

GENERAL BUILDING DESIGN AND SUSTAINABILITY

Introduction

- 23.1 Social Impact
 - 23.2 Green Buildings
 - 23.3 Sustainability of Building Materials
 - 23.4 Materials and Finishes
 - 23.5 Roof Terraces and Podiums
 - 23.6 Building Services
 - 23.7 General Acoustic Privacy
 - 23.8 General Visual Privacy
 - 23.9 Construction, Demolition and Disposal
- 23R References**
- 23R.1 Examples of ESD Measures

INTRODUCTION

This Part guides development in meeting the and objectives within KLEP. This Part applies to all development types whether or not it is individually specified in *Section A of this DCP*. It also supplements the objectives and controls for each development type in Section A and should be read with the section on Building Design and Sustainability for the relevant development type.

Each section within this Part applies to a range of development types, and some sections to all development. It provides a consistent area wide approach to issues that developments are to address. These issues include, but are not limited to, various aspects of sustainability, amenity and quality streets and public areas.

23.1 SOCIAL IMPACT

Objectives

- 1 *To ensure that development minimises adverse social impacts.*
- 2 *To ensure that social considerations are an integral part of development proposals.*

Controls

- 1 Proposals are to consider the impacts of the development on nearby residents and users of the site.

Where relevant, particular attention is to be paid to:

- Children;
 - Young people;
 - Women;
 - Older people;
 - People with a disability;
 - People from culturally and linguistically diverse background;
 - Aboriginal and Torres Strait Islander people.
- 2 A Social Impact Statement will be required in the case of proposals which are likely to have a significant social impact because they are likely:
 - i) To contribute to social inequity;
 - ii) To increase risk to public safety; or
 - iii) To threaten the existing sense of community identity or cohesiveness.

Note: Council may require a social impact statement (SIS) by an appropriately qualified and experienced social impact practitioner. Council will consider the scale of the development and the extent of potential adverse impact (geographically and over time) in determining the need for an SIS. Examples of developments that may require an SIS include major retail centre, major health or education institutions, sex services premises, pub, entertainment facility, late night trading venue, hazardous or offensive uses; strata subdivision of a low rental residential building (of 6 or more dwellings).
 - 3 A Social Impact Statement is to:
 - i) Support socially responsible development and decision-making, contributing to the determination of best policy or development alternatives;
 - ii) Acknowledge the values of different sectors of society;
 - iii) Assess the distributional equity of impacts in regard to both intra-generational equity and inter-generational equity;
 - iv) Identify impacts that are directly related to the proposal (demonstrate the connection between the intervention and the likely impact);
 - v) Address how net social benefit can be enhanced through the proposal and how negative social outcomes can be ameliorated and managed through mitigating and monitoring measures; and
 - vi) Demonstrate rigour and a social science base in presenting evidence for the assessment and recommendations.

Note: See Council's Social Impact Assessment Policy for more detailed guidelines, available on Council's website (www.krg.gov.au).

23.2 GREEN BUILDINGS

Introduction

This section applies to the following new buildings and alterations/additions:

- offices under 1,000sqm;
- hotels, motels, serviced apartments with less than 100 rooms;
- all other non-residential development, including non-residential components of mixed-use buildings.

This section does not apply to development that is required to comply with:

- State Environmental Planning Policy (Sustainable Buildings) 2022

All non-residential development (listed above) must incorporate ecologically sustainable design measures, and achieve Green Star rated buildings to Green Building Council of Australia (GBCA) standards as required in 23.2 (3), (4), (5).

This will enable buildings to comply with the ongoing mandatory performance ratings required under the Building Energy Efficiency Disclosure Act 2010 (refer to the website for details: www.cbd.gov.au.)

The Green Building Council of Australia (GBCA) has developed the following rating tools:

- *Green Star Buildings*: for all building types;
- *Green Star Communities*: for projects at the neighbourhood, precinct or community scale;
- *Green Star Interiors*: for interior fit-outs in buildings including offices, hotels schools and shops;
- *Green Star Homes*: for assessing the health, resilience and energy efficiency of homes;
- *Green Star Performance*: for the operational efficiency of existing buildings.

Except for development mentioned in the State Environmental Planning Policy (Sustainable Buildings) 2022 (offices with more than 1,000sqm GFA, and hotels, motels, serviced apartments with more than 100 rooms), all non-residential buildings with a total GFA above 2,000sqm are required to obtain Certification under the GBCA *Green Star Buildings* rating tool. This is to ensure the design and construction of buildings deliver a sustainable structure, architecture and performance,

Where developments involve large master planned sites, use of the *Green Star - Communities* rating tool is encouraged. Where large interior refurbishments are being undertaken, the use of the *Green Star - Interiors* rating tool is encouraged.

The GBCA *Green Star Buildings* rating will entitle the developer, architect and team to publicise their building as Green Star rated early in the design development stage (via the 'Design' portion of the Certification) and for the life of the building (via the 'As Built' portion of the Certification). In addition, the building will receive publicity and marketing through the GBCA and Ku-ring-gai Council's media. Council and GBCA will also publicise developments that achieve ratings under the *Interiors*, *Communities* and *Performance* rating tools.

23.2 GREEN BUILDINGS (continued)

Objectives

- 1 *To ensure that development minimises the use of non-renewable energy resources and water consumption.*
- 2 *To utilise an integrated sustainability assessment tool for gauging building sustainability.*
- 3 *To develop green buildings that incorporate innovative design, construction and operational practices that significantly reduce, or eliminate, the negative impact of development on the environment and building occupants.*
- 4 *To ensure commercial buildings deliver lower operating costs from reduced energy and alternative resource consumption, and so represent better life cycle value.*
- 5 *To ensure that all non-residential buildings consider and incorporate Ecologically Sustainable Design (ESD) systems and measures.*

Controls

General

- 1 All new non residential developments are to include Ecologically Sustainable Design (ESD) measures in the following areas, and list them under these titles in the required ESD report and checklist:
 - i) Water Efficiency:
 - provide systems to minimise mains water usage.
 - ii) Energy Generation:
 - building design is to demonstrate a reduced reliance on mains power and provision of alternate energy sources.
 - iii) Heating and Cooling:
 - use of mechanical air conditioning and heating is to be minimised. Where it is unavoidable, the systems are to be of a high efficiency in technology choice to reduce peak energy demand.
 - iv) Lighting:
 - buildings are to be designed to reduce the need for artificial light use.

Note: Refer to 23R of this Part for examples of measures of the above.

Note: This control does not apply to non-residential development assessed under the State Environmental Planning Policy (Sustainable Buildings) 2022.

Green Star Rating

Required Ecologically Sustainable Measures

- 2 This control applies to:
 - all new non-residential buildings, including alternations/additions, less than 2,000sqm GFA;
 - all non-residential components of mixed-use buildings with less than 2,000sqm GFA;
 - offices, including new buildings alterations/additions with less than 1,000sqm GFA;
 - hotels, motels, serviced apartments with less than 100 rooms, where the GFA is less than 2,000sqm.

The above development types are to provide the following documentation at Development Application (DA stage)

- i) Ecologically Sustainable Design (ESD) Report:
 - prepared by a GBCA Accredited Professional, verifying that the elements/systems included in the development will, in the view of that professional, result in buildings with an ESD level equivalent to a 4, 5 or 6 Star Rating under the GBCA *Green Star Buildings* rating tool.

