions	

Drinking water consumption

(target is 600 litres or below per day)

Area of usage	Litres estimated
Toilet	
Bathroom	
Laundry	
Kitchen	
Garden	
Total used	

Stormwater reduction measures

(target is 20% to 50% flow reduction)

Measure	Yes or No
Downpipes fed to garden soak-away	
Substitute impervious paving	
Link to community wetland	

Suitability of building materials used

Measure	Yes or No
Excessive material usage avoided	
Durable materials appropriately used	
Building designed for ease of later adaptation	
Harmful paints and adhesives avoided	
Preference given to materials with low embodied energy	
Renewable materials used where appropriate	
Local materials favoured over imported ones	
Impact of maintenance program considered	
Reused or recycled materials and components included	
Building designed for ease of material recovery	
Environmental impact of short-lived components considered	
Quotes sought from accredited green builders	

Other considerations

Use this space to bring to PALM's attention any other environmentally friendly features that you are proposing.

Appendix B

Proponent checklist

This list is provided as a quick reference check sheet. It lists each of the steps proponents of developments will need to address to meet the pre-application requirements of Designing for High Quality and Sustainability (as detailed in this booklet). It is provided as a cross reference for proponents to ensure they have covered each requirement. Full details are provided throughout this booklet.

Requirement	Completed
These are all pre-application stages	
Initial discussions with PALM	
Site Analysis Plan (responding to Site Analysis Guidelines)	
Design concept (including ***Development Concept Plan, Landscape Concept Plan***, and additional information for urban renewal sites in established areas)	
Quality Design Indicators taken into account at each stage	
Residential Sustainability Index taken into account for residential proposals	
Proposal presented to the local **LAPAC** (where there is a LAPAC) at earliest possible stage	
Proposal presented to any **neighbours** who may be affected at the earliest possible stage	
High Quality Sustainable Design Response Report submitted to PALM (in response to any Government agency feedback, feedback from the Design Review Panel to the original proposal)	

Proponent Checklist

This list is provided as a quick reference check sheet. It lists each of the steps proponents of developments will need to address to meet the pre-application requirements of Designing for High Quality and Sustainability (as detailed in the 'Designing for High Quality and Sustainability' booklet).

It is provided as a cross reference for proponents to ensure they have covered each requirement. Full details are provided in the 'Designing for High Quality and Sustainability' booklet.

Requirement	Completed
These are all pre-application stages	
Initial discussions with PALM	
Site Analysis Plan (responding to Site Analysis Guidelines)	
Design concept (including ***Development Concept Plan, Landscape Concept Plan***, and additional information for urban renewal sites in established areas)	
Quality Design Indicators taken into account at each stage	
Residential Sustainability Index taken into account for residential proposals	
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High Quality Sustainable Design Response Report submitted to PALM (in response to any Government agency feedback, feedback from the Design Review Panel to the original proposal)	

Reset Form

Quality Design Indicators

The Quality Design Indicators that PALM uses in its initial (and subsequent) appraisal of the Development and Landscape Concept Plans follow. These *Indicators* will be used as a reference by the Design Review Panel and PALM assessment officers in discussions over design concepts.

Proponents will be required to demonstrate how, through plans and the subsequent High Quality Sustainable Design Response Report, they have responded to each quality criterion.

1. (a) Is the design in character with existing local high quality townscape and landscape, in terms of:	
> building height	
> building bulk/scale	
> roof form and pitch	
> external materials and colours	
> proportions of building front and use of elements such as porches, verandahs	
> locations and size of windows on building front	
> siting and design of garages, carports, walls, fences, waste storage enclosures and other minor structures	
> appropriate use of signage	
> landscape character, such as retention of existing trees	
> driveway character such as materials and width	
1. (b) Alternatively, if the local character is not distinctive, or the existing environment is not of high quality, does the development establish a high quality benchmark for the desired future character?	
> Specify how it establishes such a benchmark	

