

8.13 PLANNING SCHEME POLICY 13 - SUSTAINABLE DEVELOPMENT

8.13.1 INTRODUCTION

This policy is intended to take broader sustainable principles and translate them into ‘policy positions’ strongly suggested for adoption in the design and construction of proposed developments. The policy also sets out ways in which to achieve the requirements regarding sustainable building design in each of the development codes. The following priority areas are addressed in this policy:

- Water Sensitive Urban Design;
- Energy;
- Waste;
- Materials;
- Healthy Buildings;
- Transport / pedestrian movement;
- Education; and
- Operation and monitoring.

Where applicable, consideration should be given to engaging a Green Star Accredited professional as part of the design team prior to commencing schematic design to co-ordinate integration of these and additional sustainability issues.

8.13.2 WATER SENSITIVE URBAN DESIGN

Investigate all opportunities to reduce the mains potable water reticulated into the site and from the site in standard drainage systems through preparation of integrated water management strategy for the development. It should consider:

- Preservation of waterways;
- Rainwater;
- Stormwater;
- Grey water; and
- Water conservation fixtures, fittings and appliances.

WATER SUPPLY	
Provide an independent water supply to minimise demand on mains potable water.	Rainwater: Harvest rainwater from roofs in accordance with Council guidelines for treatment and re-use in potable and non-potable uses. This may include: • Air conditioning cooling towers; • Amenities: toilets, washing machines, bathrooms; • Industrial cleaning equipment; • Machinery lubricant and coolant; • Carpet cleaning or other services requiring large amounts of water; • Restoring and maintaining wetlands; • Landscape irrigation; and/or • Vehicle and boat washing facilities.
	Stormwater: Collect stormwater runoff from hardstand areas into storage tanks or

WATER SUPPLY	
	detention basins and treat for re-use in non-potable uses such as: • Cleaning ; • WC flushing; and/or • Irrigation.
	* Greywater: Separate and treat greywater for non-potable uses such as: • Cleaning; • WC flushing; and/or • Irrigation. <i>*Greywater use is subject to approval by BCC or RCC.</i>
WATER CONSERVATION	
Install water conservation fixtures, fittings and appliances to minimise water consumption.	• Minimum 4 star WELS rated appliances: dishwashers, washing machines; • 4 star WELS rated flow restricted showerheads; • Minimum 4 star WELS rated taps to basins and sinks; • Tap control options such as spring loaded taps, time flow taps or infrared taps (note that infra red requires energy to operate); • Water efficient urinals such as 2.8L flush, infrared controlled urinals or waterless urinals; • Minimum 4 star dual flush toilet cisterns with 3/6L flush; • Trigger nozzles to hoses for general outdoor uses, such as truck or car washing to control water flow; and • Investigate water pressure limiting to mains supply to minimise water leakage and associated maintenance issues. Water pressure limiting systems should not hinder fire protection water pressure requirements.
Provide water meters to manage water consumption.	• Water meters to monitor and manage water consumption for all major water uses; and • Water use monitors linked to building management system (BMS) to provide a leak detection system.
Re-use water from fire protection system tests.	• Provide temporary storage for fire protection system test water and allow for re-use; and • Design vehicle washing areas to enable reuse of water. Provide porous pavements or design to allow runoff to drain into a collection, treatment and re-use system.
Irrigation systems used in the development incorporate water-wise systems and techniques.	• Design irrigation systems to: • Use water captured from rainwater harvesting systems or stormwater run off; • Have timers and soil moisture sensors to avoid water wastage; and • Use sub-surface irrigation techniques.
STORMWATER	
Provide effective management of stormwater quality.	• Minimise use of impermeable hardstand pavement to allow stormwater to soak into soil; • Design non-operational areas with porous pavements or landscape elements; • Direct runoff from paved areas to landscape areas, soak

STORMWATER

	away/infiltration trenches, or stormwater collection and re-use system; and • Treat stormwater runoff on-site by use of devices such as pollutant interceptors, settling ponds, grass swales and detention basins.
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8.13.3 ENERGY

Where applicable, investigate obtaining a minimum predicted 4 star rating for energy use in commercial office components of the building using the Australian Building Greenhouse Rating (ABGR) scheme. www.abgr.com.au

