

*City of Lake Macquarie*

# Better Buildings Strategy

(Community Buildings)



May 2014

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*Cover: Swansea Centre. Building comfort is regulated naturally by automatic (sensor driven) louvre windows on first floor. Manually operated louvre windows on ground floor.*

# 1 INTRODUCTION

## 1.1 Vision

*Council will lead by example and become an inspiration to the Lake Macquarie community. Council will consider sustainability in the design and construction of all new buildings and renewal, replacement and upgrade projects. It will aim to minimise environmental impacts and resource use in the construction, operation and maintenance of community buildings.*

## 1.2 Defining Sustainable Buildings

The term 'green building' is a generic description for any building where sustainability has been a primary consideration in its design, construction and operation. The term is now recognised by the industry, with a peak body, the Green Building Council of Australia (GBCA), established to promote and support such buildings.

The term 'design' here extends not just to the layout and appearance of the building, but also to the use of materials, method of construction and operating mechanisms. In summary, a 'green', or sustainable Council building is:

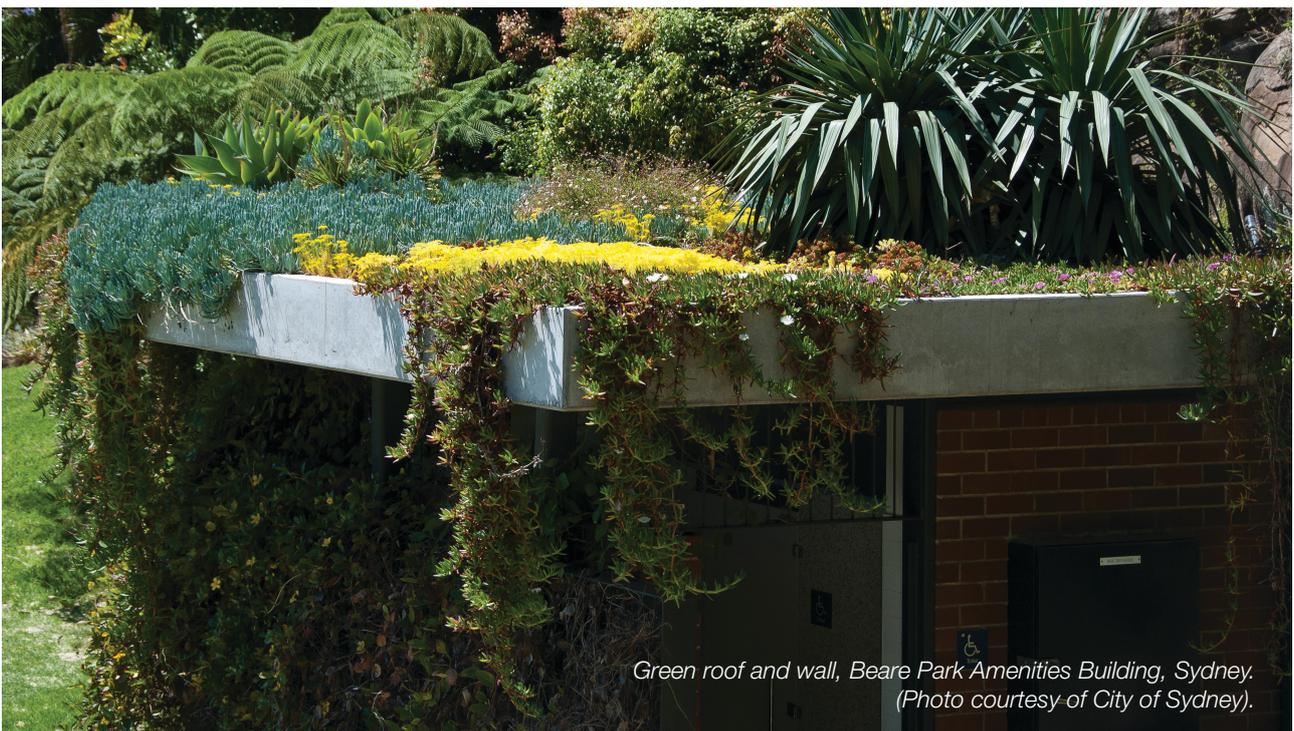
**i) Fit for Purpose** – able to meet functional and service delivery needs, while being a pleasant,

healthy and safe place, so that such buildings are adaptable to changing and future needs in the City;

- ii) Sensitive to the surrounding landscape** – visually attractive, with minimal impacts on the surrounding ecosystem;
- iii) Resilient** – able to withstand external hazards from natural and human elements (eg: flooding, bushfire, vandalism)
- iv) Affordable** – buildings and their operating components can be constructed, operated and maintained within the available financial, human and technical resources of Council;
- v) Efficient** – buildings use minimal natural resources and generate minimal quantities of waste.