Reset Form

2. Does the design ensure the quality and comfort of the public domain through providing:	
> attractive and safe public spaces and routes	
> legibility of address and access	
> ease of access (lack of barriers)	
> visible activity and opportunities for surveillance of street/s	
> active frontages	
> visual variety and interest	
3. Is the design well related to its site and its immediate surroundings, in terms of:	
> orientation and layout for best solar access	
> relationship of indoor to outdoor spaces	
> retention of existing vegetation	
> minimising cut and fill	
> ensuring visual and acoustic privacy	
> minimising hard paved areas	
> safe and convenient pedestrian and vehicular access	
> minimising effects on neighbours including overshadowing, loss of privacy and views	
> types of trees	

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4. Is the proposed open space on site:	
> clearly identified and appropriately designed as to its function (ie. either public, communal or private)	
> located for adequate privacy and minimal overshadowing	
> appropriately screened/enclosed	
> well proportioned (not tall narrow spaces)	
> surfaced attractively and comfortably	
> equipped with appropriate lighting and furniture	
> contributing to the building setting	
5. Does the proposed planting:	
> complement the scale and functions of buildings	
> provide visual interest and overall harmony	
> soften and naturalise outdoor areas	
> complement existing landscape in the area	
> provide for good solar access and appropriate shading	

Reset Form

Residential Sustainability Performance Guide

Refer to pages 12–17 of the Designing for High Quality & Sustainability booklet and complete these tables. This information must be submitted with your Development Application.

Energy consumption
(target is between 5.1 and 7.5 tonnes)

Appliance or task	Emissions estimated
Refrigerator	1 tonne
Other non-assessable appliances	.750 tonne
Cooking	
Lighting	
Hot water heating	
Space heating/cooling (with reduction for above 4 star)	
Total emissions	

Drinking water consumption
(target is 600 litres or below per day)

Area of usage	Litres estimated
Toilet	
Bathroom	
Laundry	
Kitchen	
Garden	
Total used	

Stormwater reduction measures
(target is 20% to 50% flow reduction)

Measure	Yes or No
Downpipes fed to garden soak-away	
Substitute impervious paving	
Link to community wetland	

Suitability of building materials used

Measure	Yes or No
Excessive material usage avoided	
Durable materials appropriately used	
Building designed for ease of later adaptation	
Harmful paints and adhesives avoided	
Preference given to materials with low embodied energy	
Renewable materials used where appropriate	
Local materials favoured over imported ones	
Impact of maintenance program considered	
Reused or recycled materials and components included	
Building designed for ease of material recovery	
Environmental impact of short-lived components considered	
Quotes sought from accredited green builders	

Reset Form

Other considerations

Use this space to bring to PALM's attention any other environmentally friendly features that you are proposing.

Reset Form

More information

Copies of this guide may be obtained from the:

Customer Service Centre
Planning and Land Management
16 Challis Street
Dickson ACT 2602

Alternatively you may obtain a copy by:

T: **02 6207 1923**

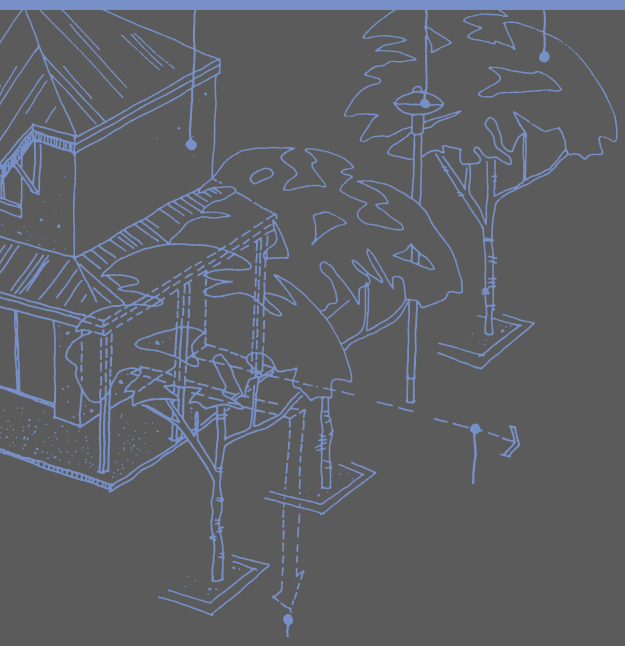
Or on the PALM website: **www.palm.act.gov.au**

Questions may be addressed to:

The Manager
Coordination and Quality Development
Planning and Land Management

T: **02 6207 2585** or **02 6207 2435**

June 2001



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