G2 Solar Access

Contents

1.0 INTRODUCTION

This Part applies to all residential zoned land or land which allows for mixed development within Waverley Local Government Area (LGA). This Part applies to all development applications (DA) with a value less than $50,000 and should be read with relevant Parts of WDCP 2010.

1.1 Objectives of this Part

(a) Improve energy efficiency of alterations and additions;
(b) Assist in providing solar access information and resources;
(c) Foster partnerships between government and private industry;
(d) Form a single comprehensive and integrated set of performance standards for solar access; and
(e) where optimum passive solar design principles cannot be achieved, ensure maximum energy efficiency is maintained.

1.2 SEPP (Building Sustainability Index: BASIX) 2004

The State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 supersedes controls within an LEP or DCP. Where a development control for a residential proposal results in a reduction of energy use and potable water consumption for single dwelling, dual occupancy (and other Class 3 buildings), multi-unit development and alterations and additions (with a value above $50,000).

2.0 SUBMISSION REQUIREMENTS

2.1 What to submit with a Development Application

Table 1. Council's information requirements.

Land use / activity	Details to be provided
Single dwellings (see Section 4) and Major Alterations and Additions	• Site Solar analysis and Shadow Diagrams • True solar north point and Floor plan layout • Passive solar and cross-ventilation elements • Window areas and shading elements • Water heating system specs and rating • Construction materials and colours • Mechanical ventilation and Water saving devices
Alterations and additions	• (Site analysis - not required for minor ground additions)
Additions to heritage items (see Section 5)	• Colour schemes, materials sensitive to heritage building
Medium density (see Section 5)	Solar setback line, where applicable • Dwelling landscaping plan
Multi-unit buildings (see Section 7)	(For Medium Density)

2.2 How to determine compliance

Compliance is determined on an application satisfactorily achieving the intent and performance criteria in the relevant sub-sections. Compliance ratings are presented in Table 2.

Table 2. Minimum Compilation Requirements.

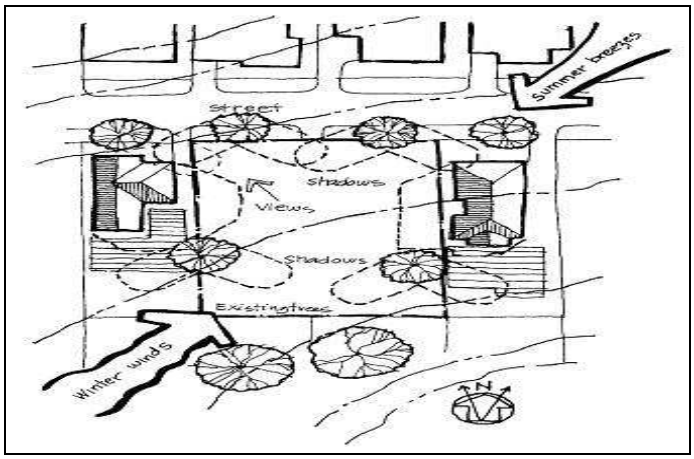
Land use	Requirements
Medium density and attached dwellings (see Section 6)	80% of all lots shall be orientated such that solar collectors face between 20° West of North and 30° East of North . (Note: This applies to developments with a site area larger than 1 hectare and/or developments which contain 5 or more building allotments).

2.3 Site Analysis

Where solar access is constrained, a site analysis is required to be submitted. Site analysis involves consideration of environmental factors to the site that will influence the site and the proposal (see Figure 1).

A typical site analysis diagram will include:

- Physical characteristics of the site;
- Site context, such as adjacent buildings or structures affecting the site, relationship of the site to the street, identification of key features (views, orientation, etc);
- Overshadowing caused by existing buildings;
- The orientation of true solar north, and a range of 30 degrees east and 20 degrees west of true north;
- Trees on, or affecting the site, identifying location, type, size and condition; and
- Prevailing seasonal winds, sun and shade characteristics.



3.0 SOLAR ACCESS

3.1 Background Principles

Design for solar access can begin with the design of a subdivision, but it may also relate to a rooftop solar hot water system panel or might involve preserving sunlight for the northern windows of a dwelling. If dwelling lots are designed to maximise solar access, energy efficiency is

much easier to achieve in the design of the dwellings. However, conflicts can arise in already developed areas.

