



**Facilities Management
Planning and Design Section
Project Management
and
Design Standards Manual**

Section Environmentally Sustainable Design



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1.0 Introduction

1.1 *Aim of the Manual*

The aim of this manual is to assist consultants and staff achieve the Environmentally Sustainable Design (ESD) objectives of the University. The relevant Australian Design Codes and Standards shall be adhered to on all University project with a higher standard to be provided as described by this and other manuals published by Facilities Management (FM)

Variations from this standard are to be approved by the relevant Senior Technical Officer.

1.2 *The University as a long term owner*

As a long term owner the University has a vital interest in the quality of its built environment and the efficient running of installed equipment. The University should continuously evaluate projects on a life cycle and running cost basis.

Any proposals on component selection or system design to improve running efficiency should be fully evaluated at the design stage. What we build today we expect to live with for a long time. The 'as constructed' project must conform to established University building standards and represent the best possible value for money, consistent with planning and financial restraints. It must also be easy to maintain, energy efficient, easy to clean and environmentally and aesthetically acceptable, both internally and externally.

It must also be buildable, and the final form must be flexible enough to allow ready and inexpensive alterations.

Finally, to the maximum extent possible, the end result must satisfy the user's requirements as detailed in the brief.

2.0 Vision

The University of Western Australia is committed to ensuring a safe working environment and acting in an environmentally responsible manner in our operations, teaching and research programmes.

The University seeks to be a leader in environmental responsibility within the community.

2.1 General Aims

To promote through all the University's activities, a sound awareness of, and favourable attitudes and behaviours towards the environment among all staff, students, visitors and the community.

Reduce the adverse impacts of the University's activities on the local, national and global environments.

2.2 The Policy

UWA Environmental Policy (2000)

http://www.fm.uwa.edu.au/about/policies/environmental_policy

The University of Western Australia recognises its environmental obligations, both locally and globally, to present and future generations.

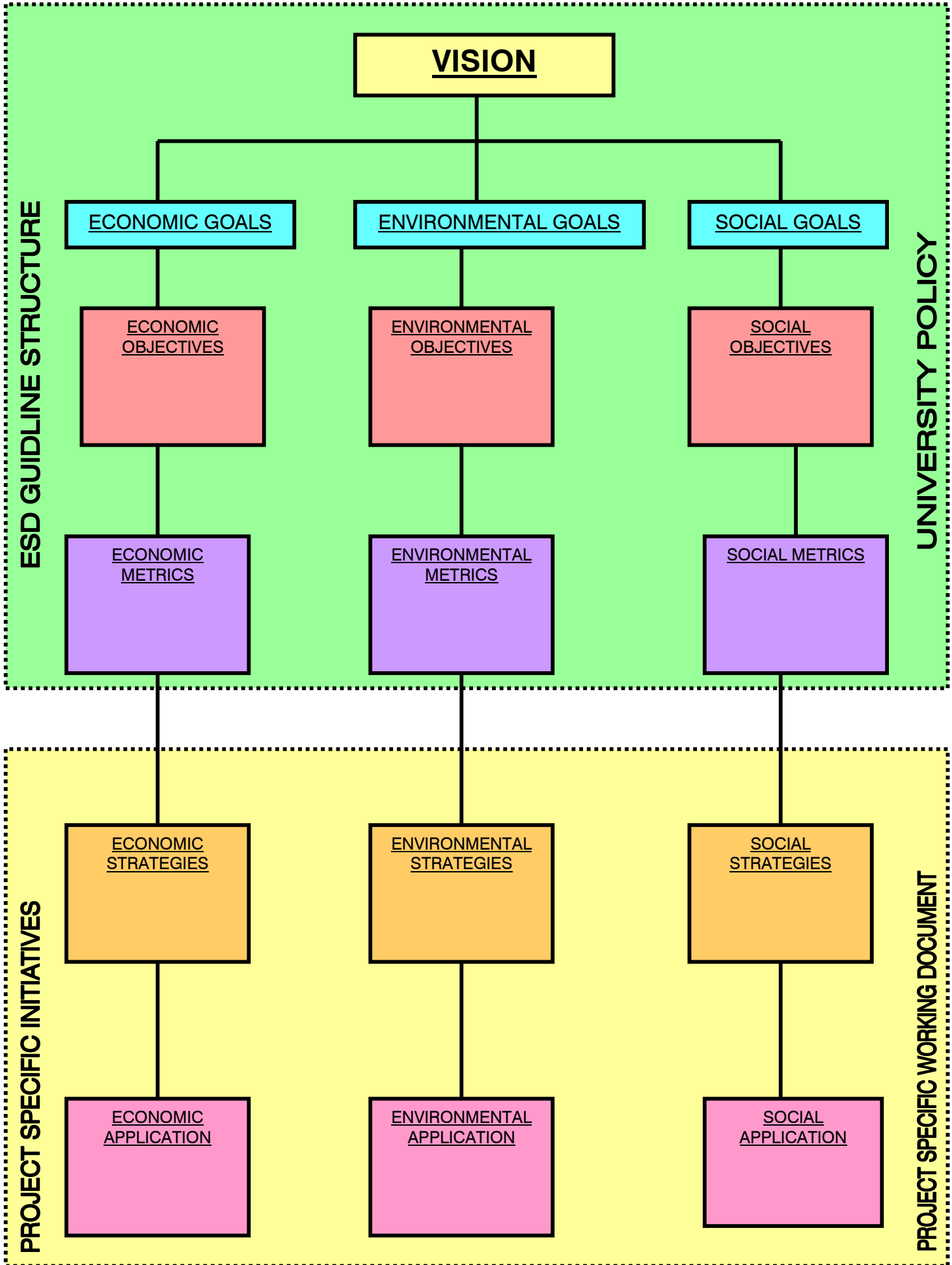
The University of Western Australia, as a progressive tertiary institution, accepts its responsibility for environmental protection.

