About Us

- Established for 35 years
- Multi-disciplinary consultancy
- 20 offices in 11 countries
- 400+ staff
- High level of repeat business
- Innovative design solutions
- Customer focused
- Award winning projects
Awarding winning projects

SA Water House, Good Green Design Awards (2011), Award Winner, Green Architecture

1 Bligh Street, CTBUH 2012, Best Tall Building Award, Asia & Australasia region

Triptych Tower Melbourne, Australia, National Innovation and Excellence Awards, 2012, The Village Building Award for Best Residential Development

Royal Children's Hospital, International Design and Health Academy Awards (2012), Sustainable Design

Ravenswood School for Girls, AIA (2012), NSW Sulman Award for Public Architecture

Zero Carbon Challenge House, Overall Winner and People’s choice award

St Leonard's College, CTBUH 2012, Best Tall Building Award, Asia & Australasia region

Rouse Hill. Town Centre, Urban Land Institutes (ULI) Awards for Excellence (2010), Asia Pacific Competition
Modelling Capabilities

- District scale urban comfort / wind analysis
- Site-level CFD study
- Semi-covered retail AVA study
- Block scale external comfort study
- Daylight factor simulation
- Overshadowing study
- Façade insolation study
55 St Andrews Place
Treasury Reserve
Melbourne
History

– Architectural competition in 1962 to produce a building of “soaring wonderment”

– Winning (non-conforming) design proposed 3 pre-cast concrete panelled boxes buildings:
  – two infill building of similar scale to the Old Treasury Building and 2 Treasury Place (constructed in 1850s)
  – a taller building to be placed facing Macarthur Street
  – Height, scale and proportioned window openings to complement the classical forms

– The infill buildings were to ‘stand out like brown sparrows between two peacocks of Victorian architecture’
Sparrows between Two Peacocks!
Complete ~1968 (4 floors only)

State Chemical Laboratories
Additional floor added in 1996
Prevailing Government Office Standards
Quality
Set the scene for the New Workplace. Social Economic Environmental
Describes the workplace as:
“a living organism, as a forum, as a functional unit.”
Looks for a method to improve productivity, specifies a “green” building along with value for money.

Environmental Performance
– Green Star - Office Design: 4-Star
– Green Star - Office Interiors: 4-Star
– NABERS Base Building: 4-Star (existing), 4.5-Star (new)
– NABERS Tenancy: 5-Star Cyclist Facilities
Existing Conditions
Fabric Loads

Ground Floor

Level 4
Other issues

– Drafts
– Stuffy
– Control system problems
– System undersized after Level 4 added
– Level 4 – return air in ceiling void (roof poorly insulated)
– No metering of chilled water to AHU
Other problems & issues

- Poor lighting system and control
- WCs use a full flush
- Minimal AAA rated fixtures
- No external shading on levels 1 to 3 – heavily tinted glass gets hot causing local discomfort
- Fire Services need upgrading
- Carpet at end of life
- Improve access for all people
Environmental Performance

**Greenhouse**
- 1 Star NABERS Energy Rating

**Comfort**
- Poor IEQ
  - Daylight
  - Visual Comfort
  - Thermal Comfort
  - Air Quality
The Challenge
Environmental Performance

- Take from 1-Star to 4-Star NABERS Energy rating
- Fix other IEQ problems!

On-going Management

- Dedicated ESD consultant engaged
- Involve the Departments’ environment manager (EMS)
- Increased productivity from improved working conditions
- Access for people with a range of disabilities
- Water efficiency
- Material selected to minimise waste and off-gassing
- Waste – kitchen design, recycling area & construction waste
- Data centre design and energy consumption considered
The Team
The Team

- Victorian Government Property Group (VGPG) (Principal & Owners’ and Tenants’ representatives)

- VGPG engaged Cundall to develop an ESD Building Improvement Plan

- Cundall engaged services of:
  - H2o Architects
  - Medland Mitropoulos (Fire, Electrical & Hydraulics)
  - W T Partnership (Quantity Surveying)
  - Stokes Perna (Building Surveyors)

- Involved Jones Lang LaSalle & AG Coombs from Day 1
  - they know the building!
The Approach
Typical Approach

- Typical approach to existing buildings is to tackle services, internal materials and fittings
ESD Improvement Plan

Our Approach

- Go back to the start and reconsider same issues as for a new building
- Philosophy:
  - Improve daylight
  - Improve comfort
  - Reduce fabric loads
  - Retain what we can
The Plan
Site, Form & Fabric

- Clear glazing & add shading
- Reduce extent of full height glass
- Add clerestory, roof insulation and openable windows to Level 4
- Relocate air intake
- Create atrium
Engineering Services

- Swirl diffusers but keep HVAC
- Metering to CHW from central plant
- New lighting system
- Rainwater harvesting
- Upgrade Fire Indicator Panel
- New low VOC carpet and paint
- Cycling facilities
- New waste storage facility
Environmental Ratings

- 4 star Green Star
- 4.5 star NABERS
- Budget of $4.3 million
- New tenant not known
Implementation
Implementing the Plan

Engagement

- Cundall Team engaged to implement ESD Improvement Plan
- Montlaur Project Managers engaged for Contract Administration
- Department of Parliamentary Services became Tenant
- Fitout integrated into base building design and documentation