23.2 GREEN BUILDINGS (continued)

Controls

- ii) Annotated Development Application (DA) Drawings:
 - clearly indicating the elements/systems described in the ESD Report, including the requirements in 23.2(1) of this section.
- iii) A signed Statement of Commitment from the applicant to develop and implement the elements/systems described in the ESD Report into the Construction Certificate (CC) stage and deliver elements/systems in the final built form.

Note: Applicants are advised to consult with a GBCA Accredited Professional at the onset of the design process to ensure the building supports ESD principles at the outset.

Refer to www.gbca.org.au for a list of Green Star Accredited Professionals.

Note: Approved DAs will have a *Condition of Consent* requiring the applicant to include the following documentation as part of their CC submission:

- i. An updated ESD Report by the applicant's Green Star Accredited Professional describing elements/systems incorporated to maintain the ESD principles that were approved at DA.
- ii. A Checklist Table of each ESD system/element included in the ESD Report to clearly state systems incorporated (refer to 23R.3 of this Part for example of Checklist);
- iii. Annotated CC Drawings clearly indicating elements/systems described in the ESD Report.

Required Green Building Council of Australia (GBCA) Certification

3 This control applies to:

- all new non-residential buildings with a GFA between 2,000sqm and 5,000sqm;
- all non-residential components of mixed-use buildings with a GFA between 2,000sqm and 5,000sqm;
- hotels, motels, serviced apartments with less than 100 rooms, where the GFA is between 2,000sqm and 5,000sqm;
- all alterations/ additions to existing non-residential buildings and existing components of non-residential buildings, where the proposed development has a GFA between 2,000sqm and 5000sqm.

The above development types must achieve 4 Star Green Star ('Best Practice') Rating under the GBCA *Green Star Buildings* rating tool.

4 This control applies to:

- all new non-residential buildings with a GFA of 5,000sqm or greater;
- all non-residential components of mixed use buildings with GFA of 5,000sqm or greater;

23.2 GREEN BUILDINGS (continued)

Controls

- hotels, motels, serviced apartments with less than 100 rooms, where the GFA is 5,000sqm or greater;
- all alterations and additions to existing non-residential buildings and existing components of non-residential buildings where the proposed development has a GFA of 5,000sqm or greater.

The above development types must achieve a 5 Star Green Star ('Australian Excellence') rating under the GBCA Green Star Buildings rating tool.

Note: Refer to 23R.2 of this Part for the Green Star Information Sheet.

Note: Refer to www.gbca.org.au for the latest version of the GBCA's Green Star Rating Tools.

- 5 Where 23.2 (3) and (4) apply, the development application (DA) must include the following documentation:
- i) Proof of registration of the proposal with GBCA for a *Green Star Buildings* Certification; and GBCA Certification of the 'Design' component of the Development Application;
 - ii) A signed Statement of Commitment from the applicant to implement and achieve Certification for both components of the *Green Star Buildings* rating tool.
 - iii) Ecologically Sustainable Design (ESD) Report prepared by GBCA Accredited Professional, stating the Green Star point distribution for the proposal, and the strategy, methods and systems proposed to achieve the Green Star rating, including the requirements in 23.2(1) of this section;
 - iv) Annotated Development Application Drawings clearly indicating the Green Star rating elements described in the ESD Report.
 - v) A signed Statement of Commitment from the applicant to retain their GBCA Accredited Professional and complete the formal GBCA Certification process and achieve Certification for both Green Star Designed and Green Star Certified under the Green Star Buildings rating tool.

Note: Approved DAs will have a Condition of Consent requiring the applicant to include the following documentation as part of their Construction Certificate submission:

- i. The GBCA Certificate of achievement of the *Green Star Buildings: Design component* demonstrating the development application will achieve the full *Green Star Buildings* certification as per the conditioned ESD report.
- ii. An updated Credit Summary and ESD Report describing elements/ systems incorporated to achieve the nominated Green Star rating;

Controls

- iii. A Checklist Table of each ESD system/element (refer to 23R.3 of this Part for example of Checklist);
- iv. Annotated Construction Certificate Drawings clearly indicating elements/systems described in the DA approved ESD Report including the requirements of 23.2(1) in this section;
- v. A copy of the letter and invoices from the GBCA to the applicant, confirming the project is registered and will progress to full certification under the *Green Star Buildings* rating tool.

Note: Approved DAs will have a Condition of Consent requiring the applicant to submit the completed and final GBCA *Green Star Buildings* Certification to Council prior to the release of the Occupation Certificate.

23.3 SUSTAINABILITY OF BUILDING MATERIALS

Objectives

- 1 To provide good indoor air quality.
- 2 To limit pollution and protect public health and comfort.
- 3 To select materials and products which minimise environmental impact throughout a building's life cycle
- 4 To reduce the consumption of natural and non-renewable, resources.
- 5 To ensure material selection has been equally driven by environmental sustainability, safety, commercial competitiveness and quality.
- 6 To promote use of materials and finishes that contribute to the design of innovative buildings.
- 7 To reduce urban heat island effects.



Figure 23.3-1
Recycled timber wall as a feature in the entry lobby.

Controls

- 1 Development proposals are to consider the following in the selection of building materials:
 - i) retain, re-use, recycle materials with:
 - low embodied energy such as sandstone and timber; and
 - high embodied energy such as brick and concrete.
 - ii) materials that come from renewable sources;
 - iii) materials that generate a lower environmental cost over time;
 - iv) materials with a low life cycle cost and/or high durability;
 - v) production methods with a low environmental impact;
 - vi) avoid large expanses of dark coloured materials that contribute to urban heat.

Note: Generally, non-recycled metals contain the highest embodied energy, followed by plastics and other materials with a high chemical content. Natural construction materials such as timber, brick and render contain the least embodied energy. To reduce the embodied energy of a typical building structure, specify:

 - i. metal produced from post-consumer waste
 - ii. concrete blends that include a percentage of recycled content (for example, cement extender including fly ash or blast furnace slag)
 - iii. concrete that incorporates recycled aggregate wherever possible
 - iv. the sourcing of locally produced materials and products
- 2 Where the use of timber is proposed, only FSC, AFS or PEFC certified timbers may be specified for construction or finishing. Medium Density Fibreboard (MDF) and particleboard is not to be specified as a construction material for the development.
- 3 The use of alternatives to PVC piping is highly encouraged including Colorbond (above ground only), and HDPE where appropriate.
- 4 The use of construction materials and chemicals with toxic components are to be avoided, to facilitate recycling and reduce pollution.
- 5 Structures are to be designed with physical, rather than chemical, termite measures. This can be achieved by:
 - i) appropriate materials and construction design;
 - ii) physical barriers;
 - iii) suspended floor systems.
- 6 Low Volatile Organic Compounds (VOC) are to be used throughout the building interior (carpets, paints, adhesives, sealants and all other finishes), and low emission building materials are to be used across the site.

23.3 SUSTAINABILITY OF BUILDING MATERIALS (continued)

Controls

- 7 Avoid the use of ozone depleting products and materials, or products and materials manufactured using ozone depleting substances must be avoided.
- 8 Materials likely to contribute to poor internal air quality, such as those generating formaldehyde, or those that may create a breathing hazard in the event of fire, such as polyurethane, must be avoided.

23.4 MATERIALS, COLOURS AND FINISHES

Objectives

Non-residential Buildings

- 1 To promote the use of high quality materials, finishes and colours for building facade articulation design and visual interest.
- 2 To ensure the use of materials, finishes and colours creates well proportioned facades and minimises the visual bulk.
- 3 To encourage the use of a subdued palette of colours and limited range of hues for building consistency across the LGA.
- 4 To deliver buildings with high quality materials and finishes that are durable and able to retain their aesthetic value over time.
- 5 To complement streetscapes natural environment and the high quality urban character of Ku-ring-gai.



