Ecologically Sustainable Development
Sustainment of Existing Buildings

What is the Purpose of this Document?

The following general objectives of Ecologically Sustainable Development (ESD) are to guide the sustainment of existing government buildings and their associated sites.

- Take a holistic, life cycle approach to planning, design, costing, construction, maintenance and building management.
- Maximise the re-use and redevelopment of existing built infrastructure and consider non-building service delivery options.
- Maximise use of passive design principles e.g. natural daylight, natural ventilation, solar and thermal mass.
- Design any modification work for ease of future adaptability.
- Maximise the use of existing, renewable, recyclable resources and locally sourced resources.
- Minimise waste to landfill from construction, modification/refurbishment and maintenance activities.
- Minimise air pollution/emissions from buildings e.g. ozone depleting substances [Chlorofluorocarbons (CFC) and Hydro chlorofluorocarbons (HCFC)], greenhouse warming gases [Carbon Dioxide (CO2) and Oxides of Nitrogen (NOx)] and Volatile Organic Compounds (VOC's).
- Minimise resource consumption e.g. materials, water and energy in the operation of the building.
- Minimise impact on the environment and preserve/support/re-establish physical viability, biodiversity and natural ecosystems.
- Monitor and review strategies established to minimise the environmental impact during design, construction, maintenance, demolition and deconstruction activities.

Strategies

As a guide to the development of practices for the sustainment of existing buildings and their associated sites, a range of environmental strategies should be considered.

SOUTH AUSTRALIA
Government of South Australia
Department of Planning, Transport and Infrastructure

Conserve Resources

Energy

The detailed requirements that Government has in regard to energy are set out in the Government Buildings Energy Strategy 2013-2020. Refer to the guide note Government Buildings Energy Strategy Compliance (G46) which can be downloaded from the Building Project Information Management System (BPIMS) Project Library.

A broad range of energy reduction considerations are set out below.

- Take a holistic, life cycle approach to energy management.
- Establish energy benchmark levels for energy consumption and greenhouse gas emissions.
- Consider the application of alternative 'Green Power' renewable energy sources e.g. solar, wind, geothermal, co-generation etc.
- Minimise energy demand by adopting passive design principles e.g. orientation, shape, layout, thermal mass, glazing, shading and insulation.
- Optimise engineering plant and services design to minimise energy consumption e.g. consider at least two alternative air-conditioning options and conduct life cycle costing to help determine preferred option.
- Minimise energy consumption in the design, operation and maintenance of engineering plant and services and through the use of control systems.
- Document design options and energy consumption forecasts in an Energy Efficiency Statement.
- Plan for commissioning of engineering and lighting services to realise operational benefits.
- Install hot water provisions to minimise pipe runs and insulate services to realise operational benefits.
- Consider the re-use of existing lighting infrastructure by modification/upgrade rather than replacement e.g. de-lamping where whole of life costs prove effective.
- Design for system controllability with optimum operating efficiency e.g. manual/automatic lighting controls.
- Select high efficiency fluorescent lights and fittings.
- Include relevant environmental standards, legislative requirements and specific environmental purchasing requirements in supply and service contracts and ensure evaluation of these criteria throughout the procurement process.
- Consider energy performance contracting opportunities.
- Operation and maintenance of assets shall incorporate energy management practices and include energy audits every five years where annual energy consumption of assets exceeds $50,000.
- Monitor energy use in operation and undertake appraisal of energy use over the first twelve months of operation of new/refurbished buildings for optimum efficiency.
- Consider including on-line displays of building energy performance to enable occupants to monitor and commit to ongoing conservation measures.

Water

- Minimise water use by installing water efficient technologies, appliances, fittings and devices e.g. flushing devices, flow controls and waterless urinals.
- Ensure compliance with the Department of Energy, Water and Natural Resources (DEWNR), Water Efficient Outlets in Government Buildings: Policy Statement. The policy references the Water Efficiency Labelling and Standards (WELS) rating scheme. Subject to certain technical exemptions, the policy requires selection of basin and sink outlets that deliver flow rates not exceeding 4.5-6.0 litres/minute (current 4 star WELS rating), and shower heads not exceeding 6.0-7.5 litres/minute (current 5 star WELS rating).Consider innovative stormwater management and reuse technologies.
- Consider innovative wastewater minimising and reuse technologies.
- Implement water efficient landscaping design and irrigation systems.
- Install water usage monitoring and reporting devices.
- Implement water consumption audit and leakage detection programs.
- Control contaminated run-offs from site works e.g. car parks.