The University of Western Australia will operate in a manner which protects the health of staff, students and visitors.

The University of Western Australia will be aware of and monitor its environmental legislative obligations and strive for best practicable methods.

The University of Western Australia will endeavour to ensure that campus visitors and users are made aware of the University's environmental values and the types of behaviour which might be detrimental to those values.

The environmental policy will establish a framework for setting and reviewing environmental goals.



2.3 Principles and Goals Environmental

To support UWA's Environmental Policy, the following principles have been developed to provide additional direction on specific issues.

The University of Western Australia will employ the best practicable methods to:

- Benchmark performance against comparable institutions to establish targets and monitor performance.
- Conserve energy (produced by non-renewable resources, and by methods which pollute the environment).
- Conserve water resources and minimise wastewater disposal.
- Minimise and, where possible, eliminate the use of harmful substances.
- Ensure the correct and safe disposal of all substances.
- Minimise waste generation through reduction, reuse and recycling.
- Minimise pollution - noise, visual, electromagnetic radiation, odour.
- Address environmental concerns in all planning and landscaping decisions.
- Encourage procurement procedures that adhere to the principles of the environmental policy.
- Encourage teaching and research activities designed to facilitate and implement specific components of this policy.
- Regularly audit its Environmental Management System.
- Develop and maintain a database of products and services suppliers meeting environmental criteria.

As part of the growing world wide trend towards environmentally sustainable building designs, the University has adopted a policy to design, build and retrofit buildings in an environmentally sustainable way as its default position.

3.0 Economic Goals

To incorporate ESD into the University's planning, design, construction and maintenance of new and existing facilities, with a neutral or overall reduction in capital and recurrent costs.