Figure 23.4-1:
Photovoltaic cells integrated into the awning design.

Controls

Non-residential Buildings

- 1 Non-residential development must:
 - i) use heavy weight building materials with high thermal mass on roofs and/or walls. Where lightweight materials are used, with high R-value insulation is to be used;
 - ii) integrate photovoltaic cells which can be mounted as panels, or used as an integrated building cladding or sun shading.
 - iii) use light coloured internal finishes to improve internal reflectivity and minimise lighting use.
- 2 External walls are to be constructed of high quality and durable materials and finishes.

Note: Material and finishes selection is to be made in accordance with objectives and controls as stated in 23.3 of this Part to ensure low environmental impact.
- 3 Reuse or recycling of existing local materials such as sandstone and brick is encouraged.
- 4 Building facades must avoid large, unbroken expanses of any single material and/or finish, in particular rendered and/or painted finishes.

Note: Well-detailed and modulated face brickwork may be acceptable.
- 5 New development is to avoid extensive use of highly reflective or gloss materials on the exterior of buildings.
- 6 For buildings of 3 storeys and above:
 - i) a large expanse of sandstone or face brick is not to be used on the upper levels of the buildings;
 - ii) lightweight materials and finishes (eg. timber and copper/steel) are encouraged for the upper levels of buildings;
 - iii) use of colours that minimise the bulk and scale of upper levels of buildings are encouraged to assist in minimising the bulk and scale of the building.
- 7 The exterior finish material (e.g. sandstone or brick) must be integral to the overall building façade design and must not appear to be cosmetic. Rendered and/or painted finishes are limited to accent elements only, and must not be the primary finish.
- 8 Highly contrasting coloured bricks are to be restricted to building elements such as sills, window heads, string courses and to assist in the division of the building into bays.
- 9 Where louvres are used, they are to be an integral element in the building façade design (e.g. west facing windows).
- 10 Material selection is to demonstrate dual purpose solutions. For example, photovoltaic panels integrated with wall cladding, and utilised as shading devices for ground level and rooftop communal spaces. See Figure 23.4-1.

23.4 MATERIALS, COLOURS AND FINISHES (continued)

Controls

- 11 Where additions and alterations are proposed, external materials and finishes are to complement the existing building.
- 12 The selection of a colour scheme for new development and in the restoration of existing facades is to comply with the following guidelines:
 - i) Base colours for major areas of building façade are to be light in tone (eg. earth tone) with minimal colour intensity (or hue) eg. off white or grey colours. Larger expanses of bold colour, black and white are to be avoided, as these detract from the prominence of other façade details. Contrasting tints, tones and shades are to be restricted to small areas. See *Figure 23.4-3*.
 - ii) Highlight colours to window and door mouldings, string courses, parapet details and the like, are to be in sufficient contrast to the base colour. Strong colours to large sections of the building are to be avoided. Details are to be finished in a matt to semi gloss range. See *Figure 23.4-3*.
 - iii) Trim colours for window frames and awning fascias are to be a darker contrast to base and highlight colours. Window frames are to be finished in either a semi gloss or full gloss.
- 13 Natural earth tones and recessive colour tones are to be used on building facades in close proximity to bushland.
- 14 The use of corporate colours to identify a business name is to be limited to signage, and is not to be used as the main building façade colour.
- 15 Where buildings colours are representational of a company or brand, the colour scheme will be accepted by Council provided the built form has been designed to address the site attributes and constraints and the surrounding urban fabric. Stock standard building forms (representational of a company) placed onto a site regardless of the context will not be accepted.



Figure 23.4-2:
Accent colour on shading devices
to commercial building.

23.4 MATERIALS, COLOURS AND FINISHES (continued)

Objectives

Multi-unit Dwellings, Residential Flat Buildings and Mixed-use Buildings

- 6 *To ensure buildings are constructed using high quality materials and finishes that are durable and able to retain their aesthetic value over time.*
- 7 *To ensure built form is of high architectural standard and able to positively contribute to the streetscape.*
- 8 *To ensure the future character of dense built form continues to contribute to the Ku-ring-gai character.*

Controls

Multi-unit Dwellings, Residential Flat Buildings and Mixed-use Buildings

- 16 External building walls are to be constructed of high quality and durable materials and finishes with low reflectivity.

Note: Material and finish selection is to be in accordance with Part 23.3 to ensure low environmental impact.

Note: For controls relating to façade articulation refer to:

 - Part 6C.8 for Multi-dwelling Housing.
 - Part 7C.6 for Residential Flat Buildings.
 - Part 8C.9 for Mixed-use Buildings.
- 17 The material and colour palette for all building façades are to be composed of three fields:
 - i) Primary Field - the predominant façade material/colour that gives the building its primary character.
 - ii) Secondary Field - a supporting colour/material that provides diversity and façade articulation by highlighting the Primary Field.
 - iii) Accent Field – supplementary colours and materials that:
 - add emphasis to the façade; and
 - highlight facade elements; and
 - typically contrast in colour or material or texture with the Primary and Secondary fields.

See Figure 23.4-3, Figure 23.4-4, Figure 23.4-5, Figure 23.4-6, Figure 23.4-7, Figure 23.4-8 and Figure 23.4-9 for Indicative Primary, Secondary and Accent Field materials, colours and finishes.

Note:

- i) Considered and resolved composition of elevations and facades communicates a clear visual hierarchy of building elements and use of materials, textures and colours.
- ii) Well-composed facades with high quality edge detailing of a more limited materials palette achieve positive streetscape outcomes.
- iii) Arbitrary changes of materials and colours and/or featureless wall planes and edge detailing do not achieve Ku-ring-gai's streetscape character.



Figure 23.4-3:
Building facade with bricks as the Primary Field facade with painted finishes creating a contrasting Secondary Field.

23.4 MATERIALS, COLOURS AND FINISHES (continued)

Controls



Figure 23.4-4: Indicative Primary Field Colours.



Figure 23.4-5: Indicative Secondary Field Colours.



Figure 23.4-6: Indicative Secondary Field Materials.

- 18 The Primary Field and predominant façade material is to be face brick. Selected bricks are to be warm earthy colours and tones that complement the local setting or future character of areas in transition, and require minimal maintenance to retain their high quality finish.
- 19 The Secondary Field is to comprise materials and textures consistent with the indicative colour and material palette at Figure 24.4-4.
- 20 The Accent Field materials and colours are to be consistent with the indicative colour and material palette at Figure 24.4-3, Figure 24.4-4, and Figure 23.4-5. The Accent Field is to highlight building elements including, but not limited to, windows, railings, parapets, doors, balustrades. The material and colour selection is to complement the overall Primary and Secondary Field façade treatment.

Note: A sample board displaying and describing the selected Primary, Secondary and Accent Field materials and colour is to be specified and submitted with the application.

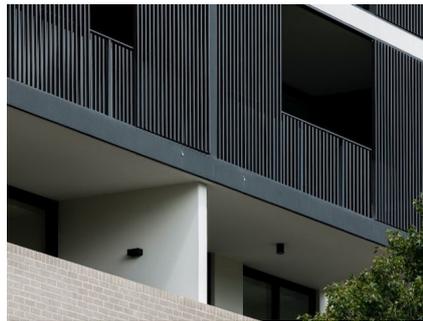


Figure 23.4-7: Louvres, sliding panels and screens as integrated Secondary Field facade elements.