To capture the essence of the above principles, Council considers that the term, 'better buildings' (as in 'better sustainable buildings'), reflects the abovementioned vision and definition.

Although Council is already addressing many of these aspects of sustainable buildings, this Strategy enables a more comprehensive approach by providing context, minimum standards, future actions and information sources.



*Green roof and wall, Beare Park Amenities Building, Sydney.  
(Photo courtesy of City of Sydney).*

### 1.3 Aims and Scope

The primary aim of the Better Buildings Strategy is to incorporate sustainable building design principles in all of Council's community buildings. Assessing the design of new buildings, as well as upgrades of existing buildings is an essential element for achieving this aim.

By developing a Better Buildings Strategy, Council also aims to:

- Lead by example and be able to showcase sustainable buildings to the community to inspire adoption of similar principles in development across the City;
- Reduce the environmental impacts of renewing, replacing and maintaining Council buildings;
- Reduce the operational costs associated with Council buildings and facilities;
- Improve the resource efficiency of Council buildings and facilities;
- Reduce reliance on non-renewable energy; and
- Provide a healthy indoor environment for those who work in and utilise Council buildings.

This Strategy is applicable to works to design, construct, upgrade, renew and replace Council's community buildings.

### 1.4 Relevant Council Policies and Strategies

The most relevant policies to the Better Buildings Strategy are listed below:

- Environmental Sustainability Policy
- Greenhouse Emissions Reduction Targets Policy
- Community Strategic Plan 2013-2023
- Asset Management Strategy 2010-2020
- Buildings Asset Management Plan
- Resourcing Strategy 2013-2023
- Lifestyle 2030
- Environmental Sustainability Action Plan 2014–2023
- Cycling Strategy 2021
- Footpath Strategy 2013–2023

## 2 COUNCIL'S COMMUNITY BUILDINGS

### 2.1 Community Building Types in Lake Macquarie City

Community buildings include a diverse range of facility types, from large multi-purpose centres and libraries, to amenities for sports fields or public parks (Table 1).

**Table 1: Existing Community Buildings by Type in Lake Macquarie City**

Type of Building	Number
Community / Multipurpose Facilities	48
Child Care Facilities (including Family Day Care)	15
Libraries	10
Cultural Facilities	2
Sporting and Aquatic Centres	6
Public Amenities	135
Sporting Club Amenities	109
<b>TOTAL</b>	<b>325</b>

In addition to the above community buildings, there are currently 40 operational buildings, the largest of which are the Administration Building and the Works Depot. These buildings will be included in a future version of this Strategy.

### 2.2 Buildings Management and Lifecycle

Council considers whole of life costing as part of the lifecycle of its assets. Lifecycle Management Plans are developed for Council's community facilities. These detail how the organisation plans to manage and operate the assets at the agreed level of service, while optimising life cycle costs. Information regarding this aspect of Council's buildings management is contained within the Buildings Asset Management Plan, prepared annually.

Community buildings are managed and operated by a number of Council departments and community organisations. Most new community buildings and major upgrades are planned and managed by Council's Community Planning Department (provision of capital funds) and City Projects (management of construction works). Renewal and replacement projects and maintenance considerations are the responsibility of Council's Asset Management Department.

The internal process for new buildings and upgrades to existing buildings was mapped with the project team as part of the development of this Strategy.

# 3 SUSTAINABLE DESIGN ASSESSMENT TOOLS

The design and construction of green buildings, or the incorporation of such features during major retrofits, can be aided by the use of existing assessment tools developed for sustainable or 'green' buildings. An overview of each of these assessment tools is provided below.

## 3.1 Section J of Building Code of Australia (BCA)

Section J of the Building Code of Australia forms part of Volume 1 of the National Construction Code. It is a Federal and State Government initiative that requires environmental performance of buildings to reduce greenhouse gas emissions. Section J applies to Class 2 to 9 buildings as defined by the BCA.

## 3.2 Green Star

Council is a member of the Green Building Council of Australia (GBCA). The GBCA has developed a range of assessment tools for the design of green buildings and these tools allow for the rating and possible certification of buildings. These tools are referred to as 'Green Star'.

Green Star is a design tool to improve the performance of buildings. Due to the cost for formal certification this tool is best utilised for large and complex new buildings or major renovations with a cost of greater than \$3 million (refer to table 2).

Green Star is a point score system. The following Green Star Certified Ratings are available:

- 4 Star Green Star Certified Rating (Score 45-59) signifies 'Best Practice' in environmentally sustainable design and/or construction
- 5 Star Green Star Certified Rating (Score 60-74) signifies 'Australian Excellence' in environmentally sustainable design and/or construction

- 6 Star Green Star Certified Rating (Score 75-100) signifies 'World Leadership' in environmentally sustainable design and/or construction.

