

Sustainability at William McCormack Place

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KEYWORDS

- Sustainable Building
- Fitout
- Facility Management
- Ecologically Sustainable Development



William McCormack Place in Cairns

QDPW manages :

- 821,000m² commercial office space & > 50,000m² fitout p.a.
- Award winning ESD Office Fitout Guidelines

Fundamental project needs of QDPW owned & managed Commercial Offices

- \$17.5 million, 4568m² N. L. A Sheridan St. Cairns.
- Deliver strict sustainability targets at no added capital cost
- Remain economically & commercially viable in operations
- Select design, fabric & services on life cycle costs.

Project initiation exploited innovative sustainability planning tactics:

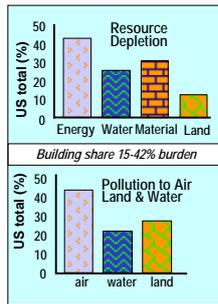
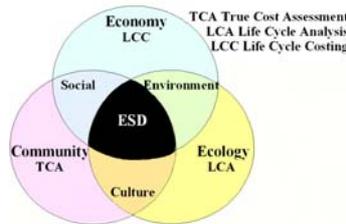
- Property's FM team responsibility to
- Deliver planning, design, construction & fitout

Construction by private sector manager under:

- 2 stage, D&C contract including fitout & public art by:
 - Managing Contractor: Barclay Mowlem Construction Ltd
 - Design team lead: Cox Rayner & Cairns-based CA Architects
 - Civil: ARUP Structural/Civil/Fire Engineers
 - Mechanical/Electrical: MGF Consultants M&E Engineers
 - Fitout Design: QDPW Project Services Office Interiors



Sustainability Scope, Method & Impact



Innovative Approaches

"It was the integration of proven advanced technologies to work efficiently as whole building systems that was most technically innovative."Manley (2003)

Keys to Project Success

- FM style leadership had greatest impact on success
- Systems thinking with modest advanced technology
- Proven, effective & simple building, services & fitout
- No compromise in quality, cost, time & scope.

Commercial Office Building Achievement

- Highest Greenhouse Rating in Australia
- Fully-occupied use 40% less energy than normal
- 4.5 star rated ESD office fitout to Qld Govt Guidelines
- Much lower outgoings increase asset value.
- Working best practice sustainability model



Project Aims, Focus & Goals

Building owner aimed to:

- Meet strict energy & sustainable fitout targets;
- Remain economically & commercially viable in regional market
- Use no Government financial incentives.

Project goals:

- 4 star National Building Greenhouse Rating
- 4 star ESD Office Fitout Rating

Design goals were property was to:

- Suit owner, manager & tenant over long term;
- Be flexible & manageable considering high churn rate;
- Minimise lifecycle environmental, social & economic costs; and
- Employ local business to capture & improve their knowledge base.



Project Brief Development

At Project Initiation Owner Gave Control To:

- Team responsible for future operational management
- Retain long-term perspective for property performance
- Maximise functionality, manageability
- Deliver on time & budget

Building Owner's Brief:

- Consideration for local firms, material & apprentices
- Project brief specify environmental targets
- Sustainable economic, environmental & social outcome
- Experienced FM project leader to integrate effort

Project Planning Brief:

- Design fabric/services to reduce energy & lifecycle costs
- Operational Compliance to a
 - 4 star Greenhouse Rating
 - 4 star ESD Office Fitout



Design Brief Development

Building Design Brief

- Open streetscape, bright 'tropical low roof-line exterior
- **Passive design for energy in-use**
- Safe, accessible, work-place
 - Pleasant for occupants' work
 - Shady landscaped curtilage
- Culturally sensitive artwork
 - Linking built, natural, social & cultural
 - Reflective tranquil space outdoors

Fitout Design Brief to ensure:

- 4 star ESD Office Fitout Guidelines for:
 - Healthier, more ecologically sustainable fitout
 - Reduced risks associated with hazards and
 - Industry liaison for sustainable trade & employment.

Building Services Brief:

- Year-round air-conditioning in hot, humid climate
- Simple and reliable with high redundancy



Milestones

All achieved on time & budget :

- Project approval & managing contractor appointment 2001
- Completion of design development May 2001
- Commence site work May 2001
- Fitout design freeze Sept 2001
- Practical completion June 2002
- Fully occupied July 2002
- NBGR Audit Aug 2003
- Exceeded 4-star energy rating

Environmental, Economic & Social outcomes delivery over -planning, design, construction, fitout, operation & disposal



Achievements for Australia

First full-scale commercial office building

- Official 5-star energy rating
- Exceeded 15% to set new benchmark for GGE
- Set benchmark for ESD office fitout

Success confirms:

- Clear objectives & thorough design reduced risks
- System D&C savings balanced cost
- Local technology leaders & knowledge providers
- System integration for success
- Systematic combining proven technology

Energy Savings:

- HVAC saved 37% energy & 61% capital & maintenance cost.
- Passive design for daylight
- Fitout natural daylight in layout
- High-efficiency luminaires
- Low energy office equipment

Quantity survey reports show cost:

- environmental enhancements same as comparable ordinary commercial building.