Figure 23.4-8: Timber handrails provide Accent contrast to the Secondary concrete balustrades and columns and complement the Primary brick facades.



Figure 23.4-9: Dark window and balcony rail Accent colour contrasting with the Primary brick facades.

23.5 ROOF TERRACES AND PODIUMS

This section does not apply to single dwellings

Objectives

- 1 To provide high quality of private and public common open space on roof terraces and podiums.
- 2 To design roof terraces so that they contribute to the streetscape.
- 3 To encourage use of low maintenance planting and low water use on roof terraces and podiums with appropriate support systems.



Figure 23.5-1:
Roof top recreation area.



Figure 23.5-2:
Roof top public parkland.



Figure 23.5-3:
Roof top vegetable garden.

Controls

- 1 All roof terraces and podiums are to provide appropriate building systems to make them trafficable, and to support landscaping.
- 2 Roof and terrace common open areas are to incorporate sun shading devices, wind screens and facilities such as BBQ and kitchenette area with drinking water to encourage usage.
- 3 Where artificial lighting is required, energy efficient lights are to be used in conjunction with timers or daylight controls. All light spill is prohibited.
- 4 Roof terraces and podiums are to provide soft landscaping areas that complement the appearance of the building, soften the edges of the building, and reduce the scale of raised terraces and other built elements such as services.
- 5 Robust and drought tolerant plant material are to be used to minimise maintenance and ensure long term survival.
Note: Communal produce gardens are encouraged.
- 6 Roof terraces and podiums are to be designed for optimum conditions for plant growth by appropriate solar access, soil mix, and the provision of water connections and drainage.
- 7 Minimum soil provision for a range of plant sizes are to be in accordance with the following:
 - i) large trees (canopy diameter of up to 16m at maturity)
 - minimum soil volume 150m³
 - minimum soil depth 1.3m
 - minimum soil area 10m x 10m area or equivalent
 - ii) medium trees (8m canopy diameter at maturity)
 - minimum soil volume 36m³
 - minimum soil depth 1m
 - approximate soil area 6m x 6m or equivalent
 - iii) small trees (4m canopy diameter at maturity)
 - minimum soil volume 11m³
 - minimum soil depth 0.8m
 - approximate soil area 3.5m x 3.5m or equivalent
 - iv) shrubs
 - minimum soil depth 0.5-0.6m
 - v) ground cover
 - minimum soil depth 0.3-0.45m
 - vi) turf
 - minimum soil depth 0.1-0.3m

Note: Any subsurface drainage requirements are in addition to the minimum soil depths quoted above.

Note: Council will require a long term maintenance plan for both the greenery and the waterproofing.

23.5 ROOF TERRACES AND PODIUMS (continued)

Controls

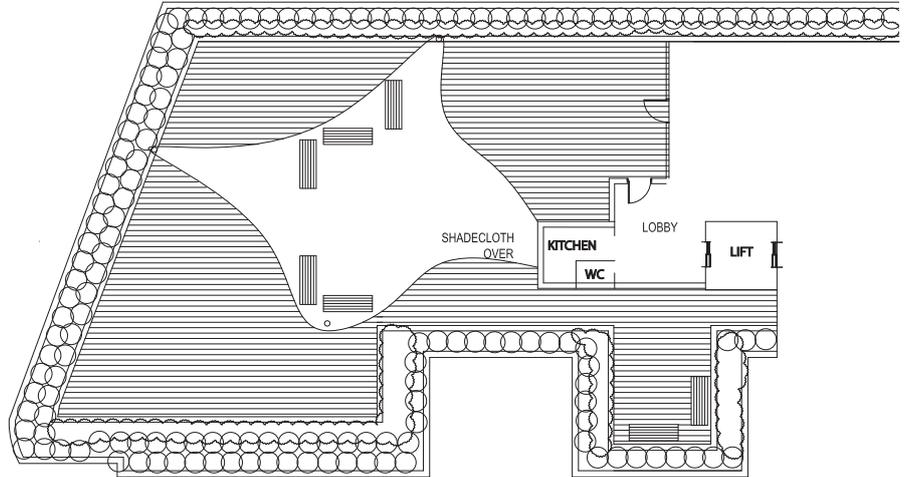


Figure 23.5-4: Roof terrace design

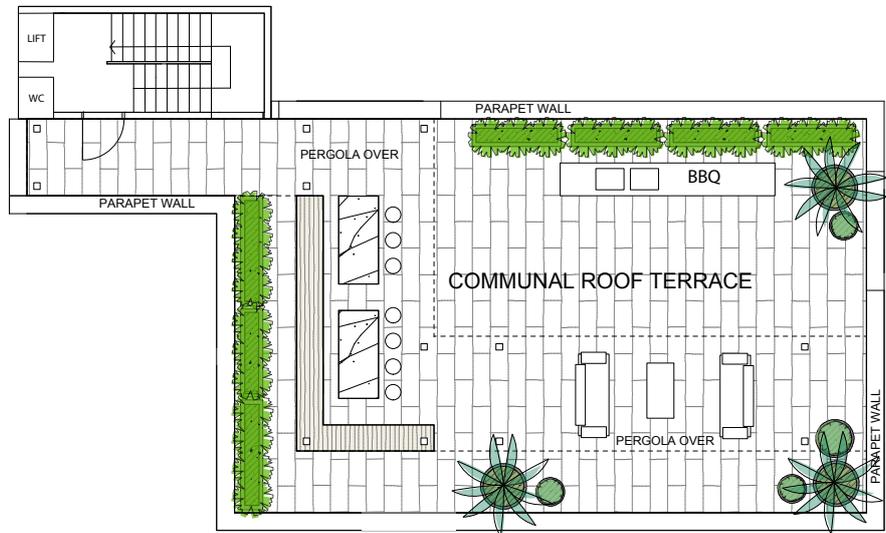


Figure 23.5-5: Roof terrace design

Objectives

- 1 To ensure visually intrusive service elements are located away from the streetscape.
- 2 To ensure that proposed or future service provision does not detract from the visual or general amenity of the building users.

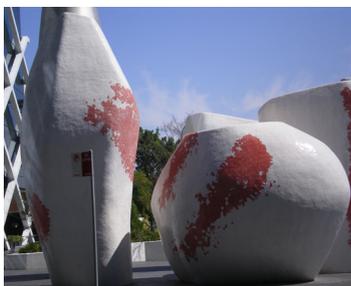


Figure 23.6-1 Public art used to hide ventilation stacks

23.6 BUILDING SERVICES

Controls

- 1 All applicants are to consult with service providers such as energy, electricity, gas, water, telephone and fire.
- 2 For high and medium density development, including Seniors Housing, Multi Dwelling Housing and Residential Flat Buildings, underground electricity services are to be provided from the proposed building on the site to the appropriate power pole(s) or other connection point.
- 3 Services and structures required by the providers are to be located within basements, or concealed within the facade, with appropriate access. Where this is not possible, the proposal is to demonstrate an alternative method of minimising street impact, such as screening with landscape or built elements. Particular care should be taken in mixed use precincts to ensure substations and fire hydrants are not visible from the primary street and principal active street frontages.
- 4 Ventilation stacks are to be concealed within the building. Where they exhaust at street level (eg. from basements) they should be integrated within the design of the site. (See *Figure 23.3-1*)
- 5 All new developments designed to allow for commercial uses are to include an internal ventilation shaft to ensure future alterations do not place the shaft in an unsuitable location.
- 6 With the exception of dwelling houses, all buildings are to accommodate proposed or future air conditioning units within the basement or on rooftops, with provision of associated vertical/horizontal stacks to all sections of the building.
- 7 Air conditioning condensers are to be located within the basement or within the roof structure of the upper most roof. Air conditioning condensers are not to be located on:
 - i) the building façade;
 - ii) the top of a flat roof;
 - iii) terraces;
 - iv) private or communal open spaces; or
 - v) balconies.