## 3.3 Sustainable Design Scorecard (SDS) – NSW Version

A group of Victorian councils and sustainability experts established the tool in 1999 to enable designers and Council officers to assess all building types with the view of reducing their environmental impacts. The tool has now been adapted for use in NSW (Version 7).

The Scorecard is aimed at performance outcomes that are a step above minimum legal requirements and current general industry practice (SDS 2012).

It also allows for consideration of outcomes that address other aspects of building design such as being adaptable and active.

## 3.4 NABERS

NABERS, or the National Australian Built Environment Rating System, is a NSW government initiative that measures and compares operational environmental performance of buildings. NABERS was launched in 1998 and since mid-2010 has been mandatory for all commercial office buildings with a net floor area greater than 2000m<sup>2</sup>.

## 3.5 Criteria for Design Standards

In order to allow for a standardised approach to green buildings in Council, use of the assessment tools is recommended in accordance with the tables below.



**Table 2: Use of the Tools for the Design of New Buildings and Upgrades <sup>1</sup>**

PROJECT TYPE			APPROPRIATE DESIGN STANDARD FOR COUNCIL FACILITIES			
New Buildings and Extensions to Existing Buildings			GBCA Green Star		Sustainable Design Scorecard v7	
GFA <sup>2</sup>	Cost	Nature	Stars	Grade	Score	Grade
<250m <sup>2</sup>	<\$1mil	Simple	4 Star	Best Practice	111 - 160	Enhanced Sustainable Design
250 – 1,000m <sup>2</sup>	\$1 – 3mil	Moderate	5 Star	Aust Excellence	161 – 210	Best Practice
>1,000 m <sup>2</sup>	>\$3mil	Complex	6 Star	World Leader	211+	Excellent

<sup>1</sup> Refer to Glossary for terminology definitions

<sup>2</sup> Gross Floor Area

**Table 3: Use of the Tools for the Design of Replacements/Renewals of Buildings <sup>1</sup>**

PROJECT TYPE			APPROPRIATE DESIGN STANDARD FOR COUNCIL FACILITIES			
Refurbishments to Existing Buildings			GBCA Green Star		Sustainable Design Scorecard v7 (NSW)	
% GFA <sup>2</sup>	Cost	Nature	Stars	Grade	Score	Grade
<30%	<\$200k	Simple	N/A	N/A	111-161	Enhanced Sustainable Design
30 – 70 %	\$200k – \$1mil	Moderate	4 Star	Best Practice	162 – 210	Best Practice
>70%	>\$1mil	Complex	5 Star	Aust. Excellence	211+	Excellent

<sup>1</sup> Refer to Glossary for terminology definitions

<sup>2</sup> Percent of Gross Floor Area

# 4 BUILDING PERFORMANCE



Photo 1: Lake Macquarie City Art Gallery solar panels.

## 4.1 Energy

Buildings owned by Council use energy in many different ways, including electricity, natural gas, Liquefied Petroleum Gas (LPG) and diesel. Energy use comprises a large part of the running costs for these buildings.

Council's greenhouse gas emissions reduction target of 3% per year from its own operations, reflects the need to address the emissions created by Council's buildings.

### 4.1.1 Minor Works Recommendations

Minor works are small scale upgrades (less than 30% Gross Floor Area (GFA) or cost of less than \$200,000), (refer to Table 3),

#### Lighting

Lighting used (i.e. 'luminaires', including tubes and bulbs) is to have an energy efficiency greater than 130 lumens/watt<sup>1</sup>. In most situations, light emitting diodes (LEDs) will meet this efficiency rating and are recommended.

Lighting designs should consider sensor controls (motion and light level) where appropriate for the use of the space to help deliver energy savings.

#### Air Conditioning

Wherever possible provision of insulation to be in accordance with requirements of Section J of the Building Code of Australia (BCA) Volume 1, or the Your Home Technical Manual, before air conditioners are considered.

Air conditioning systems with an Energy Star Rating of 4.5 or a Coefficient of Performance (COP) of 4.0 or greater to be considered, subject to site conditions and available funding. Systems should comply with:

- AS/NZS 3823.2-2011 Performance of electrical appliances, air conditioners and heat pumps
- Energy labelling and minimum energy performance standards (MEPS) requirements, and AS/NZS 4755.3.1:2012
- Demand response capabilities and supporting technologies for electrical products
- Interaction of demand response enabling devices and electrical products
- Operational instructions and connections for air conditioners.

#### Hot Water Systems

Solar, thermal or heat pump<sup>2</sup> hot water systems to be considered for installation on community buildings, subject to site conditions and available funding.

Hot water usage should be minimised by actions identified in the Water section of this Strategy.

Hot Water Supply Systems to comply with AS/NZS 3500.4:2003 Plumbing and Drainage - Heated water services and the Plumbing Code of Australia (National Construction Code: Volume 3).