ENERGY SUPPLY

Alternative supply: Increase the use of renewable energy sources as an alternative to greenhouse intensive non-renewable fuels.	• Investigate non-standard renewable energy options in terms of technical and economic feasibility as well as environmental and marketing benefits; • Investigate gas-based cogeneration whereby on-site power generation and heat production are achieved simultaneously from the same raw energy source; • Investigate the feasibility of grid connected photovoltaic power generation: • Integrate photovoltaic panels into the fabric of the building to reduce additional costs and materials. • Connect photovoltaic system to the grid to avoid requirement for battery storage. • Investigate solar power for independent systems such as: • Hot water systems. • Pumps for water reticulation from storage tanks. • Landscape lighting. • Investigate use of LP gas: • Cooking. • BBQs. • Hot water system. • Petrol-engine forklifts and other vehicles (converted or manufacturer supply). • Investigate the use of commercial biofuels (eg Biodiesel and Ethanol) in vehicles either wholly or blended with petroleum-derived fuel; and • Investigate purchase of GreenPower™ for some electricity supply.
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ENERGY CONSERVATION

Passive Thermal Design: Design buildings to maximise thermal performance and comfort, and minimise the energy use of Heating Ventilation and Air-Conditioning (HVAC) systems.	Orientation • Facilitate passive thermal design with simple long, narrow, rectilinear forms and building layout, including simple roof forms to maximise solar access for natural light and heating as well as cross ventilation. Where possible design buildings with longer north and south elevations and shorter east and west elevations. Solar access and shading • Provide adequate eaves and/or external shading devices to all glazed areas, designed to prevent summer sun, but allow winter sun to enter the building; • Provide glazing with a low Solar Heat Gain Coefficient to all air-conditioned areas to reduce summer heat gain. Be aware that this
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ENERGY CONSERVATION

may make the space cooler in winter;

- Plant shade trees on the west and east of all buildings to shade walls and windows from low angle morning and afternoon sun;
- Design shading devices to suit the orientation (East and west elevations require some screening over the sides) face of windows to prevent low angle summer rising and setting sun. The North elevation requires only awnings over because the sun is high in the sky. South elevations may require awnings over with vertical fins on the east and west sides to prevent low angle rising and setting sun from the South East and South West;
- Design glazing size and location to minimise heat gain in summer and heat loss in winter:
- Provide fewer windows on the east and west elevations. Too much unshaded glass on the East and West can cause heat load problems resulting in high air cooling costs;
- Provide shade to solid surfaces such as walls, driveways and car parking areas to minimise the amount of glare and heat reflected or absorbed and re-radiated. Consider planting trees or building shade structures.

Insulation

- Install reflective sarking or foil-backed insulation under metal roofs to reflect heat and provide a moisture barrier to condensation forming under the roof;
- Provide insulation to roof, ceiling and external walls;
- Provide air seals to all doors and windows to external / un-air conditioned spaces to prevent heat gain to interior;
- Consider specialist insulative coatings for roofs to improve the thermal performance of steel sheeting; and
- Masonry walls such as concrete block or tilt slab walls have greatly improved thermal performance when external insulation is applied. This may be preferred to internal insulation for some work spaces.

Colour

- Roofs: use light colours to reflect heat;
- Facades: Use light colours to reflect heat. Unpainted concrete is not preferred.

Ventilation

- Include roof ventilation systems, such as perforated eaves and/or roof ventilators;
- For non air-conditioned spaces include provision for natural ventilation;
- For air-conditioned spaces include a fresh air cycle for mild temperature days and a heat exchanger between exhaust conditioned air and fresh air for hotter and colder days; and
- For air-conditioned spaces ensure entry/exits either install automatic sliding doors or have double-door air locks to reduce loss of heated or cooled air.

Note: Ventilation may conflict with indoor acoustic considerations and may not be appropriate in some noise-affected locations.

Mass of building materials

Heavy weight / mass materials store and release heat energy stabilising internal temperatures and function as follows:

- During summer: Shaded mass materials inside the building absorb heat out of the air and provide cooler indoor temperatures; and