Note: Where air conditioning condensers are to be located within the basement, certification from a mechanical engineer is to be provided confirming that the nominated area/plantroom will be large enough to accommodate the number of proposed condenser units. This certification is to also indicate the likely required supply/extraction air flow within the plant room to demonstrate that ventilation requirements have been sufficiently incorporated into the basement design. Additionally there is to be sufficient service ducting incorporated into the development so that the systems operate efficiently.
- 8 Air conditioning units located on the roof will only be permitted where they are well screened, integrated into the building form and do not result in adverse noise impacts on neighbouring occupants.

23.6 BUILDING SERVICES (continued)

Objectives

- 3 To minimise visual impacts of utility infrastructure, including kiosk substations and fire hydrant and booster assemblies, on streetscape character and amenity.
- 4 To manage the cumulative visual and amenity impacts of utility infrastructure, including kiosk substations and fire hydrant and booster assemblies, resulting from development.
- 5 To ensure early consultation with utility providers to enable joint consideration of visual impacts of new infrastructure.



Figure 23.6-2: Visually obtrusive kiosk substation detracting from streetscape.



Figure 23.6-3: Hydrant and Booster Assembly located perpendicular to the street to reduce visual impact

Controls

Electrical Kiosk Substations and Fire Hydrant Boosters

- 9 All utility infrastructure is to be located to have minimal physical and visual impact and obstruction to the streetscape, natural environment and to the development.
- 10 Kiosk substations and hydrant and booster assemblies are to be designed and located to:
 - i) not dominate the street frontage of the development; and
 - ii) be integrated within the overall development; and
 - iii) retain and protect existing trees.
- 11 Any proposed kiosk substation and hydrant and booster assembly that is part of a Residential Flat Building development or a Multi-dwelling Housing development is to be screened from the street using a fence/ gate system that is integrated into the architecture of the development and its fencing. The fence/gate is to provide a screen so that the kiosk substation and hydrant/booster assembly is not visible from the adjoining public street. Refer to Figure 23.6-5.

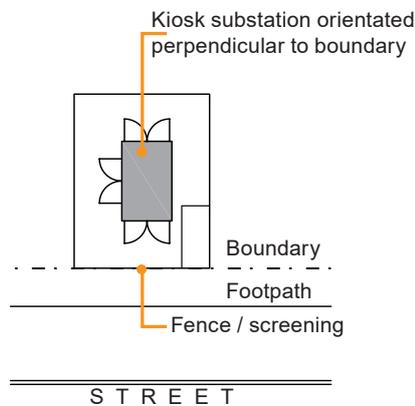


Figure 23.6-4: Kiosk Substation orientated perpendicular to property boundary to minimise visual impact

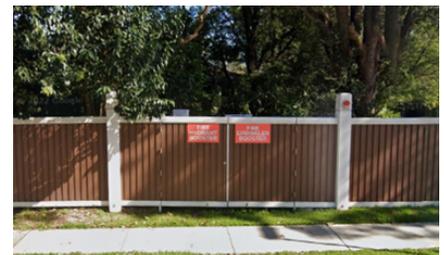


Figure 23.6-5: Screened Hydrant and Booster Assembly – within an enclosure or 1.2m high fence to minimise visual impact to streetscape.

23.6 BUILDING SERVICES (continued)

Controls

- 12 For Mixed-use Buildings, all kiosk substation and hydrant and booster assemblies are to be enclosed within the building facade with compliant access doors that are integrated into the design of the building architecture.

Note: To demonstrate due diligent consideration of the location of key utility infrastructure, development applications are to submit the following:

- i) A letter from Ausgrid to demonstrate consultation to agree:
 - a) The assessment undertaken to determine the type of kiosk substation required and its proposed location.
 - b) The incorporation of a fence/gate screen at the front of the kiosk as per Section 8 - *Ausgrid Network Standard NS141 Site Selection and Preparation for Kiosk Substations 10/02/2023*.
 - c) The location and orientation of the kiosk substation perpendicular to the street frontage with reference to *Annexure A: Site Requirements for Off-Street sites - Ausgrid Network Standard NS141 Site Selection and Preparation for Kiosk Substations 10/02/2023*.
- ii) A letter from Fire and Rescue NSW (FRNSW) to demonstrate consultation to agree:
 - a) An assessment has been undertaken by FRNSW to determine the performance requirements for a fire hydrant and booster assembly, specific to the proposed development.
 - b) An assessment has been undertaken by FRNSW of the performance solution proposed by the Proponent and submitted with the Development Application.
 - c) A request has been made to FRNSW to incorporate the Hydrant and Booster Assembly within an enclosure or to be screened.

23.7 GENERAL ACOUSTIC PRIVACY

Further controls that may apply:

SECTION B
PART 20 - Development Near
 Road or Rail Noise

Objectives

- 1 To ensure high standards of acoustic privacy for all occupants of the development.
- 2 To minimise the impact of the development on the acoustic privacy of neighbouring developments.
- 3 To ensure housing adjoining main roads is designed and constructed to minimise the impact of external noise and facilitate comfortable living conditions for residents.
- 4 To ensure measures to address acoustic privacy have regard to the existing or desired future character of the street.

Service and circulation areas used to buffer noise sensitive areas.

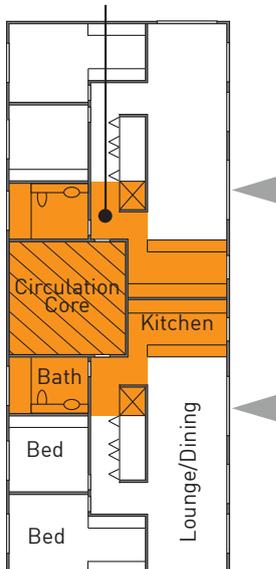


Figure 23.8-1:
 Buffer zone to minimise noise pollution.

Controls

- 1 Development is to be designed to minimise the impact of external noise sources (eg busy roads, railways, swimming pools, heavy vehicle entries) on the internal and external spaces used by occupants.
 - 2 Balconies and other external building elements are to be designed and located to minimise infiltration and reflection of noise onto the facade.
 - 3 Buildings are to be designed to minimise noise transmission by, but not limited to:
 - i) careful siting and orientation of the building;
 - ii) locating bedrooms away from both internal and external noise generators of a development, eg by using storage or circulation areas as a buffer or grouping room uses according to the noise level generated.
- Note:** Internal noise generators include, but are not limited to - kitchens, laundries and living areas
- External noise generators include, but are not limited to - traffic, railway line, vehicle entries and mechanical equipment; pool pumps, air conditioning units, garbage collection areas, tennis courts.
- iii) fitting out building services with appropriate acoustic insulation;
 - iv) incorporating appropriate noise shielding or attenuation techniques into the design and construction of the development.
- 4 Measures such as mounding or high solid fencing will only be permitted where they are compatible with the streetscape.
 - 5 When designing and siting active open space areas (eg BBQ areas, swimming pools, communal areas etc) regard is to be paid to potential noise impacts on adjacent rooms and buildings, such as bedrooms.
 - 6 Noise levels associated with air conditioning, kitchen, bathroom, laundry ventilation, or other mechanical ventilation systems and plant either as an individual piece of equipment or in combination is not to be audible within any habitable room in any residential premises before 7am and after 10pm. Outside of these restricted hours noise levels associated with air conditioning, kitchen, bathroom, laundry ventilation, or other mechanical ventilation systems and plant either as an individual piece of equipment or in combination is not to emit a noise level greater than 5dB(A) above the background noise (LA90, 15 min) when measured at the boundary of the nearest potentially affected neighbouring properties. The background (LA90, 15 min) level is to be determined without the source noise present.