<sup>1</sup> This performance criterion was set by assessing feasibility technologies from OEH Energy Saver – Energy Efficient Lighting Technology Report (2014)

<sup>2</sup> With a Coefficient of Performance (COP) of 2 or greater at an ambient air temperature of 10°C

## Appliances

Appliances are to have an Energy Star Rating of 3.5 or greater<sup>3</sup>.

### 4.1.2 Major Works Recommendations

Major works are new builds and extensions as well as renewal/replacement projects with a GFA greater than 30% and a cost above \$200,000 – refer to Tables 2 and 3.

1. Incorporating passive design measures to maximise the use of natural ventilation, cooling and natural lighting;
2. Minimising light pollution through best practice lighting design (AS 4282-1997: Control of Obtrusive Effects of Outdoor Lighting);
3. Striving for long-term energy resilience by installing appropriately sized clean energy generation systems, such as solar photovoltaics or tri-generation wherever viable;
4. Consideration of energy consumption modelling, to determine optimal running costs of various designs, operations and appliances; and
5. Consideration of thermal performance modelling<sup>4</sup> for determination of optimal designs and features for buildings with a need for thermal control (such as air conditioned spaces).

## 4.2 Water

The Lower Hunter's water supplies are very reliable under typical climatic conditions, and will be able to supply the water needs of a growing population and business community for around 20 years. However, the region is vulnerable to drought, because water storage levels can fall quickly in prolonged periods of hot dry weather (NSW Govt 2014). The need for water efficiency measures reflects this vulnerability.

Council has developed Water Cycle Management (WCM) Guidelines to address water management issues associated with development in the City. These Guidelines provide direction on how to achieve the water objectives, as outlined in Council's Development Control Plan. They provide practical advice for implementing WCM principles and explore practical

<sup>3</sup> This performance criterion was set by assessing feasibility technologies from Ausgrid Appliance Star Search - <http://www.ausgrid.com.au/Common/Ways-to-save/Appliance-Search.aspx>

<sup>4</sup> This performance criterion was set by assessing feasibility technologies from Ausgrid Appliance Star Search <http://www.ausgrid.com.au/Common/Ways-to-save/Appliance-Search.aspx>. ArchiCAD, AutoCAD and Revit all have thermal modelling capabilities or plugins

water management options for developers.

The principles are to:

- Reduce potable water consumption;
- Reduce wastewater discharge;
- Maximise water reuse; and
- Achieve best practice management for stormwater before discharge to the aquatic environment.

The outcomes are achieved using the following guiding principles:

- Demand management;
- 'Fit-for-purpose' water use;
- Identification and use of alternative urban water sources, and;
- Applying best practice environmental management targets for stormwater.

In keeping with these principles, it is recommended that the following items are considered and incorporated into all community building works and planning as appropriate:

- Water efficient appliances – minimum requirements:
  - › Tapware – 4 stars or better;
  - › Showerheads – 3 stars;
  - › Toilets – 4 stars.
- Stormwater management – the building should demonstrate compliance with Council's DCP provisions (Site Discharge Index of 0.1) using Water Sensitive Urban Design Principles and Council's Stormwater Management Guidelines
- For works involving landscaping, use a Certified Practising Soil Scientist to provide recommendations for the prevailing soils and the desired landscaping outcomes;
- Irrigation – where an irrigation system is required, the system is to be designed by a Certified Irrigation Designer (CID), with input from a Certified Irrigation Agronomist, as required. All irrigation systems are to be compatible with Council's Central Irrigation Control system. Sports field irrigation systems are to meet Council's specifications and performance benchmarks (currently under development). Exemptions may apply to particular small scale projects. Consultation with Sustainability Department staff is required to determine whether an exemption is applicable.

## 4.3 Indoor Environment Quality

Indoor environment is a key component of sustainable building performance and is critical to productivity, workplace satisfaction and self-reported worker wellbeing.

The CSIRO has assessed the opportunity cost in Australia to be in the order of a 6% productivity loss from poor indoor air quality alone, with a cost to business estimated at A\$12 billion (Brown 1998).

Indoor environment quality (IEQ) considerations include:

- Air Quality and Ventilation;
- Monitoring and Management of Pollutants;
- Lighting;
- Views;
- Thermal Comfort;
- Occupant Control;
- Noise Levels and Acoustic Comfort;
- Materials or Product Specifications; and
- Indoor Plants.

## 4.4 Waste and Construction Materials

### 4.4.1 Construction/Demolition Waste

The management of this aspect of the building lifecycle is governed by the development assessment process, specifically by the preparation of a Waste Management Plan (as required by Waste Management Guidelines supporting DCP No.1 – Principles of Development-Guidelines Vol 1) which specifies waste quantities by type, and disposal methods.