Site analysis is an important aspect of maximising solar access to developments and minimising impacts.

Shadow diagrams for winter solstice at 9:00am, 12 noon and 3:00pm must be submitted for all developments that have the potential to impact the solar access of an adjoining property (see Section 2).

3.2 Submission Requirements

Intent

To preserve solar access to north facing 'solar collectors' (such collectors include windows, photovoltaic cells, solar hot water/air panels, clerestory windows etc.), private open space and clothes drying facilities in all residential development.

Performance Criteria	Possible Design Solutions
Solar collectors face between 20^o West of true solar North and 30^o East of true solar North and receive direct sunlight for 2 hours on June 21 as follows: • Full solar access is to be maintained to solar hot water or photovoltaic panels; • Two hours of direct sunshine is received by 50% of other north facing solar collectors designed/installed under this Part; • Sunlight is available to at least 40% of required private open space for at least two hours; and • New development will not reduce the solar access of collector/s of an adjoining property to less than two hours per day in mid- winter except solar hot water and photovoltaic panels, full access must be maintained.	• Design so that all north facing solar collectors have in front of them a volume bounded by an imaginary inclined plane, angled up at 30^o to the horizontal and two vertical planes 45^o either side of the centre-line which is clear of all shadow–forming objects such as trees, garages, neighbouring dwellings (refer to Figure 2). • Step building heights, plans and setbacks to permit solar access requirements. • In the absence of existing solar hot water panels provision must be made for future installations. • Position solar collectors in areas where no shadows fall (determine through site analysis).

Figure 1. Site Analysis: Factors for Consideration.

3.3 Subdivision

(a) Orientation and topography suitability Lots should be oriented so that one axis is within 30 degrees east and 20 degrees west of true solar north (refer to Figure 3). North-facing slopes improve opportunities for solar access; small lots are best suited to north-facing slopes with gradients of less than 15% (or 1:9). South-facing slopes impose a penalty on solar access; large lots/lowest densities are therefore best suited to south-facing slopes (refer to Figure 3).

(b) Lot size and shape Sloping sites are suitable for medium to large lots only.

(c) Access Footpaths are designed to access public transport

routes. Subdivision design include clearly marked bicycle network; kerbside bike lanes, dedicated cycle ways, links to regional cycle ways.

(d) Setbacks Variable setbacks and zero lot lines are a means of maximising solar opportunity, especially with small or narrow lots. Setbacks are to maximise solar access (refer to Figure 4).

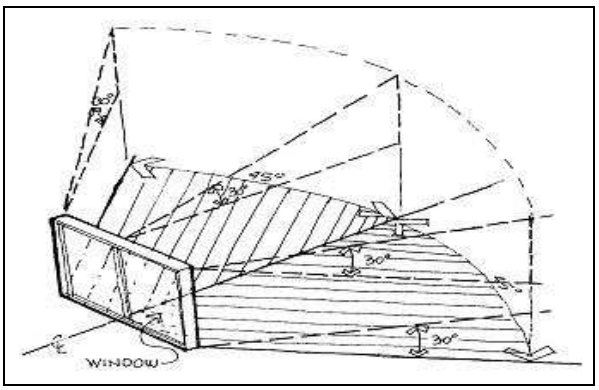


Figure 2. Desired Solar Access for Solar Collectors: Area to be free of shadow forming objects.

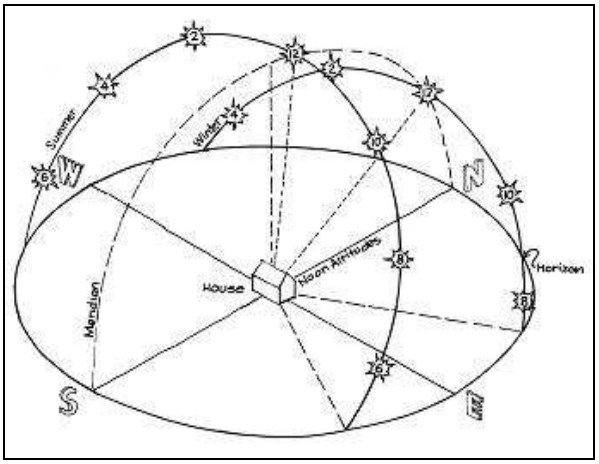


Figure 3. Variations in the sun's path during the year.