Note: Council requires an acoustic assessment be undertaken for multi-dwelling housing, residential flat buildings, mixed-use development, non-residential buildings, and child care centres. Council may require an acoustic assessment be undertaken for dwelling houses and secondary dwellings. Assessment is to be undertaken by a suitably qualified acoustic consultant to assess compliance with the above criteria. Recommended noise attenuation measures are to be included in this report where applicable.

23.8 GENERAL VISUAL PRIVACY

Objectives

- 1 *To ensure the impact of development on the visual privacy of neighbouring occupants is minimised.*
- 2 *To ensure that the level of visual privacy to principal living areas and private open spaces is appropriate to the development type.*
- 3 *To ensure high standards of visual privacy for all occupants within low density residential development.*
- 4 *To ensure visual privacy measures do not compromise outlook, ventilation and solar access or the functioning of internal and external spaces.*

Controls

- 1 Private open spaces and principal living spaces of the proposed dwelling/s and adjacent dwellings are to be protected from direct or unreasonable overlooking from all new residential and non-residential developments. Siting and design measures to achieve this include:
 - i) use of distance or slope;
 - ii) appropriate dwelling layout;
 - iii) off-setting windows in relation to adjacent windows;
 - iv) use of obscure glass or highlight windows;
 - v) screening devices such as fences, louvres, translucent screens, perforated panels, trellises and courtyard walls;
 - vi) using louvres/screen panels to windows and balconies (see Figure 23.9-1);
 - vii) using solid or semi-transparent balustrades or screens to balconies or terraces (see Figure 23.9-2);
 - viii) off setting balconies in relation to adjacent balconies;
 - ix) using recessed balconies and/or vertical fins between adjacent private balconies;
 - x) using deep sills with planter boxes or incorporating planter boxes into walls or balustrades (see Figure 23.9-3).
 - xi) providing vegetation as a screen between spaces;
 - xii) utilising pergolas or shading devices to limit overlooking of lower building levels or communal and private open space.



Figure 23.9-1:
Balconies with sliding panels
to increase visual privacy.



Figure 23.9-2:
Use of a mix of solid and
transparent balustrades on
different levels to ensure
visual privacy.

23.9 VISUAL PRIVACY(continued)

Controls

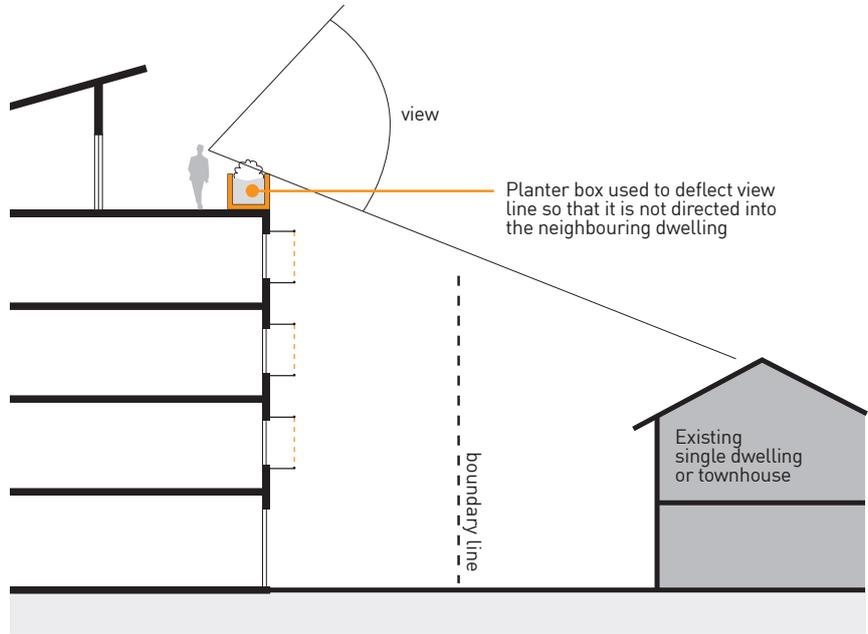


Figure 23.9-3: Incorporation of planter boxes into walls or balustrades for visual privacy.

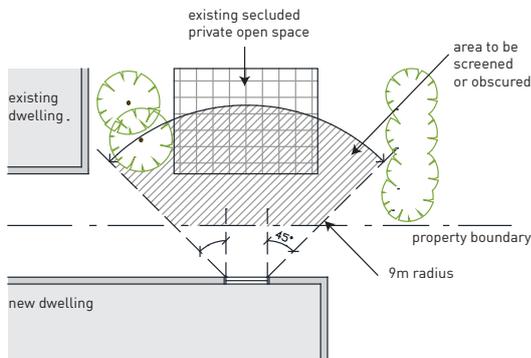


Figure 23.9.4: Designs incorporating screening to protect residents of the development.

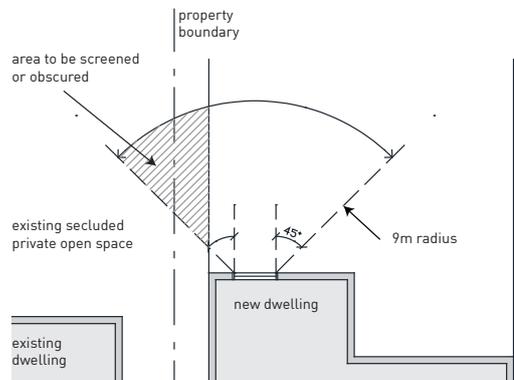


Figure 23.9.5: Area of neighbouring development to be protected from overlooking..

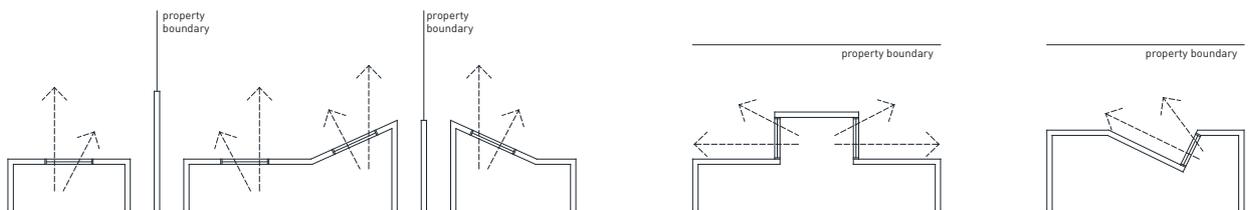


Figure 23.9.6: Arrangement of windows to avoid overlooking of adjacent open space or living areas

23.9 VISUAL PRIVACY(continued)

Controls

- 2 For low density residential development first floor decks, balconies and roof top terraces are not permitted where they unreasonably overlook or would directly overlook principal living spaces or private open space and the impact cannot be adequately mitigated.
- 3 Continuous transparent balustrades are not permitted to balconies or terraces for the lower 3 storeys.