Construction and demolition impacts can be significantly reduced through consideration of the following:

- Minimise construction waste by planning ahead and choosing the right quantity of materials and ensure that any unused materials can be returned to the manufacturer;
- When renewing or replacing a community building, maximise reuse of materials, firstly on-site, then off-site, to minimise the use of non-renewable resources;
- Select materials with the lower embodied energy and environmental impacts;
- Analyse the expected quantities of demolition / construction waste by waste streams and identify

the most appropriate disposal method and facility, focusing on reuse or maximising recycling;

- Provide adequate collection receptacles to allow for correct separation of waste streams and maximise recycling;
- Allow adequate space for recycling, waste storage and composting by building occupants; and
- Require disposal of waste only to EPA licenced sites.

### 4.4.2 Waste from Building Use

New and renovated buildings provide the opportunity to provide for best practice waste management during ongoing operations. The GBCA Green Star Performance tool provides additional guidance ([www.gbca.com.au](http://www.gbca.com.au)). Planning and design should address:

- Provision for on-site source separation and collection –
  - › Conduct an analysis of the expected quantities of waste by waste streams - general waste, commingled recyclables (glass, cardboard, paper, rigid plastics, soft plastics, cans), special recyclables (other metals, moulded polystyrene (EPS), toner cartridges, e-waste, oils, household batteries, car batteries, gas cylinders, fire extinguishers, smoke alarms, light globes, fluorescent light tubes), organics (green waste, food waste)
  - › Provide practical collection sites and space for appropriate receptacles for general waste, commingled recyclables, problem recyclables (separate bin per type) and organics
- Consultation with Sustainability and Waste, Environment and Rangers departments during the planning stage to ensure that Council waste collection during use of the facility is possible and there are no access restrictions for the collection vehicles.
- Consultation with Sustainability Department for assistance regarding education, recycling providers and disposal options.



Photo 2: Amenities Building, Warners Bay. Beginnings of a green wall.



Photo 3: Green roof, Teralba. (Photo courtesy of Umwelt)

## 4.5 Local Environment

It is important that Council's community buildings harmonise with the surrounding environment, add to its ambience and, where possible, enhance habitat values. For those facilities that are occupied by staff, volunteers and visitors during the day, it is also desirable that the designs provide them with a visual connection to the external environment.

Accordingly, the main objectives are to:

- Provide an attractive place to visit and work;
- Restore habitat and improve community spaces surrounding buildings; and
- Minimise the impact during construction and operation on biodiversity, water flow and quality, soil quality and erosion, and visual amenity.

There are many opportunities to achieve these objectives in the design and construction of the building itself, as well as ancillary features, such as carparks and the surrounding open space.

The Green Star – Public Buildings rating tool provides credits in the Land Use and Ecology category, with the aim of reducing environmental impacts and enhancing the quality of local ecosystems.

Therefore, planning and design principles to consider are:

- Avoid loss of high quality habitat, including old growth forest and woodland, retain buffers near wetlands, and avoid habitat of threatened species;
- Retain topsoil for reuse post-construction, whilst minimising importation of topsoil from off-site;
- Provide adequate soil and erosion protection measures during construction;
- Develop a landscape plan that considers measures to enhance habitat values whilst maintaining the desired functional and visual outcomes;
- Provide adequate, skilled site supervision during construction and commissioning; and
- Consider the inclusion of green roofs and walls (refer to Photos 2 and 3).

Whilst the majority of Council's community buildings will be located in previously cleared areas, from time to time Council builds new facilities in greenfield areas, such as libraries and community centres. These projects warrant close attention to the above objectives and principles. See also Section 4.2 (Water) for specific stormwater management measures.

## 4.6 Transport

Council has made a commitment to reduce greenhouse gas emissions by 3% per year from its own operations (see Section 4.1). In 2004, the transport sector accounted for about 13% of Australia's GHG emissions (Australian State of the Environment Report, 2006), second only to the energy sector. Council's 2012-13 State of the Environment Report notes that the number of private vehicles increased by 1.9%, or 2,693 more vehicles, from the previous year. Depending on the fuel efficiency and typical distances travelled, such a trend is likely to increase the City's emissions and add to traffic congestion and air pollution.

The economic benefits of walking are estimated at around \$2.12 per kilometre walked, versus avoided car travel (Commonwealth of Australia, July 2013).

Because of the variety of services and facilities provided by community buildings, they form a significant destination for journeys by City residents. This section of the Strategy addresses those measures that can be used to minimise the need for visitors to use private cars to access them, and for staffed facilities, to assist staff to use alternative means to commute to and from work.

#### 4.6.1 Car Parking – Encouraging Fuel Efficient Transport

Whilst Community facilities need to meet the minimum parking requirements for specific development types, as specified in the City-wide Development Control Plan (DCP), and any area-specific DCPs, scope remains to encourage the use of fuel efficient vehicles.

One of the principal means to do this is to provide dedicated spaces for small cars, hybrids, electric vehicles (EV), and motorcycles. Spaces for these might also be provided closer to the building entrance and/or be covered to exclude sun and rain.