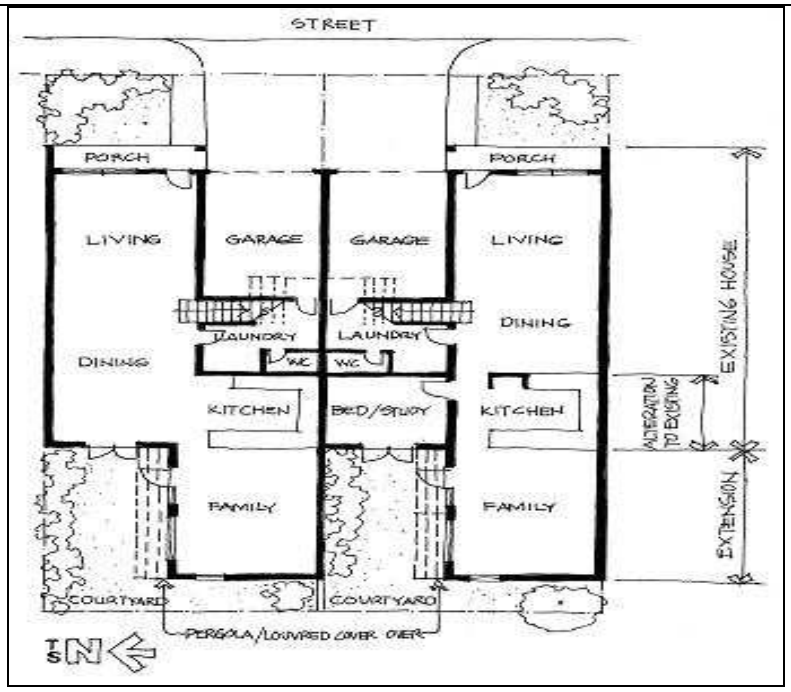


Figure 4. Variable Setbacks and Solar Access.

3.4 Urban Design and Landscaping

Intent

Ensure streetscape components do not detrimentally affect solar access to individual dwellings (see Figure 5).

4.0 SINGLE DWELLINGS

4.1 Background Principles

An energy efficient dwelling is, in effect, passive solar by design, and minimises household energy needs for the provision of services. Passive solar design principles achieve these effects by combining and balancing the effects of building and window design, orientation and shading, insulation, thermal mass and ventilation to create naturally comfortable thermal interiors.

4.2 Orientation and Solar Access

Provide solar access in accordance with Section 3 (see Figure 6).

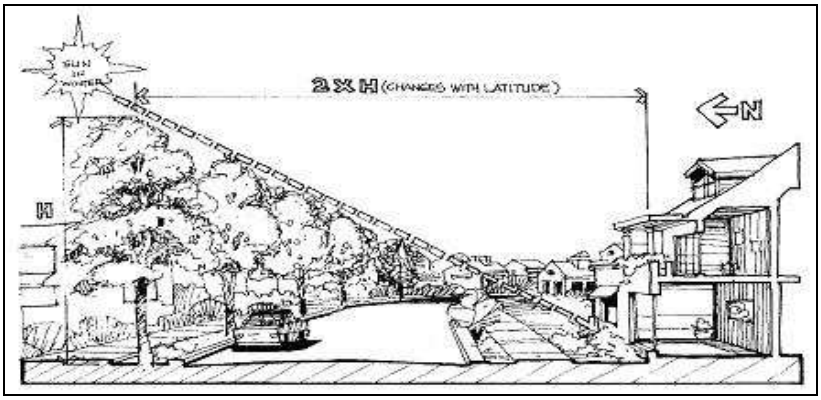


Figure 5. Streetscapes: basic principles for tree planting for selective shading, summer and winter.

