Veterans Capital Works Guidance Notes

Source: Adapted from Sport and Recreation Victoria's "Fact Sheet Environmentally Sustainable Design.

Environmentally Sustainable Design

Environmentally Sustainable Design (ESD) can reduce operational costs and environmental impacts while increasing building resilience.

What is the objective of sustainable design?

The main objectives of sustainable design are to reduce, or completely avoid, depletion of critical resources like energy, water, land, and raw materials; prevent environmental degradation caused by facilities and infrastructure throughout their life cycle; and create built environments that are livable, comfortable, safe, and productive.
Source: http://www.wbdg.org/design-objectives/sustainable

Applicants to the Veterans Capital Works Grants program are encouraged to consider ESD principles. The outcomes may be a reduction in running costs and emissions, water and energy savings. Below are a range of Environmentally Sustainable Design initiatives that you may consider in the design and development of your project.

1. OPTIMISE SITE / STRUCTURE POTENTIAL

- **Building Orientation:** Ensuring that the building has good solar access – amount of sun's energy available to the building – that will result in heat gain from the sun, reduce energy requirements and improve comfort levels.

- **Insulation** of the building envelope will help keep heat in during the winter and reduce heat gain in summer. Some insulation materials can also be used for soundproofing. Insulation should always be coupled with appropriate shading of windows and adequate ventilation in summer.

- **Windows:** Window design, orientation, glazing treatment, shading and internal coverings can have a significant impact on building's energy efficiency and comfort. Look for Windows Energy Ratings Scheme (WERS) labels.

- **Integrated green roofs and light coloured roofs** can assist with insulation and reduce heat pockets.

- **Landscaping**
    - Minimise habitat disturbance, enhance biodiversity and complement natural systems
    - Capture storm water run offs
    - Use vegetation swales and depressions to reduce run offs

- Control erosion through improved landscaping practices
- Use vegetation, grading and stabilization techniques to prevent erosion
- Consider planting trees to shade areas of the building exposed to sun
- Minimise water use
- Minimise invasive plants
- Minimise chemical use

- **Design for sustainable transportation:** encourage alternatives to commuting; consider bicycle parking and proximity to public transport.

2. OPTIMISE ENERGY USE: PASSIVE SOLAR DESIGN

- **Thermal mass** refers to building materials ability to absorb and store heat, and release it later. Adding thermal mass within an insulated building acts as a heat sink thereby tempering the internal environment by reducing and delaying the onset of peak temperatures, keeping the building cooler in summer and warmer in winter.

- **Daylighting: Light Shelves** – designed to shade external windows and at the same time reflect daylight into the building interior. Light shelves can complement conventional artificial lighting in the daytime and reduce need for artificial lighting.

- **Light pipes** are designed to transport daylight over extended distances by installing the collector, transmitter and emitter and will offset the cost of conventional lighting.

- **Dual purpose solar hot water systems:** excess heat generated by increasing the number of solar panels can be used to for space heating – by passing hot water through the pipes and cooling – by driving the absorption chillers with excess heat. Applicable to buildings with hot water and pool heating and cooling and heating spaces.

- **Automatic shading system –** solar powered shading system allow for automated operation incorporating wind and solar sensors.

- **Solar air heaters** provide free interior heating. The sunrays heat the solar collectors, warming the air to be conveyed into a room.

- **Thermal storage: Heat pumps** – work like a domestic refrigerator in reverse – they absorb heat from the ground, air or body of water and store it in a small space.

- **Solar chimney:** by natural convection – air exchange and movement within the building – solar chimneys promote ventilation of unwanted heated air.

- **Transpired Solar Air Heaters** – use of clean solar energy to reduce the heating load for all or part of the building, suitable for large heating loads and large indoor spaces.

- **Photovoltaic systems:** widely used for generating electricity for a variety of purposes. Innovative use of photovoltaic systems is supported by the use heat recovery.

- **Solar concentrators:** excess heat generated by conversion of solar energy into electricity used to generate hot water – combined heat and power system.

- **Trombe walls** forms part of the building envelope. Solar radiation will heat the air trapped between the outer double layer of glass and the 20-30cm tick masonry wall and the wall itself. The heat is released into the indoor spaces. Trombe wall can complement or entirely replace the conventional heating.

- **Hollow core:** precast extruded concrete slab with in-built air ducts that acts as climate control system. The slabs act as heat storage and air exchange device. Air is circulated into the room by mechanical ventilation systems.

Clean Energy Council: http://www.solaraccreditation.com.au/consumers.html

3. PROTECT AND CONSERVE WATER

Environment Protection Authority Victoria: www.epa.vic.gov.au/for-business/how-to/lower-environmental-impact-business/improve-resource-efficiency-business :

- **Water harvesting and recycling:** storm water is easy to capture, store and use for many purposes around community facilities. Simple management protocols and catchment management practices will ensure that water can be used for low-risk purposes such as irrigation.

- **Stormwater harvesting and use:** https://www.epa.vic.gov.au/for-community/environmental-information/water/stormwater

- https://www.epa.vic.gov.au/for-community/environmental-information/water/stormwater/harvest-stormwater

- **Building sites and stormwater:** https://www.epa.vic.gov.au/for-business/find-a-topic/stormwater-building-sites

- **Using rainwater:** https://www.epa.vic.gov.au/for-community/environmental-information/water/alternative-water-supplies-and-their-use

4. USE ENVIRONMENTALY FRIENDLY OR GREEN MATERIALS AND PRODUCTS

Choose materials that have reduced impact on the environment and that provide a healthier indoor environment by:

- Reusing existing materials, such as saving materials from demolition
- Maximising use of recycled materials or with high recyclable content
- Using locally produced materials
- Using materials that require low usage of row resources in their production
- Using non-toxic materials
- Using wood from sustainably managed forests.

5. ENHANCE INDOOR ENVIRONMENTAL QUALITY

- **Drought Proofing and ventilation:** the control of air movement achieved through reduction of air leakage and installation of controllable ventilation. This will improve indoor air quality.
- **Consider indoor air quality:** consider building products, systems (e.g. heating and cooling), ventilation and design that will result in good indoor air quality. www.epa.gov/indoor-air-quality-iaq/office-building-occupants-guide-indoor-air-quality

6. FIND SUSTAINABLE TRADES PEOPLE AND PROFESSIONALS

- Consider **builders, plumbers, electricians, painters, landscapers and other tradespeople** who can incorporate sustainable practices into the project.
- Find an accredited thermal performance assessor: http://www.bdav.org.au/thermal-performance-assessors

Other Useful Resources

- Commonwealth Scientific and Industrial Research Organisation: www.csiro.au
- Sustainability Victoria: www.sustainability.vic.gov.au/
- Department of Environment and Energy: www.energy.gov.au/ www.environment.gov.au/climate-change
- Green Building Council of Australia: www.gbca.org.au
- Water Rating: www.waterrating.gov.au/
- Energy rating: www.energyrating.gov.au/