For larger facilities, consideration should be given to allocating a dedicated electric vehicle parking space equipped with Level 2<sup>5</sup> charging facilities for use by both staff and visitors. Such facilities would generally include libraries, multi-purpose centres and larger community centres. As Level 2 EV charging equipment requires a dedicated 30A circuit, the switchboard and wiring to the dedicated car space should be installed when the facility is constructed. The actual charging equipment (station) can be provided at that time, or where its installation is deferred, the wiring should be terminated in a weather proof junction box. Charging station equipment can be wall mounted, or bollard mounted.

#### 4.6.2 Encouraging Active and Public Transport

The *City of Lake Macquarie Environmental Sustainability Action Plan 2014-23* contains two transport targets to be met by 2023:

- An increase in public transport trips to 10 per cent of total trips within the City
- An increase in walking and cycling trips to 6 per cent of total trips within the City

The *Lake Macquarie Cycling Strategy 2011-2021*, and the *Lake Macquarie Footpath Strategy*, are two important strategies that Council has adopted to help meet these targets.

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<sup>5</sup> Level 2 chargers are single phase vehicle coupler complying with SAE J1772/2009 automotive plug specifications and enabling charging at up to 7.2 kW (30A x 240V). They require the installation of a dedicated charging station and electrical circuit. Level 2 stations can easily charge a typical EV battery in just a few hours, making them a common installation for fleet facilities. Each vehicle parking space should be paired with a dedicated charger, meaning a dedicated 30A circuit per vehicle will need to be considered for the electrical supply.

To be consistent with these commitments, community buildings should therefore provide end of trip facilities to support the use of active and public transport modes, as well as be safely and conveniently accessible by such means.

In planning the location of new facilities, preference should be given to those sites that have the best active and public transport access, but that still meet the facility's core functional requirements. Where possible, they should be connected to:

- An off-road system of linked open space;
- Shared paths, and/or separated bike lanes on roads; and/or
- Nearby public transport nodes and other amenities.

Many of the principles for such measures have been researched and embedded in the *Green Star – Public Building Design v1 Rating Tool*, developed by the GBCA. Even if this tool is not being used for certification, it provides useful guidance on the types of measures to take. The tool assigns regional weightings to each of the nine component categories, with the 'Transport' category assigned a 10% weighting in NSW, i.e. transport is an important component of a building's sustainable footprint.

Not all end of trip facilities may need to be provided on-site, provided they can be shared off-site on an adjacent site also managed by Council. For example, cyclist parking, lockers and showers could be provided in conjunction with another facility on-site, or adjacent to it.

The above referenced Green Star tool cites the following two principal facilities that need to be considered for cyclists:

- Secure bicycle storage; and
- Showers and changing amenities.

Showers and changing rooms may not be warranted at all facilities, but as a guide, any substantially staffed community centre or multi-purpose centre should include them.

Traditional bike racks, for up to 10 or more bikes in a single piece of equipment, do not provide adequate support for bikes and can damage wheels (see Photo 4). They also do not provide adequate space to enable easy connection of bike locks. Consequently in recent years, Council has adopted a specific type of bike 'stand', where each stand can accommodate two bikes (Photos 5 and 6). These provide solid support,



Photo 4: Older style bike racks not used by Council

enable easy attachment of locks and being made of stainless steel, are low maintenance. They also provide a unified appearance across the City. One of the two adopted designs can be specified in marine grade stainless steel product for use at locations close to the lake or ocean (generally within 100 metres of the lake or 500 metres of the ocean).

Bike stands can also be used to enhance public spaces as a form of street art (Photos 7 and 8). On occasion, Council may consider their use; however, they will still need to provide the abovementioned functionality, including maintaining public safety and being low maintenance.

In providing secure bicycle storage, the Green Star tool indicates that the design should also address:

- Security from theft:
  - › By being located in areas having higher levels of incidental public and staff surveillance;
  - › Designed to allow both a wheel and the frame to be locked securely to the structure in accordance with AS2890.3 Bicycle Parking Facilities.
- Protection from the elements:
  - › Secure bicycle parking spaces should be protected from precipitation.
- Convenient location:
  - › Secure bicycle parking spaces must be located in a convenient location, i.e. either inside the building or outside on the site. The location must be clearly signposted, with directions from the main entrance of the building to the bicycle parking spaces (refer AS2890.3 Bicycle Parking Facilities).
- Lighting:
  - › For facilities used after dark, bicycle parking spaces located outdoors should be lit in accordance with AS1158 Lighting for Roads and Public Spaces, Part 3.1 Pedestrian Area Lighting.