3.1 Economic Objectives

Lower annual operating costs

More efficient asset management

Increased occupant productivity

Decreased staff churn

Marketing advantage

Higher market value for assets

Future proofing against mandatory government requirements

Attract tenants and higher rents

Attract grants and subsidies for environmental stewardship

Reduce carbon emissions

3.2 Economic Metric

To achieve a reduction in annual energy costs

To achieve a reduction in annual water costs

To achieve a reduction in annual waste costs

To achieve a reduction in maintenance costs

To achieve an increase in staff productivity

To achieve an increase in student productivity

To increase staff retention rates

4.0 Environmental Goals

To reduce the environmental footprint created by the construction and operation of University facilities.

4.1 Environmental Objectives

Lower annual energy usage

Reduction in greenhouse gas emissions and contribution to human induced climate change

Purchase a portion of electricity from renewable sources (Green Power)

Lower annual scheme and ground water consumption

Very high indoor environment quality

Sustainable transport networks in and around University grounds

Improvement in the ecological value of the site

Lower polluting emissions from the site

High use of sustainable construction materials

Support and encourage innovation and new technologies

Demonstration projects

4.2 Environmental Metric

Achieve a reduction in annual energy use

Achieve a reduction in greenhouse gas emissions

Purchase of percentage of accredited Green Power

Achieve a reduction in annual mains water usage

Achieve a reduction in annual ground water usage

Develop a sustainable transport strategy

Decrease in car use as main form of transport to work

Reduced waste to landfill

Pollution prevention

Participate in greenhouse Challenge

Demonstrate progress through innovation.

4.2.1 New BCA Class 5 buildings

From July 2007 all new Building Code of Australia (BCA) Class 5 office buildings for the University shall be designed to achieve a 6 Star Green Star rating using the Green Building Council of Australia's (gbca) Green Star Office Design rating tool.

Specific credits within the rating tool have been identified as mandatory while others are optional for use in achieving the rating. Refer to the following table for a list of mandatory credits.

Ratings tools can be downloaded from the Green Building Council of Australia's website

<http://www.gbcaus.org>

The rating tool shall be used in conjunction with the appropriate Technical Manual. Technical Manuals can be obtained from the GBCA.

The most recent version of the rating tool and technical manual available at the time of project commencement shall be used. If the rating tool and technical manual are updated early in the project design phase, the University Senior Project officer will determine which version shall be used on the project.

Green Star – Office Design Credit Summary

Management	Green Star Accredited Professional	M
	Commissioning - Clauses	M
	Commissioning - Building Tuning	M
	Commissioning - Commissioning Agent	O
	Building Users' Guide	M
	Environmental Management	O
Indoor Environment Quality	Waste Management	O
	Ventilation Rates	O
	Air Change Effectiveness	O
	Carbon Dioxide Monitoring and Control	O
	Daylight	O
	Daylight Glare Control	O
	High Frequency Ballasts	O
	Electric Lighting Levels	O
	External Views	O
	Thermal Comfort	O
	Individual Comfort Control	O
	Asbestos	M
	Internal Noise Levels	O
	Volatile Organic Compounds	O
	Formaldehyde Minimisation	O
Mould Prevention	O	
Tenant Exhaust Riser	O	
Energy	Energy	M
	Energy Improvement	O
	Electrical Sub-metering	M
	Tenancy Sub-metering	O
	Office Lighting Power Density	O
	Office Lighting Zoning	O
	Peak Energy Demand Reduction	O
Transport	Provision of Car Parking	M
	Small Parking Spaces	O
	Cyclist Facilities	M
	Commuting Public Transport	O
Water	Occupant Amenity Potable Water Efficiency	O
	Water Meters	M
	Landscape Irrigation Water Efficiency	O
	Cooling Tower Water Consumption	O
	Fire System Water Consumption	O
Materials	Recycling Waste Storage	M
	Re-use of Façade	O
	Re-use of Structure	O
	Shell and Core or Integrated Fitout	M
	Recycled Content of Concrete	O
	Recycled Content of Steel	O
	PVC Minimisation	O
	Sustainable Timber	O
Land Use & Ecology	Ecological Value of Site	M
	Re-use of Land	O
	Reclaimed Contaminated Land	O
	Change of Ecological Value	O
	Topsoil and Fill Removal from Site	O
Emissions	Refrigerant ODP	M
	Refrigerant GWP	O
	Refrigerant Leak Detection	O
	Refrigerant Recovery	O
	Watercourse Pollution	O
	Reduced Flow to Sewer	O
	Light Pollution	M
	Cooling Towers	O
	Insulant ODP	O
Innovation	Innovative Strategies and Technologies	O
	Exceeding Green Star Benchmarks	O
	Environmental Design Initiatives	O
M=Mandatory Credit O=Optional Credit		