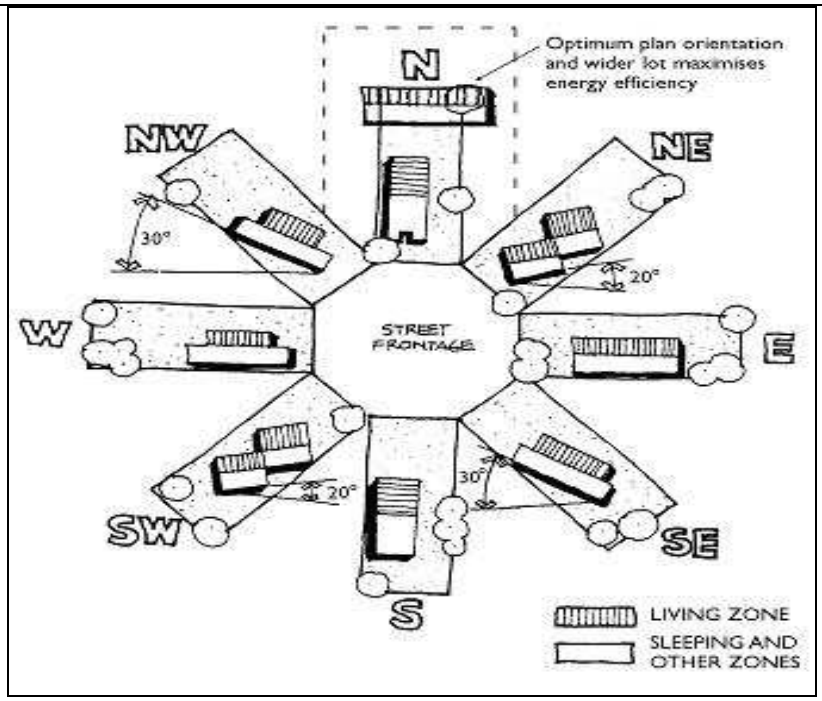


Figure 6. Solar access, orientation and floor plan layout principles relevant to True Solar North.

5.0 ALTERATIONS AND ADDITIONS

5.1 Background principles

An energy efficient alteration or addition employs passive solar design to maximise comfort and minimise household energy needs for services.

5.2 Solar Design and Access

Passive solar design maximises thermal comfort in those areas of a dwelling that are most heavily used, generally the living areas. Where possible principles of orientation (ie. major windows of extensions facing between 30 degrees east and 20 degrees west of true solar north) should be observed (refer to Figure 7). Figure 8 shows a day lighting design solution for dwelling with poor solar access.

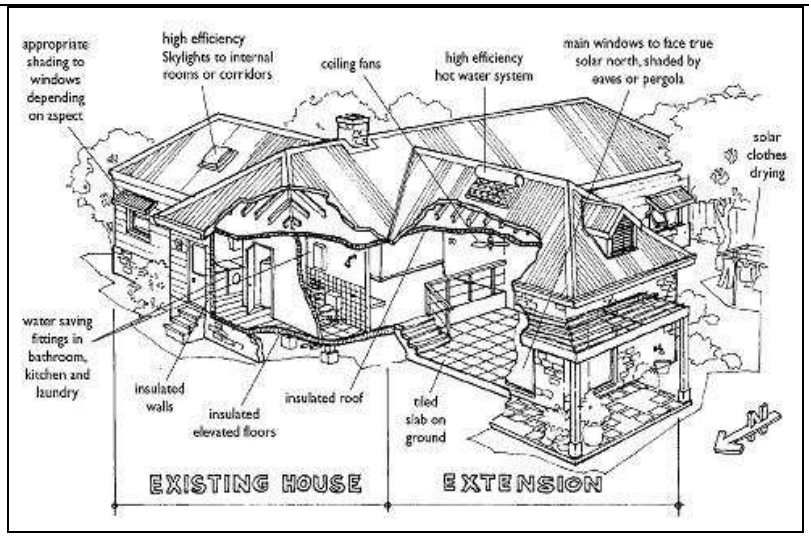


Figure 7. Principles for energy efficient alterations and additions.