Showers and changing amenities:

- Ideally, one male and one female shower should be provided for staffed facilities (or two unisex showers), and at least one shower for every 10 bicycle parking stands (where a single ‘stand’



Photos 5 and 6: Adopted bike stand products used by Council



Photos 7 and 8: Bike stands as street art used to enhance public spaces (Left: Church Street, Parramatta, Right; Marmong Point)

provides capacity to park two bicycles, i.e. 20 bicycles);

- The changing amenity should be adjacent to the showers and include one secure locker per bicycle storage space for staff (80cm tall by 25cm wide for box lockers or 180cm tall by 40cm wide for 'L-shaped' double lockers).

Toilet facilities can be used as changing amenities if there is sufficient private space as well as lockers. Showers and changing amenities should be made available for users other than cyclists. Unisex facilities are appropriate if a level of privacy is provided for the showering and changing (i.e. opaque partitions and private changing amenities adjacent to the showers), provided they are compliant with the National Construction Code (incorporates the BCA).

## 4.7 Innovation

From time to time, there is opportunity to consider designs and retrofits that seek to improve the built environment in a unique way and that help demonstrate Council's leadership in sustainable development. The Green Star Technical Manual's section on Innovation notes the aim as, 'To encourage and recognise pioneering initiatives in sustainable design, process or advocacy', using the following criteria:

- Technology or process that is considered a 'first' in Australia or in the world; and
- The project substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.



## 5.1 Monitoring

### 5.1.1 Electricity

Electricity monitoring of community buildings is currently used by Council to achieve the following objectives:

- Provision of information to facility managers regarding electricity use and running costs of various appliances and building use. For example, real time monitoring combined with a wall-mounted display enables facility users and managers to test the consumption of various appliances by comparing total site use when the appliance is on or off;
- Verification of energy saving targets and ‘ground-truthing’ of estimated upgrade results. For example, a monitoring system placed on a specific end-user a few months ahead of scheduled upgrade allows comparison of pre and post upgrade and performance. This means that energy savings can be quantified to track against Key Performance Indicators, calculate Energy Savings Certificates (ESCs), and detect incorrect operations;
- Provide specific groups with energy use reports and recommendations by using monitoring with multiple current clamps (a current clamp is an electrical device having two jaws which open to allow clamping around an electrical conductor); and
- Continually monitor large energy use sites to track energy use trends and identify issues as they arise.

### 5.1.2 Water

Detailed water monitoring (smart metering through data loggers) is currently undertaken at high risk sites. High risk sites have risk factors that could result in significant water use that would not be easily rectified or detected. High risk sites can be characterised by long, old and/or complex water supply network, high water consumption and/or irregular demand patterns. Swim centres and holiday parks are classified as high risk sites. Where a facility is identified as a high risk site, consideration should be given to the type of water meter to be installed and potential sub-metering arrangements.

Currently the analysis of these data and provision to facility managers is not formalised and further action is required to provide this information in an easily understood format to facility managers so they are able to readily identify any leakages or other water usage issues at their site.

## 5.2 Commissioning

Commissioning is a vital stage of most construction projects. Effective commissioning can help ensure that building fabric and services operate as intended by the design team, in an efficient and effective way (GBCA Technical Manual, 2008).

During the design phase, consideration must be given to how specific components (e.g. irrigation, lighting, heating and/or cooling systems) will be installed, commissioned, operated and maintained over the long term. This will require the collaborative involvement of key stakeholders including users, facility managers, technical experts, asset management and maintenance personnel.

During the construction process, a range of factors (including previously unknown site conditions) can result in changes to the actual building or building components. Where a specialist technology or system has been included in the design, it is vital that the system is installed and operated in an efficient and effective manner. Ongoing and effective maintenance is also vital.

A possible means of ensuring appropriate installation is to engage the designer (or another suitably qualified professional other than the contractor) to provide independent site supervision services during construction/installation. These services could also extend to overseeing the commissioning of the system, providing detailed work as executed drawings and undertaking performance inspections or checks immediately prior to handover.

The exact nature and extent of independent site supervision services required should be assessed on a case-by-case basis. Ideally, this assessment would be undertaken in close collaboration with the relevant Council staff (including subject matter experts).

## 5.3 Materials

The selection of materials for a specific project involves a number of considerations that are often unique to the particular project. These matters are best dealt with in the design phase with input from relevant stakeholders. Any specific material requirements for construction must be specified in the relevant construction documentation (eg. drawings and specifications).

## 5.4 Building Cleaning

One of the outcomes of sustainable design is to create buildings that do not require the purchase of cleaning products that pose a risk to human health or the environment. The adoption of sustainable design principles can reduce the frequency and intensity of cleaning.

In order to achieve the objectives indicated in this Strategy, specific actions for community buildings design and management have been developed. These actions have been categorised as short or long term and appropriate responsible department(s) indicated. The implementation of these actions will be reported on at the time of Strategy review.