23.9 CONSTRUCTION, DEMOLITION AND DISPOSAL

Objectives

- 1 *To preserve the various natural elements and habitats such as soil profile, vegetation, natural rock shelves and watercourses.*
- 2 *To protect existing trees and the natural elements of the site, including soil profile, vegetation, rock outcrops and water courses.*
- 3 *To reduce the volume and cost of construction and demolition waste material.*
- 4 *To protect neighbouring structures and minimise disturbance to neighbouring and downstream properties.*
- 5 *To ensure regular rainfall events do not adversely affect water quality.*
- 6 *To protect the sensitive Hawkesbury Sandstone communities in the LGA.*
- 7 *To prevent cumulative impacts from pollutants, (such as excess nutrients, sediment) on downstream ecosystems.*
- 8 *To maintain visual amenity of the locality and the natural environment.*

Controls

Environmental Site Management Plan

- 1 Site disturbance during construction or demolition is to be minimised by:
 - i) avoiding excavation beyond the building area;
 - ii) restricting machinery and vehicle movement to the building footprint and access corridor;
 - iii) locating service lines close to the building or within previously excavated areas where possible; and
 - iv) locating storage areas to areas outside the tree protection zones of trees to be retained.
- 2 An environmental site management plan showing tree protection areas, machinery usage zones, storage areas, site sheds and location of stormwater pollution barriers is to be submitted with the application as per Councils DA Guide.

Waste Management Control

- 3 A Waste Management Plan (WMP) is to be submitted with the application, in accordance with *23R.8 of this Part*. Evidence such as weighbridge dockets, copies of invoices or some other form of written evidence will be required to be submitted to Council on completion of the development to verify the quantities and destination of waste and recycling materials generated during works (either demolition and or construction).

Note: Plans and drawings of the proposed development that highlight the location of and space allocated to the waste management facilities and the nominated waste collection point is to be attached to the WMP. The path of access for both users and collection vehicles are to be highlighted.
- 4 Provide source separation facilities on building sites so that different waste streams may be easily separated during construction and demolition to encourage the reuse and recycling of materials.

Stormwater Quality Control During Construction

- 5 Manage soil, water and materials on construction sites to prevent erosion, sedimentation and pollution of waterbodies and the natural environment.
- 6 Manage the quality and quantity of post-construction stormwater runoff from the site to protect downstream ecological communities, to prevent altered nutrient regimes and to reduce litter entering the waterways.
- 7 Control erosion and sedimentation by:
 - i) minimising the extent of disturbance;
 - ii) rapidly stabilising the disturbed areas;
 - iii) diverting clean runoff around work areas; and
 - iv) trapping eroded sediment as close to the source as is practical.

23.10 CONSTRUCTION DEMOLITION AND DISPOSAL (continued)

Controls

- 8 Provide for appropriate management of wastes, chemicals and fuel through:
- i) Appropriate storage and handling to prevent discharge of pollutants to waterways;
 - ii) On-site containment of waste water from construction activities;
 - iii) Appropriate storage and disposal of waste materials; and
 - iv) Appropriate management and disposal of waste water.

Note: Under the *POEO Act 1997*, owners and builders have a responsibility to notify Council or the Environment Protection Authority (NSW Office of Environment and Heritage) of any harmful pollution incident as soon as is practicable. Allowing pollutants (including sediment) to enter any waterway is an offence under the *Protection of the Environment Operations Act 1997*.

Failure to notify could result in a maximum fine of \$250,000 for corporations and \$120,000 for individuals.

Erosion and sediment control

- 9 All activities that have the potential to pollute are to comply with the requirements of the Protection of the Environment Operations Act
- 10 All development applications are to be accompanied by an 'Erosion and Sediment Control Plan' (ESCP) that describes the measures undertaken at development sites to minimise land disturbance and to control sediment pollution. The ESCP is to be prepared in accordance with "Managing Urban Stormwater, Soil and Construction, 2006 (Landcom)".
- 11 Disturbance to existing vegetation should be minimised when installing controls, especially along watercourses, on highly erosive lands and in high-conservation-value areas.
- 12 Where land disturbance activities occur in riparian zones (Category 1 and 2) or watercourses, a separate Vegetation Management Plan may be required. This plan is to cover all disturbed lands within the riparian zone. It should address revegetation, bush regeneration and weed control. It should ensure that previously stored topsoil is respread over disturbed lands and the litter layer is restored. Any imported topsoil is to be weed free.

Note: Under the *POEO Act 1997*, it is an offence to store hazardous and dangerous liquids (including oils, solvents, fuels, acids and paints) in such away as to allow any water pollution incident to occur. Also you need to be in accordance with the Ku-ring-gai Council DA guide.

23.10 CONSTRUCTION DEMOLITION AND DISPOSAL (continued)

Controls

- 13 All disturbed areas should be rehabilitated as soon as possible after excavation or completion of the construction period. This includes, but may not be limited to:
 - i) restoration of all surfaces to their original condition (or as specified);
 - ii) re-establishment of surface stability with suitable cover to achieve a permanent C-factor of less than 0.1 (equivalent to 60 per cent ground cover) within 20 working days from the start of works.
- 14 Disturbance to existing vegetation should be minimised when installing controls, especially along watercourses, on highly erosive lands and in biodiversity significant areas.

23R References

23R.1 Examples of ESD Measures

REFERENCES



23R.1 EXAMPLES OF ESD MEASURES

Water Efficiency

These measures ensure all non-residential buildings implement systems of water collection and recycling. Systems to minimise mains water usage may include:

- i) on-site rainwater collection and on-site waste water treatment to provide recycled water for use within the development;
- ii) provide low flush toilets and water efficient fixtures and fittings, including waterless urinals;
- iii) utilise water efficient landscape principles, such as the selection of low water usage species, including local species, and the use of tree foliage to create on ground shade and windbreaks.

Energy Generation

These measures encourage implementation of systems that provide alternative energy sources. Energy generation measures may include:

- i) solar louvres (powered by photovoltaic cells) that track the sun to supply building use;
- ii) solar hot water system;
- iii) solar energy collection technology such as solar heat pumps for hot water and photovoltaic cells;