4.2.2 New BCA Class 9b buildings

From July 2007 all new Building Code of Australia (BCA) Class 9b buildings for the University shall be designed to achieve a 6 Star Green Star rating using the Green Building Council of Australia's (gbca) Green Star Education Pilot rating tool.

Specific credits within the rating tool have been identified as mandatory while others are optional for use in achieving the rating. Refer to the following table for a list of mandatory credits.

Ratings tools can be downloaded from the Green Building Council of Australia's website

<http://www.gbcaus.org>

The rating tool shall be used in conjunction with the appropriate Technical Manual. Technical Manuals can be obtained from the GBCA.

The most recent version of the rating tool and technical manual available at the time of project commencement shall be used. If the rating tool and technical manual are updated early in the project design phase, the University Senior Project officer will determine which version shall be used on the project.

Green Star – Education Pilot Credit Summary

Management	Green Star Accredited Professional	M
	Commissioning - Clauses	M
	Commissioning - Building Tuning	M
	Commissioning - Commissioning Agent	O
	Building Users' Guide	M
	Environmental Management	O
	Waste Management	O
	Learning Resource	M
Indoor Environment Quality	Maintainability	M
	Ventilation Rates	O
	Air Change Effectiveness	O
	Carbon Dioxide and VOC Monitoring and Control	O
	Daylight	O
	Daylight Glare Control	O
	High Frequency Balasts	O
	Electric Lighting Levels	O
	External Views	O
	Thermal Comfort	O
	Hazardous Materials	M
	Internal Noise Levels	O
	Volatile Organic Compounds	O
	Formaldehyde Minimisation	O
Mould Prevention	O	
Energy	Energy-Conditional Requirement	M
	Energy Improvement	O
	Electrical Sub-metering	M
	Peak Energy Demand Reduction	O
	Stairs	O
	Unoccupied Areas	O
	Lighting Zoning and Control	O
	Efficient External Lighting	O
	Car Park Ventilation	O
	Centralised Energy Systems	M
Transport	Car Park Minimisation	M
	Fuel Efficient Transport	O
	Cyclist Facilities	M
	Commuting Mass Transport	O
Water	Pedestrian Routes	M
	Occupant Amenity Potable Water Efficiency	O
	Water Meters	M
	Landscape Irrigation Water Efficiency	O
	Heat Rejection Water Consumption	O
	Fire System Water Consumption	O
Materials	Potable Water Use in Laboratories	O
	Recycling Waste Storage	M
	Reuse of Façade	O
	Reuse of Structure	O
	Recycled Content of Concrete	O
	Recycled Content of Steel	O
	PVC Minimisation	O
	Sustainable Timber	O
	Flooring	O
	Joinery	O
	Loose Furniture	O
Land Use & Ecology	Recycled-Content & Reused Products and Materials	O
	Disassembly / Deconstruction	O
	Ecological Value of Site	M
	Reuse of Land	O
	Reclaimed Contaminated Land	O
Emissions	Change of Ecological Value	O
	Topsoil and Fill Removal from Site	O
	Ozone Depletion Potential	M
	Refrigerant GWP	O
	Refrigerant Leak Detection and Recovery	M
	Watercourse Pollution	O
	Reduced Flow to Sewer	O
Exceeding Green Star Benchmarks	Light Pollution	M
	Legionella	O
	Innovative Strategies & Technologies	O
Exceeding Green Star Benchmarks	O	

Environmental Design Initiatives	O
M=Mandatory Credit O=Optional Credit	

4.2.3 New Fitout in BCA Class 5 buildings

From July 2007 all new fitouts in Building Code of Australia (BCA) Class 5 office buildings for the University shall be designed to achieve a 6 Star Green Star rating using the Green Building Council of Australia's (gbca) Green Star Office Interiors rating tool.