Key Innovations

State-of-Art Technology with Simple FM Office Portfolio learnings

Project delivery focus

- integrating whole building systems
- achieved new sustainability benchmarks
- no quality, cost, time or scope compromise

Plant room houses HVAC system

- Simple, reliable & high energy efficiency
- Preconditioner- thermal wheel recover 61% exhaust heat
- Rotary screw chillers on duty/standby each 105% load
- Pumps/fans variable speed drives
- Zoned variable air volume boxes
- 15,000l chill water avoid long low load time
- BMS to control/monitor a.h. operation



Key Whole System Innovations

Integrated technologies:

For cleaning & maintenance:

- Extended eaves with walkways
- Ensures ease of safe access without lifts
- Maintenance staff to all building exterior

To reduce solar heat gains:

- Extended eaves for sun shading
- High performance glass
- High performance wall insulation

To reduce lifetime costs:

- Recyclable cut-pile carpet tiles 21% over loop-pile
- Flexible office space:
- Strategic column placement
- Zone lighting control
- Occupancy sensing to limit A/C delivery




Environment Outcomes In Planning

Attributes:

- Thorough, honest communications built stakeholder relationships
- Climate of change for sustainability throughout
- Sustainability essential foundation not an add-on.

Ensure:

- Greatest long-term influence to reduce environmental impact
- Decisions affected building's lifetime performance
- Early, cost effective addressing of life cycle issues

Attention to:

- Passive building design
- Active HVAC & electrical systems
- Interior daylighting, adaptable layout
- Minimised lifecycle cost impacts
- Enhanced manageability cradle to grave
- Durable, low-maintenance recyclable:
 - Colorbond, Stainless & Aluminium
 - Colour-render not painted
 - Minimal applied finishes
 - Finish minimise chemical cleaning



Environment Outcomes in Design

Passive elements:

- Clean lines & visual amenity
- Does not impose on nearby premises
- Building shape & orientation to minimise exposure to direct sun
- Façade material & glazing to minimise heat transmission to interior
- Wide roofline/eave shade façade
- Window shade all seasons not impeding interior sight-lines
- Efficient insulation & air-tight to
 - Minimise untreated air influx
 - Control air egress



Environment Outcomes in Construction

Concise contractual requirements ensured:

- Minimal site issues dealt with swiftly

Thorough construction planning & design:

- Minimised rework & wastage

Prior fitout design freeze ensured:

- Seamless integration
- No shell demolish/waste.
- Fitout seamless & completed shortly after shell.

As main contract variation managing contractor delivered:

- Partition, HVAC ducting, &
- Electrical & communication cabling hard-fitout:
 - Incorporated in original construction &
 - no removal or changes to work already completed.



Environment Outcomes In Fitout

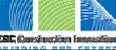
Features:

- Minimal built zones
- Demountable partition
- modular furniture
- Open plan
- Workstation daylight near windows
- Rooms to floor centre
- Highly flexible & open space



Low impact features include:

- Sustainably managed timber
- Uniform size doors for re-use
- Mechanical connection for reuse
- Very low off-gassing material
- Recycled polymer
 - units, upholstery, shelving
- Carpet for whole of life benefits
 - environment/economic



Environment Outcomes In Use

Appealing with complimentary:

- Unobtrusive structure set back from street
- Landscaping, seating & local native planting
- Visually attractive & inviting

Tenant surveys show that staff generally

- Feel good about working there &
- EPA staff feel they 'practise what they preach' at work.

Energy, environmental & economic benefits:

- Passive design elements
 - maximise daylight &
 - minimise thermal penetration
 - Immediate & over building life
- Active system reduce heat load
 - Recovers exhaust air energy
 - Extremely cost effective



Environment Outcomes In Use

Common pre-conditioning unit all air:

- Thermal wheel recovers exhaust air energy to cool/dehumidify air ingress air
- Before it flows to ventilate/condition main chiller plant room without added fans
- Wrings last useful energy from air before it finally leaves building.

Advantages:

- Humidity removed from supply air without inefficient reheat systems
- 61% energy recovered from heat in waste air

Actual energy consumption:

- 109kWh m⁻² p.a.
- 108kg CO₂ m⁻² p.a.
- 40% better than target



Environment Outcome in Disposal

Most materials recyclable:

- Construction/office recycling bins & space for contractors.
- Generic design for adaptive reuse as office or other use.
- Stripping to shell for minimal waste as most recyclable.

Fitout for disassembly & future adaptive reuse:

- modular workstation
- components of recycled materials &
- mechanical fixings rather than glues,
- carpet tile selected for lifecycle benefits
 - can be 'remanufactured' for extended life
 - 15 year 'first life' prior to lifting,
 - minimal remanufacturing & re-laying
 - recycled backing is finally replaced
 - 30 year useful life,
 - 4 x broadloom life that goes to land fill;
 - Sections more easily replaceable
 - Replacement runs suppliable
 - Spares are minimised.

Concepts 33 Charlotte St Brisbane, 15,000m² new building



Economic Life Cycle Outcomes



Business case a commercial venture:

- Sustainability initiatives did not increase project economic cost,
- Reduced operating costs improve market rental position.
- Short & long term economic benefits for Cairns community.
 - Maximum local employment had strong effect on local economy.
 - 12,550 person weeks work generated in D&C.
 - 2 new F/T positions in building operation.
 - local contractors & suppliers employed in use & maintenance

Success of project ESD initiatives provided:

- High profile exposure & business opportunities.
 - Designer of mechanical services & electrical systems
 - contribute greatly to building's active systems energy efficiency.
 - Cairns firm MGF Consulting gained industry-wide exposure

QPDW strategies to communicate success to:

- various industry, construction & facilities management interest groups
 - making it available for case studies;
 - facilitating information & data flow to students etc via Internet publications
- show a working model of sustainability addressed without compromising quality, cost, time & scope.



External Validation Of Project



Awarded

- First 5 star energy rated new commercial office building in Australia
- 2004 FMA Environmental Excellence Award + others

Compared to average:

- 45% less energy,
- saves 419t GGE
- \$68K p.a. less to operate

Ideal opportunity to develop sustainable office accommodation

Practical Exemplar

- Sustainability benchmark
- Best practice
 - environmental outcomes
 - economic outcomes
 - social outcomes
- planned & achieved for the
 - building lifetime
 - at every phase

