



MONTESSORI INTERNATIONAL COLLEGE

Showcasing Montessori International College, Maroochydore Road, Forest Glen as part of a series of case studies that have been developed to illustrate best practice Clean Technology solutions.

The Clean Technologies industry has been identified as one of seven high value industry sectors for the Sunshine Coast region, as defined in the Sunshine Coast Council's Regional Economic Development Strategy 2013-2033.

Clean Technology Solutions at Montessori International College:

- Design, construction and operation of the buildings reflect Montessori's ethos that environmental sustainability is central to student learning
- Whole school community collaboration in school design
- Ecological Sustainable Design goals and an Environmental Management Plan incorporated at design phase
- Insulating double brick and concrete slab building envelopes
- Passive building design
- Low toxic building materials that have been recycled or contain recycled content
- Durable building materials with coloured finishes
- Integrated onsite water management system with stormwater harvesting, treatment and reuse
- 100% rainwater supply
- 43% of the site preserved as habitat
- 20% organic farmland/permaculture land laboratory

The Clean Technology industry on the Sunshine Coast generates \$214 million in economic activity, employs 1,770 people and has become a model for sustainability in Australia*.

Please contact us to provide you with a list of regional solution providers.

BENEFITS:

- ✓ Zero water supply costs
- ✓ Comfortable indoor temperatures and lower heating and cooling costs
- ✓ High indoor air quality and access to views and natural lighting for increased student wellbeing and productivity
- ✓ Efficient lighting and appliances and lower energy costs
- ✓ Less structural maintenance
- ✓ Lower structural carbon footprint



MONTESSORI
INTERNATIONAL COLLEGE



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What is Clean Technology?

Economically viable products, services and processes that harness renewable materials and energy sources, dramatically reduce the use of natural resources and cut or eliminate emissions and wastes.



Sustainable Design and Structural Materials

When Montessori International College (MIC) decided to move premises, sustainability was the guiding principle. Built on 22-hectares of bushland in Forest Glen, the building and carpark footprint is limited to 3% of the site providing substantial outdoor classroom space and bushland conservation.

The college worked with Sunshine Coast architects PlaceSense to embody sustainability including dematerialising the design of the buildings where possible and siting structures to minimise the impact on the natural environment whilst maximising opportunities for future land rehabilitation. Building materials were chosen for durability and low life cycle impacts, toxicity and maintenance requirements with good thermal and acoustic properties.

Future plans include a mobile learning space of approximately 50 m² which can be relocated to new learning areas on campus allowing students to learn in the natural environment while providing protection from the elements.

FEATURES:

- Relocated and repurposed 685 m² floor space of lightweight, steel and timber framed buildings from the Sippy Downs campus
- Subtropical contemporary thermal passive design which respects the character of the natural topography and natural environment and is orientated northward to allow for the penetration of sea breezes and sunlight
- Round house is double bricked with an insulated cavity that achieves the required 50 decibel acoustic rating whilst being more economical than multi-wall timber construction
- Low maintenance light toned bricks that reduce solar absorption and exposed concrete slabs to help control ambient air temperatures by moderating outside extremes
- A flat roof that not only allows for future expansion upwards but provides a learning space for students including green roof trials and air quality monitoring
- Durable and low carbon concrete that contains 25% of the waste product, fly ash
- Webnet stainless steel mesh allow endemic climbing vines to grow and create a green wall



BENEFITS:

- ✓ Reducing embodied energy by up to 72% and waste to landfill by 3 m³ per tonne of steel over the steel life cycle and construction costs by relocating and repurposing buildings
- ✓ Low carbon concrete not only utilises a waste stream but has greater strength than conventional concrete, resistance to chemical attack and resistance to corrosion of reinforcing steel
- ✓ Passive thermal design and building materials reduce heating and cooling costs
- ✓ Coloured bricks reduce painting requirements while exposed concrete used for floors and ceilings reduce finishing costs and maintenance
- ✓ The green wall helps with climate control and also filters air pollutants from the adjacent road



Water Supply

MIC is not connected to mains water and relies on harvested rainwater to meet its water consumption requirements. The round house is surrounded by 16 water tanks that harvest rainwater.