Materials

- Adopt life-costing principles for materials and system selection e.g. life cycle analysis, whole of life environmental impacts and use of materials with low embodied energy.
- Assess/select products and systems for their future ability to be recycled and from renewable sources i.e. reduce or avoid the use of rare and non-renewable resources.
- Assess/select construction, modification/refurbishment technologies, products and materials for their future ability to be recycled and dismantled with minimum damage.
- Avoid toxic emitting, hazardous materials and those that release hazardous emissions (VOC's) into the atmosphere e.g. carpets and upholstery, paints and adhesives – including those with toxic/pollutant release during fires and during construction modification/refurbishment activities.
- Select durable, low maintenance materials.
- Select locally sourced materials where available.
- Ensure any timber used is from sustainable regrowth forests/plantations.
- Minimise material quantities (e.g. use simple design, standard material sizes and components).

Waste

- Implement waste management practices in construction, modification/refurbishment and maintenance activities to support re-use and recycling e.g. reduce off-cuts, arrange on-site waste separation services.
- Manage the use and storage of hazardous substances and waste.

User Amenity/Healthy Environment

As a guide to the project team in the development of the design, details and work practices, the following issues shall be considered in regard to user amenity.

Heating, Ventilation and Air-conditioning (HVAC)

- Minimise requirements for HVAC systems by maximising use of passive design including natural heating, cooling and ventilation technologies e.g. orientation, shape, thermal mass, window glazing/shading, insulation.
- Consider the use of building thermal modelling and energy performance simulation programs to determine the most efficient building and system performance.
- Design for system controllability and optimum operating efficiency e.g. manual/automatic air-conditioning, ventilation and water storage controls.
- Consider re-use of existing infrastructure by modification/upgrade rather than replacement where whole of life costs prove effective.
- Promote installation of renewable energy in replacement systems e.g. consider solar, wind, geothermal and co-generation opportunities.
- Optimise engineering plant and services design and modification to minimise energy consumption.
- All new/replacement air conditioning units that are not centrally controlled[1] must be provided with:
    - an automatic switch-off device that shuts the system down after a specified period, or when no movement is detected after a specified period
    - a temperature control mechanism that restricts the temperature setting to a pre-set range of 18-22oC in winter and 22-26oC in summer and does not permit users to select temperatures below or above this.
- Install hot water provisions to minimise pipe runs and insulate services to realise operational benefits.
- Ensure proper commissioning of engineering services to realise operational benefits.
- Minimise air pollution/emissions from buildings e.g. ozone depleting, greenhouse warming and toxic gases.
- Implement innovative water efficient technologies e.g. flow control devices.
- Consider including online displays of building energy performance to enable occupants to monitor and commit to ongoing conservation measures.

[1] Government Buildings Energy Strategy 2013-2020, Government of South Australia

Lighting

- Design lighting levels appropriate to tasks.
- Maximise natural daylight penetration to building interior and allow selective use of artificial lighting where daylight is inadequate.
- Select high efficiency light fittings.
- Minimise the impact of night lighting and solar shadows on adjoining sites.
- Consider re-use of existing lighting infrastructure by modification/upgrade rather than replacement e.g. de-lamping, where whole of life costs prove effective.

Noise and Acoustics

- Minimise impact of noise pollution including noise from construction/refurbishment and maintenance activity/equipment.
- Separate noise-generating activities from quiet activities.
- Minimise impact of noise pollution to adjoining sites.

Office Equipment and Furniture

- Select office equipment, computers and machines for their energy efficiency and using principles applicable to the selection of building materials.
- Consider recycling/refurbishment of existing furniture in lieu of purchasing new.
- Select furniture following the same principles as those for building materials.

Natural Environment

As a guide to the project team in the development of the design, details and work practices, the following issues shall be considered in regard to preserving the physical viability of natural ecosystems.

Bio-diversity

- Evaluate site and local ecosystems by conducting environmental impact assessment and consider in project cost benefit analysis.
- Support the maintenance of bio-diversity by conserving viable site populations of all native flora/fauna and maintain their habitats.
- Support the maintenance of bio-diversity with site remediation activities.

Physical Environment

- Minimise resource, environmental, physical and social impacts in any construction / modification / refurbishment activities.
- Preserve/re-establish the physical viability of natural ecosystems.
- Carry out site contamination testing.

- Implement environmental landscape principles that mitigate soil erosion, reduce water requirements, ensure stormwater management/reclamation, (including wetland technology) and optimise microclimate (including wind, light, heat and the effect of solar shadows).
- Protect site and adjacent environment during maintenance and construction activities e.g. dust control, water quality and control of contaminated run-off.

Social Cultural and Heritage

As a guide to the design team in the development of the design, details and work practices, the following issues shall be considered in regard to social, cultural and heritage issues.

- Consider social, cultural and heritage impacts and allow for community participation.
- Balance needs for privacy, security and social interaction.
- Consider shared use or provision of adjacent facility infrastructures.
- Minimise adverse physical and visual impacts.

References

Government Buildings Energy Strategy Compliance (G46)
http://www.bpims.sa.gov.au/bpims/library/downloadResource.do?id=778

Contact

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