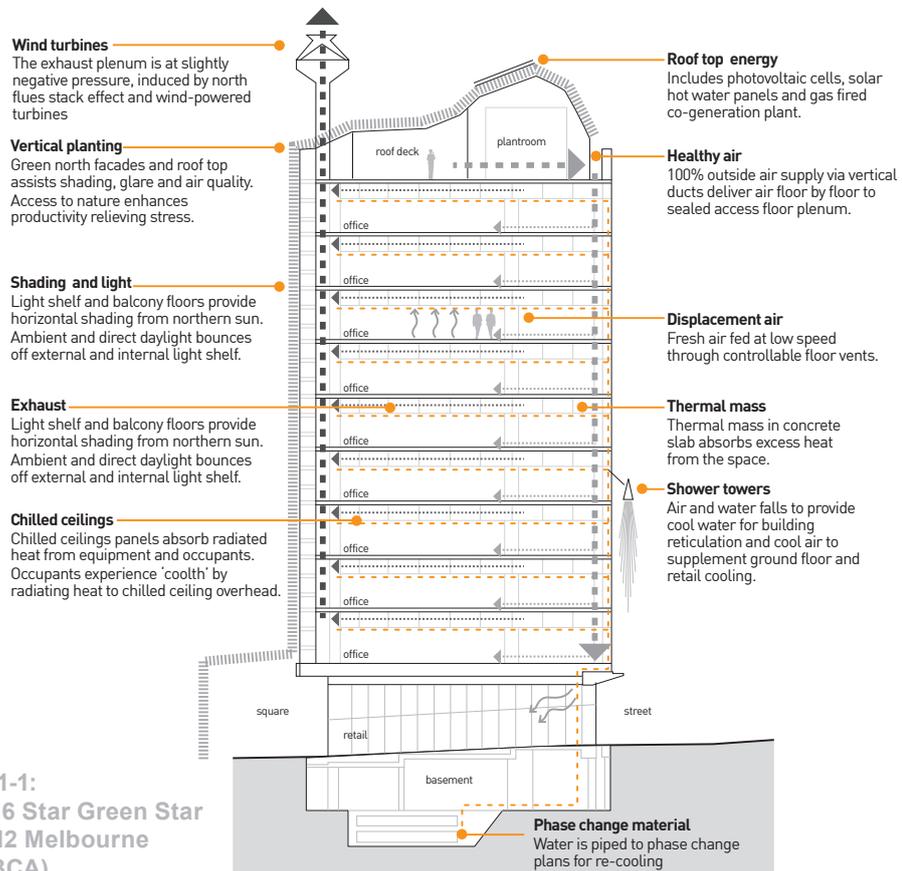


Figure 23R.1-1:
Example of 6 Star Green Star Building CH2 Melbourne
(Source: GBCA)

23R.1 EXAMPLES OF ESD MEASURES (continued)

- i) use of photovoltaic cells which can be mounted as panels, or used as an integrated building cladding as shading device;
- ii) use of co-generation or tri-generation plants located within the basement to service the whole building; and
- iii) wind turbine technology.

Heating and Cooling

These measures reduce the heat and carbon output of non-residential buildings. Alternative heating and cooling measures may include (refer to *Figure 23R.1-2*):

- i) displacement ventilation with low level air delivery and high level air exhaust to create air change effectiveness;
- ii) thermal chimneys in atriums to draw warm air up and out of work areas;
- iii) new generation cooling systems such as chilled ceiling beams;
- iv) active mass cooling system utilising thermo-active slabs and concrete core conditioning;
- v) radiant slab heating to provide energy efficient thermal comfort;
- vi) night purge systems to cool and clear stale air within the building;
- vii) roof surfaces with a sheen finish that reduce heat gain in summer (only where they do not impact on the amenity of neighbour in terms of glare and reflectivity);
- viii) roof gardens and landscaped terraces which provide thermal insulation;

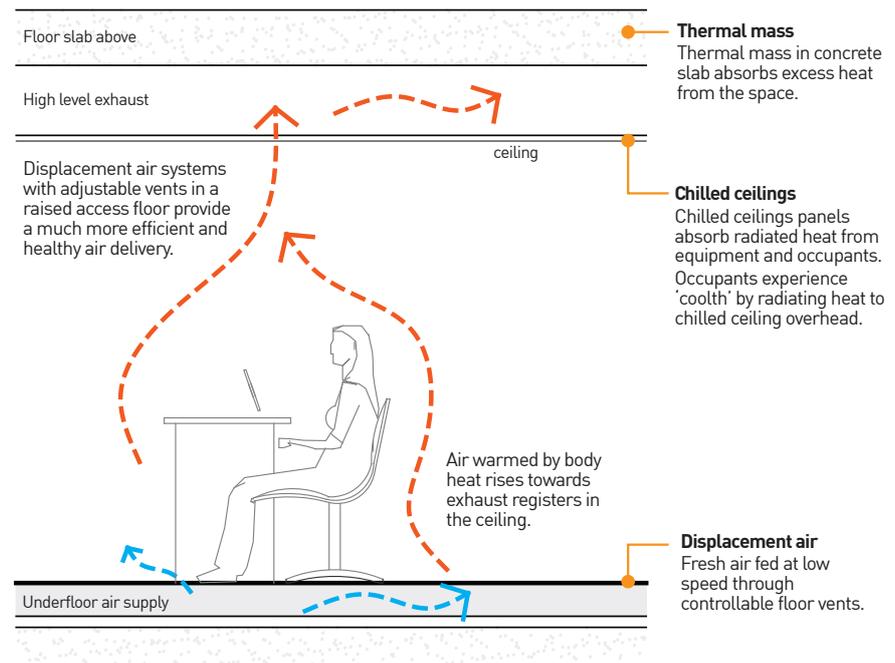


Figure 23R.1-2:
A displacement air system. Removing contaminants efficiently with 100% fresh air supply, resulting in a healthier work environment.

23R.1 EXAMPLES OF ESD MEASURES (continued)

- ix) use of tri-generation plants located within the building basement;
- x) use of vertical planting to shade building elevations;
- xi) insulation and ventilation of roof spaces; and
- xii) use of heavy weight building materials, such as concrete, for thermal mass on flat roofs and/or walls. Where lighter weight materials are used they are to be well insulated.

Lighting

These measures reduce the energy uptake for lighting systems within non-residential building sites. Measures to reduce artificial light use may include (refer to *Figure 23R.1-3*):

- i) considering internal building use relative to window location;
- ii) consider fenestration with high performance glazing with spectrally selective glass that allows views and a high degree of diffused natural light into the workspace without glare;
- iii) select and position light fittings to minimise energy consumption. For example create separate lighting zones for areas close to and further away from windows;
- iv) lighting used in common areas such as entries, corridors, car parks and communal open space areas are to utilise daylight sensor control, movement detectors, automated dimmers and timers. Lightspill is to be controlled;
- v) improve internal natural light reflection and minimise lighting use by using light coloured internal finishes;

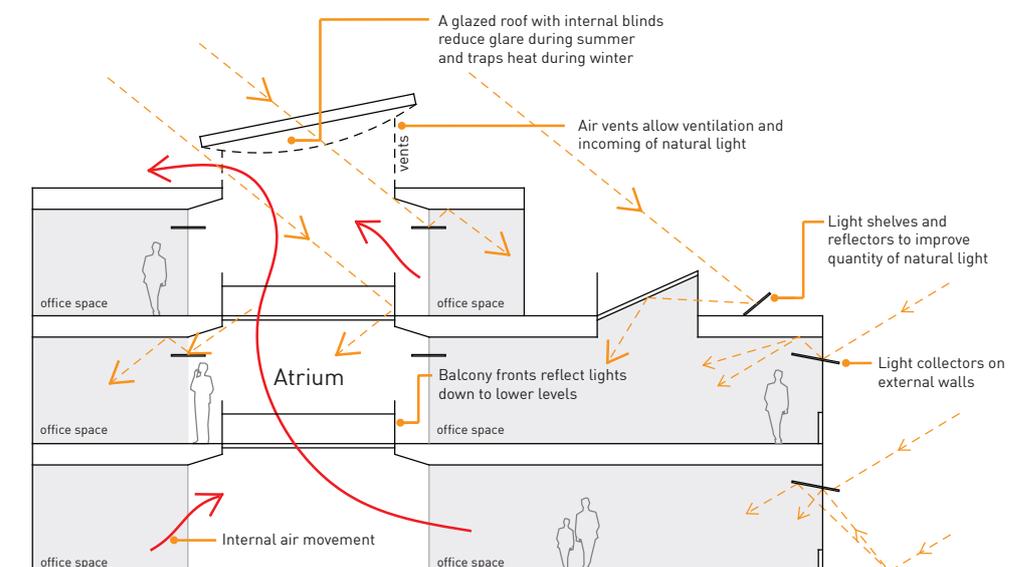


Figure 23R.1-3:
Lighting and ventilation.