## 6 THE WAY FORWARD

	<b>ACTION</b>	<b>TIMEFRAME</b>	<b>RESPONSIBLE DEPARTMENT/S</b>
1	Identification of 3 community buildings for audit and retrofit	1-2 years	Sustainability Asset Management Community Planning
2	Inclusion of information relating to improved building features in the Operating Manuals for specific buildings	1-2 years	Community Planning
3	Development of an Efficiency Toolkit for facility managers	2-5 years	Sustainability
4	Educational material to be developed for display onsite to inform building users of design features and operation of appliances to ensure optimal performance	2-5 years	Sustainability
5	Development of Technical Specifications for various aspects of buildings function (list of possible aspects provided in Appendix A)	1-2 years	Sustainability
6	Asset Management System – include appropriate information in the new system to allow for inclusion of appropriate sustainable buildings information data	1-2 years	Asset Management Sustainability
7	Assessment of resourcing options for design assessment tool via: > external consultants, or > training for existing staff	1-2 years	City Projects Sustainability
8	Development of templates for waste quantification and documentation of disposal methods for demolition/ construction of community buildings	1-2 years	Sustainability
9	Review of Waste Management Plan (DCP requirement) every four years	2-5 years	Sustainability
10	Review current electricity and water monitoring of community buildings and determine a mechanism for providing this information in a readily available and easily understood format on a regular basis to facility managers	1-2 years	Sustainability
11	Development of a feedback process for building users (where appropriate) at intervals of 2 months, 6 months and 12 months post occupation for a new building or one undergoing an upgrade.	2-5 years	Sustainability Community Planning
12	Development of an appropriate species list for indoor plant types.	1-2 years	Sustainability

## 7 REVIEW OF THE BETTER BUILDINGS STRATEGY

This Strategy will be reviewed every two years, with a formal review to be undertaken within four years of its adoption.

Folder No.	PM/120085	TRIM Record No.	
Audience:	Council-wide		
Department:	Sustainability		
Officer:	Sustainable Living Officer - Melissa Bailey		
Review timeframe:	Within 4 years	Next scheduled review date:	9 May 2016
Authorisation:	Manager - Sustainability - Alice Howe, 9 May 2014		

## Glossary

**Accredited Professional** – A building professional who has attended a one day Green Star Accredited Professional training course, has passed the associated examination and is registered with the Green Building Council of Australia

**BMS** – Building Management System. The BMS automatically controls the building services systems to maintain temperature, humidity, ventilation rates and lighting levels to predetermined load requirements and to provide safe, efficient operation of equipment.

**Commissioning** – The process of putting building services systems into active service. This includes testing and adjusting HVAC, electrical, plumbing and other systems to assure proper functioning and adherence to design criteria, and instructing building representatives in their use.

**Green Building** - A Green Building incorporates design, construction and operational practices that significantly reduce or eliminate its negative impact on the environment and its occupants; an opportunity to use resources efficiently while creating healthier environments for people to live and work in.

**Gross Floor Area (GFA)** – The total floor area of all parts of a building that are permanently covered and can be protected from the elements. Car parking (including under-cover car parking) should not be included in the GFA.

**HVAC** – Heating, Ventilation and Air Conditioning. Mechanical systems that provide heating, ventilation and air conditioning in buildings.

**IEQ** – Indoor Environment Quality. Covers issues such as indoor air quality, thermal comfort, illumination, daylight, views, acoustics and occupant control of building systems.

**Mechanical Ventilation** – Ventilation systems which use fans or other electrically operated air movement devices to provide ventilation to a building.

**Natural Ventilation** – The process of supplying and removing air in building spaces by natural means, by using openings in the façade (eg. windows), non-powered ventilators, solar chimneys and infiltration processes.

**Passive Design** – Design that reduces the energy consumption of a building by taking advantage of natural heating, cooling and lighting.

**Renewal** – Expenditure on an existing asset, which returns the service potential or the life of the asset up to that which it had originally.

**Replacement** - Expenditure that will create a completely new asset to replace an asset that has reached the end of its useful life.

**Thermal Comfort** – A means of describing occupant comfort which takes into account air temperature, radiant temperature, humidity, draught, clothing value and activity rates.

**Upgrade** – Expenditure which enhances an existing asset to provide a higher level of service or expenditure that increases the life of the asset beyond its original lifespan.

**Waste Management Plan** – A document which outlines how construction and demolition waste will be collected for recycling and recycled, and how the recycling of that waste will be recorded.

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## Appendix A

### Possible Building Aspects for Technical Specifications Development

Building insulation

Cleaners

Distributed Energy

Domestic Heating and Cooling

Domestic Hot Water Services

External shading

Internal shading

Large HVAC Systems

Lighting indoor controls

Lighting indoor lamps

Lighting outdoor controls

Paints and finishes

Rainwater tanks

Wetware – taps, toilets, showers, urinals

White goods

Windows, doors and skylights





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