Specific credits within the rating tool have been identified as mandatory while others are optional for use in achieving the rating. Refer to the following table for a list of mandatory credits.

Ratings tools can be downloaded from the Green Building Council of Australia's website

<http://www.gbcaus.org>

The rating tool shall be used in conjunction with the appropriate Technical Manual. Technical Manuals can be obtained from the GBCA.

The most recent version of the rating tool and technical manual available at the time of project commencement shall be used. If the rating tool and technical manual are updated early in the project design phase, the University Senior Project officer will determine which version shall be used on the project.

Green Star – Office Interiors Credit Summary

Management	Green Star Accredited Professional	M
	Tenancy Fitout Commissioning	M
	Commissioning - Tenancy Fitout Tuning	M
	Tenant Guide	M
	Environmental Management	O
	Waste Management During Tenancy Fitout	O
Indoor Environment Quality	Ventilation Rates	O
	Carbon Dioxide Monitoring and Control	O
	Daylight	O
	Daylight Glare Control	O
	High Frequency Ballasts	O
	Electric Lighting Levels	O
	External Views	O
	Individual Comfort Control	O
	Asbestos	M
	Internal Noise Levels	O
	Volatile Organic Compounds	O
	Formaldehyde Minimisation	O
	Air Supply Ductwork	O
	Tenant Exhaust	O
Indoor Plants	O	
Energy	Energy Efficiency	O
	Energy Improvements	O
	Electrical Sub-metering	M
	Office Lighting Zoning	O
Transport	Public Transport	O
	Car Parking	O
	Cyclist Facilities	M
Water	Potable Water Efficiency	O
Materials	Workstations	O
	Flooring	O
	Walls and Partitions	O
	Chairs	O
	Tables	O
	Storage	O
	Joinery	O
	Ceilings	O
	Waste Management for Tenancy Operation	M
	PVC Minimisation	O
Timber	O	
Land Use & Ecology	Green Star - Office As Built Certified Building	O
	Building Layout Efficiency	O
	Building Environmental Management	O
	Commitment to Building Performance	O
	Shell and Core or Integrated Fitout	O
Building Conservation	O	
Emissions	Refrigerant Ozone Depleting Potential	M
	Insulation Ozone Depleting Potential	O
Innovation	Innovative Strategies and Technologies	O
	Exceeding Green Star Benchmarks	O
	Environmental Design Initiatives	O
M=Mandatory Credit O=Optional Credit		

4.3 Environmental Strategy

4.3.1 Environmental Ratings

From July 2007 all new BCA Class 5 office buildings and the Class 5 portions of mixed classification buildings shall be designed to achieve a 6 star GBCA Green Star Office Design rating.

From July 2007 all new fitouts in BCA Class 5 office buildings and the Class 5 portions of mixed classification buildings shall be designed to achieve a 6 star GBCA Green Star Office Interiors rating.

From July 2007 all new BCA Class 9b buildings and the Class 9b portions of mixed classification buildings shall be designed to achieve a 6 star Green Star Education rating. (note: Pilot rating tool only available at this stage)

4.3.1 Energy

From July 2007 all new BCA Class 5 and 9b buildings shall be designed to achieve as a minimum the conditional energy requirements of the applicable Green Star rating tool. Improvements in energy efficiency over and above those required in the Green Star tool shall be explored and exploited on a project specific basis.