FEATURES:

- Rainwater harvesting to supply 100% potable water and designed for the 1 in 20 year event
- 600 kL rainwater collection capacity
- Water efficient appliances and education program has limited water use to 8.7 L of rainwater per student per day which is equivalent to typical mains water use for schools
- Water saving plumbing fixtures (4 Star WELS)
- Dams capture rainwater for agricultural use



BENEFITS:

- ✓ Self-sufficient water supply with zero water supply costs

Montessori International College philosophy

Our place teaches us about the world we live in as we ... design solutions with nature.



Energy Supply and Management

MIC have reduced ongoing energy costs through good building design and the use of efficient appliances. Future proofing their college has been achieved through master planning buildings which will allow for future installation of solar PV panels.

Future plans include installation of PV solar array on rooftops. Installation of shade structures over the carpark or walkway area is likely to incorporate solar PC arrays to maximise solar capture within the footprint.

FEATURES:

- Building design that allows for maximum penetration of natural light and ventilation
- Passive thermal design to reduce air conditioning requirements and energy costs
- Energy rated (4+ star) appliances to reduce operational costs
- Older equipment salvaged where possible from the Sippy Downs campus
- Solar hot water systems and gas heated water that minimise carbon emissions



BENEFITS:

- ✓ Lower operational costs
- ✓ Reduced greenhouse gas emissions
- ✓ Reduce embodied energy from relocating old appliances



Wastewater Treatment

With no sewer connection, the college must treat all waste water on site. Sunshine Coast water treatment professionals, EcoCycle and FuturePlus, were approached to install a wastewater treatment system that produces Class A standard water allowing for greater reuse options.

Meters and monitoring have been installed on both the water harvesting and water treatment to allow the school to monitor the water cycle. This has allowed them to identify and repair several critical leaks to the onsite water supply and sewer infrastructure.

Stormwater management of overland flows have been improved to reduce the impact on the water quality in Eudlo Creek. Water sensitive urban design has been used to treat runoff from carpark and paved areas.

FEATURES:

- 2045 L of waste water treated daily via irrigation dispersal area
- Metering and monitoring to assess the water cycle
- Bio-retention and filtration of carpark and paved area runoff
- Riparian buffer zone established to protect water quality in the Eudlo Creek



BENEFITS:

- ✓ No external water utility costs
- ✓ Maximised beneficial reuse of treated water
- ✓ No impact on water quality in the Eudlo Creek



Award winning design

MIC incorporated award winning features into this project from project inception. It is one of a few select projects to receive Queensland Government Green Door approval which was a collaboration between Industry, Queensland Government and the Local Government Authority, in this case Sunshine Coast Regional Council, to fast track the development assessment of exemplary sustainable 'green' developments in Queensland. The MIC project was selected due to the Ecological Sustainable Design goals and Environmental Management Plan incorporated into the design of the development.

Project design commenced with a collaboration between the MIC community of students, staff, parents and artists working to define and prioritise strategic goals to achieve a sustainable vision for the school.

The project also won the Sunshine Coast Master Builders State Housing and Construction Awards for the 'Best Education Facility over \$5 million' and 'Excellence in Sustainable Building' categories in 2015. It was also nominated in the Built Environment Category of the Premier's Sustainability Awards 2015.

*Data referenced in the Regional Economic Development Strategy (2013 - 2033). "Savings are over the lifecycle of the steel product. Australian Government, Australian Government, our Home, www.yourhome.gov.au/materials/waste-minimisation and Stanford University, Buildings, Grounds and Maintenance, Frequently Asked Questions: Benefits of Recycling bgm.stanford.edu/pssi_faq_benefits. "Sydney Water, Water in our School: How water is used in our schools. www.sydneywater.com.au/SW/teachers-students/facts-about-water/primary-students/how-do-we-use-water/water-in-our-school/index.htm

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FOR MORE INFORMATION

Go to www.invest.sunshinecoast.qld.gov.au or email invest@sunshinecoast.qld.gov.au or call the Coordinator - High Value Industries on +617 5475 9932.

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