ENERGY CONSERVATION	
	- During winter: Mass materials inside the building receiving sunlight absorb the heat and release during the evening maintaining warmer indoor temperatures. The benefits of mass materials are only achievable in internal areas that are exposed to sun during winter. In large commercial buildings these areas can be very limited and using hard floors throughout instead of carpet is often not appropriate for acoustic and aesthetic reasons: - Locate mass materials in areas where they will be most effective eg. lunch rooms where people relax and congregate; and - All ground level floors are preferred to be slab-on-ground with minimum area carpeted.
Energy Efficient plant and Equipment: Heating Ventilation and Air-Conditioning (HVAC) systems are designed to meet the building performance requirements, while minimising energy use.	- All equipment must be properly maintained to stay operating efficiently; - Only air-condition those spaces that require heating and cooling; - Install air-conditioners less than 10kW_r with minimum cooling Star Rating of 4.5; - Install air-conditioners between 10kW_r and 65kW_r with Energy Efficiency Ratio (EER) equal to or greater than 3.0 with Coefficient of Performance (COP) equal to or greater than 3.3 (see www.energyrating.gov.au); - Insulation and sealing to air conditioning pipework and ducts must comply with BCA Specification J5.2; - Air-conditioning systems provide for either 'mixed modal', 'economy' or 'night flushing' operation; - Heat recovery systems are installed with air-conditioning systems to pre-heat water; - Ensure that the air conditioning system is on a timer set to when the most staff are in the office and switches off outside these times. Enable manual switching for smaller zones outside these times; - Control temperature in zones – zones near glazing having different temperatures to internal zones; - Set air conditioning to a wider temperature range to minimise the cooling energy required; and - Change temperature settings in summer and winter to align more closely with outdoor temperatures (warmer in summer and cooler in winter).
Energy Efficient Lighting: Design buildings to maximise the use of natural light and minimise energy use for artificial lighting, whilst meeting lighting performance standards required for each area.	Natural Lighting - Translucent roof sheeting materials are used to increase infiltration of natural light; - Investigate using skylights to light dark internal areas. Ensure they allow light without heat; - Paint interiors in light colours – dark colours absorb light, increasing the amount of lighting needed; and - Where natural lighting is employed to any part of a building (including near windows), artificial lighting to the same area shall be controlled by ambient light sensors to minimise operation when there is sufficient daylight. Efficient electrical lighting - All internal and external lighting must comply with BCA Part J6;
Energy-efficient water heating.	Energy efficient hot water system: - Efficient LP gas instantaneous, - Electric heat pump,

ENERGY CONSERVATION	
	• Solar hot water systems with electric or LP gas boost. • Hot water systems designed to take advantage of waste heat flows from other energy services for heating eg the air-conditioning system; • Insulate hot water pipes; and • Heat trace system to maintain water heat in the water pipe to reduce heat lost while water sits in the hot water pipe between the heating system and the tap.
Energy efficient appliances and equipment.	• All equipment must be properly maintained to stay operating efficiently; • Select equipment that meets the National Minimum Energy Performance Standards (MEPS, see www.energyrating.gov.au), including: • Refrigerators and freezers; • Mains pressure electric storage water heaters; • Small mains pressure electric storage water heaters (<80L) and low pressure and heat exchanger types; • Three phase electric motors (0.73kW to <185kW); • Single phase air conditioners; • Three phase air conditioners up to 65kW cooling capacity; • Ballasts for linear fluorescent lamps; • Linear fluorescent lamps – from 550mm to 1500mm inclusive with a nominal lamp power >16W; • Distribution transformers – 11kV and 22kV with a rating from 10kA to 2.5MVA; • Commercial refrigeration (self-contained and remote systems); and • External power supplies. • Select office and entertainment equipment that meets the National Energy Star requirements (see www.energyrating.gov.au): • Copiers; • Computer and monitors; • Printers and fax machines; • Scanners; • Consumer audio and DVD; • MFDs – Multifunction Devices; and • TVs and VCRs.
Metering, timers and sensors for efficient use of all systems.	Provide sub-metering to monitor lighting, air-conditioning and any large electrical uses separately; • Specify sensors or timers on lighting to turn off automatically when the room is out of use; • Locate meters in a highly visible and frequently used area. They need to show current period and previous energy use and associated cost of that use; and • Consider having meters accessible by utility providers to provide remote readings to reduce the need for utility staff to take manual readings.

8.13.4 WASTE

WASTE	
Minimisation: Development minimises waste generation.	- Specify materials and products with less packaging and/or bulk deliveries to minimise packaging; - Use standard size materials; - Use materials that can be delivered cut to length to minimise on-site cutting and waste; - Specify that suppliers of construction materials are required to take back any excess materials delivered to site; and - Use supply and fix contracting agreements to encourage sub-contractors to take responsibility for the amount of materials used and the resulting waste.
Re-use: Development incorporates waste re-use measures.	Building design and layout incorporates features that enable the building to be easily modified to suit other uses, as well as maximise the opportunities for recycling building materials during demolition.
Recycling: Development incorporates waste recycling.	- Waste recycling facilities are sized appropriately for the development and are indicated on all plans; and - Waste facilities are easily accessible by building users and service vehicles of sufficient capacity to service the development.
Waste Management Plan.	- An Operational Environmental Management Plan is prepared for the development site to address recycling issues in accordance with the Environmental Management Plan policy; and - A waste-recycling program is implemented during construction to separate wood, metal, glass, plastic and cardboard from other waste, and a designated person is responsible for on-site construction waste management.