From July 2007 on all new projects other than BCA Class 5 and 9b buildings shall be designed to achieve a minimum;

- 40% reduction in the Annual Energy Consumption Allowance as stated in Table JV2 of Section J of the BCA, or
- 30% reduction in the Annual Energy Consumption Allowance as Calculated by JV3 Verification using a reference building of Section J of the BCA.

4.3.1 Water

University grounds shall not be irrigated by mains (scheme) water supply. Grounds shall be irrigated using ground water abstracted via bore directly from the shallow aquifer and delivered to the grounds through a dedicated irrigation pipework network.

All new landscaping shall be of drought tolerant plantings only.

Where practical, sub-soil irrigation shall be used in place of surface watering techniques.

Urinals shall be waterless type with mechanically operated odour seal. (Urimat, "Eco" model or approved equal)

Drinking water fountains are to supply ambient temperature water only.

Cisterns shall be dual flush: 6 Litres full flush, 3 litres half flush.

Mains (scheme) water supplies to each building shall be metered. Water meters shall contain pulse heads (Max 10 litre per pulse) and be connected to the site BMS to provide monitoring leakage alarm capacity.

Where practical, the roof areas of new buildings shall be used to collect rain water for use as feed water into de-ionised water (DI water) systems. DI feedwater systems shall include storage and piping systems for the collected rainwater. Consideration should be given to adjacent facilities that require DI water that may not have suitable collection or storage means.

Student toilet areas shall be supplied with cold water only.

Timed flow taps shall be installed to all student and staff hand basins

Flow restrictors shall be installed to all student and staff hand basins.

Shower heads shall have a maximum flow rate of 9 Litres per minute.

Where practical, all taps shall be provided with flow restrictors.

Where practical, waste water (grey water) shall be re-used. (e.g. shower water re-used for sub-soil irrigation)

Storm water shall be retained on site and used to recharge the shallow aquifer. Each new project shall assess the use of light liquid and gross pollution traps to prevent entry into the storm water system.

Where practical, storm water shall be prevented from directly entering the Swan River via surface run-off and drainage. (Crawley Campus site only) Storm water shall be prevented from directly entering adjacent wetlands and river systems via surface run-off and drainage.

For additional information refer to the Universities Hydraulics Guidelines.

<http://www.fm.uwa.edu.au/about/policies#fmcads>

4.3.2 Hot Water Systems

Hot water systems shall be point-of-use natural gas type.

Each new project shall assess the use of solar hot water systems.

4.3.2 Mains Gas Supply

Mains gas supplies to each building shall be metered. Gas meters shall be “Elster” turbine type with pulse head connected to the site BMS to provide monitoring leakage alarm capacity.

4.3.3 Transport

At the earliest practical stage, each new project shall be coordinated with the University transport planner. Projects shall incorporate end-of-trip facilities in accordance with the University policy.

Many car parking spaces and cycling facilities are provided on a “shared” basis amongst buildings. Each project will need to consider the shared aspects of the transport infrastructure to ensure adequate facilities are provided for the project and double counting.

Traffic flow patterns are to be create around the promotion of non-motorised access

4.3.4 Space Utilisation

At the earliest practical stage, each new project shall be coordinated with the University Architect and Space Planner.

For all new projects, space utilisation surveys shall be conducted of nearby buildings to identify potential common use areas and facilities. Refer to the Australasian Association of Higher Education Facilities Officers (AAPPA) Space Planning Guidelines, Edition 2 for additional guidance on space planning.

5.0 Social Goals

To improve the social health and wellbeing of all University stakeholders and to build the cultural value of the institution

To respect the social health and wellbeing of the community affected by the University's activities.

5.1 Social Objectives

Increased occupant wellbeing and comfort

Decreased staff churn

Reduce health problems associated with poor indoor environments

Increase benefit in being a good neighbour

Show leadership

Improve universal access provisions

Social Metric

Awards for environmentally sustainable design

Decrease in staff churn

Decrease in absenteeism