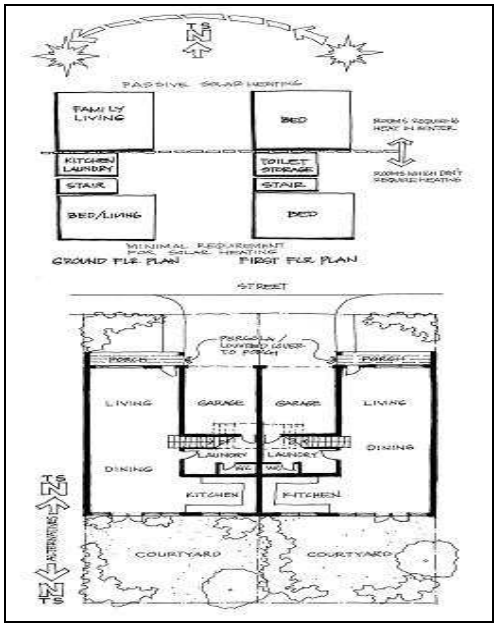


Figure 8. Orientation of zones within a dwelling for maximum solar access

6.0 MEDIUM DENSITY AND ATTACHED DWELLINGS

6.1 Background Principles

Developments should use passive solar design to maximise comfort and minimise household energy needs for the provision of services, such as lighting and space heating in winter and cooling in summer.

7.0 MULTI-UNIT RESIDENTIAL BUILDINGS

7.1 Background Principles

Multi-unit buildings are usually on larger blocks and may therefore have the flexibility to be oriented toward true solar north. Refer to Section 8.0 for controls.

8.0 GENERAL CONTROLS

8.1 Urban Design and Landscaping

8.1.1 Background Principles

Streets and public spaces in a subdivision can be designed to contribute to solar efficiency, chiefly through the selection and location of trees. Trees can also be used as wind breaks, many evergreen species are ideal for this purpose provided that the potential conflicts between species and solar access are considered. There are potential conflicts between the principles of ESD, biodiversity and the use of non-indigenous deciduous trees which require managing of leaf drop issues.

8.2 Subdivision Design and Multi-unit Development

8.2.1 Background Principles

Maximise dwelling allotments which have good solar access.

8.2.2 Performance Criteria

(a) 80% of all lots shall be orientated such that solar collectors face between 20^{o} West of North and 30^{o} East of North (this applies to developments with a site area larger than 1 hectare and/or developments containing 5 or more building allotments).

(b) Building allotments are of a suitable shape to provide solar access to dwellings and private open space.

8.3 Private Landscaping

8.3.1 Background Principles

Landscaping principles for dwellings are based upon the location and species selection of trees. Trees will influence solar access, shade and shadows, provide wind breaks, and channel or deflect breezes. For further information, contact Council's Park's and Garden's section.

8.3.2 Performance Criteria

Achieve landscape design that does not inhibit the energy and solar efficiency of individual dwellings.

Performance Criteria	Possible Design Solutions
Specific areas of a dwelling are targeted to receive sunlight in winter (Living rooms as a minimum), shade in summer through locations and types of trees. Landscaping is used to protect and channel breezes	▪ Deciduous trees should be planted to the north of the dwelling. ▪ Tall cylindrical-shaped trees in row plantings are ideal for shading low-angle sun on the eastern and western sides of a dwelling. ▪ Consider use of mature trees that do not cast a shadow over solar collectors. If evergreens are planted within the northern quadrant, they should be spaced well away from the dwelling so as not to block the winter sun. ▪ Variations in mature heights of different species of trees should be taken advantage of shading walls / windows. ▪ Consider including courtyards sheltered by vegetation.

8.4 Space Heating and Cooling

8.4.1 Background Principles

If a dwelling is designed to optimise its passive solar potential, it is possible to all but eliminate the need for fuel-based space heating or cooling.

8.4.2 Performance Criteria

(a) Dwelling design should eliminate or reduce the need for fuel-based heating or cooling (ie. through orientation, insulation, shading, thermal mass, ventilation etc.) and ensures that any mechanical heating or cooling will be energy efficient and minimise generation of greenhouse gas.

(b) The use of solid fuel heating in all new dwelling designs is prohibited.

8.5 Other Information

The same principles apply as for heated swimming pools as for domestic water heating, insulate to reduce energy needed to maintain water temperature, reduce losses and use sustainable energy sources such as solar heating for water heating. Heated swimming and spa pools should be kept covered when not in use.