8.13.5 MATERIALS

MATERIALS	
Development maximises the use of plantation or recycled timber.	- All timber used in the development is sourced from certified plantations, thereby excluding the use of rainforest and old growth timbers; - The use of recycled timber is maximised; and - Low-toxic or no timber preservative treatments are used; for example, using pine treated with ammoniacal copper quaternary (ACQ) rather than with copper chromium arsenate (CCA).
Development utilises systems, products and services that capitalise on reduced embodied energy and recycling.	- Materials are sourced locally where possible to minimise energy consumption from transport; - Back-fill aggregate with recycled content is used; - Concrete with fly-ash content greater than 20% is used, particularly for non structural components; - Carpet finishes and underlay containing recycled content is used; and - Recycled materials are used where possible eg timber, crushed concrete and cleaned bricks.

8.13.6 HEALTHY BUILDINGS

HEALTHY BUILDINGS	
The development provides a high level of ventilation with clean outside air.	- Indoor air quality meets the Australian Standard 1668.2-1991 for mechanical ventilation for acceptable indoor air quality, where indoor air quality is maintained by introducing adequate amounts of outside air into the system; - Air filters are installed in ventilation systems to remove particulate contamination; and - The Australian Standard 3666-1989 for air handling and water systems of buildings – microbial control, is consulted to provide recommendations for control of microbial contamination of air systems, by microbiological agents such as Legionella spp.
Development is managed to ensure that a high standard of indoor air quality is achieved and maintained.	- Materials and practices that may impact on air quality are investigated and appropriate mitigation systems established; - Specify products and materials with low or no VOCs. (Examples of such compounds include aromatics, ketones, halogens, esters, alcohols, aldehydes, epoxies, aliphatic hydrocarbons and formaldehyde.) Products where VOC's can be avoided include: - floor finishes (use linoleum instead of vinyl); - paint finishes; - carpets; - adhesives. - Where possible avoid joinery and furniture containing urea formaldehyde glues. Where formaldehyde is used ensure it is phenol formaldehyde with an emission category not exceeding E1; - Insect and pests are prevented entry to buildings by mechanical means or sealing and caulking rather than chemical means. This includes external doors, hallway doors and points of entry and opening windows; - Avoid specification of PVC products such as waste water pipes, conduit and cables where possible; - Avoid use of PVC for plumbing drainage pipes and specify High Density Poly Ethylene (HDPE) where possible; - Avoid insecticide sprays for white ant protection. Use physical barriers, visible slab edges and Termi-mesh. Educate staff and develop a simple inspection / management plan; - Minimise reliance on synthetic materials made from petrochemical derivatives; and - Establish set limits for toxic emissions from materials, finishes, and furnishings to help guide selection and specification processes.
Indoor environments are designed to optimise occupant health, satisfaction and productivity.	- Promote office employee communication and interaction with workstation partitions that are no higher than 1.5 metres high. This also encourages natural ventilation and light; - Utilise natural indoor plants throughout the office to improve indoor air quality and aesthetics; - Office interior layout promotes the infiltration of natural sunlight and air, as well as employee communication and interaction; and - Floor surfaces are slip-resistant and easily cleaned.

8.13.7 TRANSPORT / PEDESTRIAN MOVEMENT

TRANSPORT / PEDESTRIAN MOVEMENT	
Development assists in minimising Vehicle Kilometres Travelled per staff member.	- Public transport incentives are promoted; - Staff car sharing schemes are supported; - Footpaths are provided at those facilities where there is a requirement to facilitate access to adjacent land uses (eg retail facilities, bus stops etc); and - Bikeways are encouraged, provided for and integrated with existing paths.

8.13.8 EDUCATION

EDUCATION	
Development assists in educating occupants and visitors about the incorporated sustainability features.	- Where appropriate, provide interpretive information on the sustainability features incorporated in the building to promote occupant education and awareness. This may take the form of: - Interpretive signage; - Information booklets or brochures; and - Building user guides for occupants explaining how the sustainability measures work and what they achieve.

8.13.9 OPERATION AND MONITORING

OPERATION AND MONITORING	
Incorporate sustainable purchasing policies.	A sustainable purchasing policy is determined for the development, which stipulates the purchase of sustainable products over standard products, for example, use of recycled paper, energy-efficient replacement lamps, and 'Energy Star' rated office equipment.
Monitor metering systems for ongoing improvement.	Provide an ongoing monitoring strategy for all meters and establish consumption targets. This will enable water and energy use to be accurately tracked and understood by occupants and ongoing use to be controlled and reduced to meet targets.