The Budget

- Total budget approx $7 million
- 60:40 cost split between base and tenancy
Implementing the Plan

Design Process

- Different approach – ESD consultant as Principal!
- Dynamic action plan replaced:
  - Minutes
  - Cost Plan
  - Programme
  - Brief
  - Green_Plan
- Meeting rotated between offices
- Facility Manager part of team
- Everyone owned the design
Design – Ground Floor

- New A/C system for committee rooms
- 100% outside air with heat recovery and indirect evaporative cooling
- FCU to each room
- High performance internal blinds
Implementing the Plan

Design – Level 1 - 3

- External automated blinds and clear single glazing
- Swirl diffusers and recommission VAV boxes
Design – Level 4

- 1200mm spandrel added to reduce fabric loads
- Mixed mode deleted – tenant didn’t want it
- Non-conditioned resource room (wintergarden) added
- Skylights added
- HVAC & Lighting as per Levels 1-3
- Data Centre – natural ventilation?
Implementing the Plan

Design – Central Services

- Relocated air intake
- Increase outside air by 50%
- Add tenant exhaust
- CO2 sensors
- New control strategy
- Commissioning Agent
- Duct cleaning
- CHW, energy & water metering
- Rainwater harvesting for toilet flushing & irrigation
Design – Lighting

- T5 ceiling lights to provide 160 lux
- Task lighting to desks & meeting rooms
- New lighting control system
Implementing the Plan

Design – Internal & Fitout

- Low VOC carpet & paints
- Reuse 50% furniture & partitions
- Retain 80% of ceilings
- Waste storage added
- Cyclist facilities added
- Disabled toilets added to 2 floors
- Relocate building entry
- Use of internal & external planting
Implementing the Plan

**Delivery Process**

- Integrated documentation
- ESD embedded in tender docs
- Conventional tender process

**Delivery Process**

- Schiavello appointed
- Lowest tender
- Tender below pre-tender estimate
- ISO14001 accredited
- Good ESD experience
Outcomes

- 4.5 star NABERS Energy Base Building
- 5 star NABERS Energy Tenancy
- 4 star Green Star – Office As-Built rating
- 4 star Green Star – Office Interiors
- Over 40% reduction in greenhouse gas
- Cost saving of over $100k per annum

Recognition

- UK Chartered Institute of Building Services Engineers (CIBSE) ‘Sustainable Building Services Award’
55 St Andrews Place

Before
After

55 St Andrews Place
The Existing Building Challenge
Global Greenhouse Gas Emission Reduction Targets
Global CO2 Emissions Reductions Targets

Emissions Reduction (%) Relative to 1990 Levels

- Australia: Approx. 3 Star NABERS Energy
- USA: Approx. 4 Star NABERS Energy
- EU: Approx. 5 Star NABERS Energy

Challenge in Context
Global CO₂ Emissions Reductions Targets

Current Emissions

Interim Targets

- Australia
- USA
- EU
- SA, NSW, VIC
- Melbourne
- Queensland
- City of Sydney

Emissions Reduction (%) Relative to 1990 Levels

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Challenge in Context

Global CO2 Emissions Reductions Targets

Emissions Reduction (%) Relative to 1990 Levels

Current Emissions
- Australia
- USA
- EU

Interim Targets
- SA, NSW, VIC, USA
- Queensland
- Melbourne

Restorative Targets
- Approx. 3 Star NABERS Energy
- Approx. 4 Star NABERS Energy
- Approx. 5 Star NABERS Energy

City of Sydney
- Melbourne
- QLD, SA, VIC, WA, NSW
- UK, EU, California

Years:
- 2000
- 2010
- 2020
- 2030
- 2040
- 2050
Commercial Building Impact Data
Greenhouse Gas Emissions

- Account for 10% of National GHG emissions
- Increase by 2.1% pa BAU scenario
- GHG increase by 87% from 1990 to 2006
- Australia has a legal obligation to reduce GHG emissions (Kyoto agreement)

**Built environment has the largest & most cost effective GHG abatement opportunity through energy efficiency**

Government introducing mandatory energy efficiency schemes to overcome market failures and barriers
Why focus on existing buildings?
Challenge in Context

Impact of 3 New 5-Star Buildings per year

Average NABERS Energy Rating

Global CO2 Emissions Reductions Targets

- **Current Emissions**
  - Australia
  - USA
  - EU

- **Interim Targets**
  - SA, NSW, VIC
  - Melbourne
  - Queensland
  - City of Sydney

- **Restorative Targets**
  - QLD, SA, VIC, WA, NSW
  - Melbourne
  - City of Sydney
  - UK, EU, California

Approx. 5 Star NABERS Energy
Approx. 4 Star NABERS Energy
Approx. 3 Star NABERS Energy

Challenge in Context
What if the same amount of money was used to upgrade 20 buildings a year in each city by 1.5 NABERS stars?
Challenge in Context

Impact of Existing Buildings

Average NABERS Energy Rating

- **Without existing building improvement**
- **with existing building improvement**

- **2008**
- **2009**
- **2010**
- **2011**
- **2012**
- **2013**
- **2014**
- **2015**
Taking up the Challenge
Existing Conditions

- Deep plan building offering limited daylight penetration & access to views
- Limited fenestration on longest two facades (i.e. north-west & south-east)
- Heavily tinted primary facade facing south-west
- Dated aesthetic needing re-vitalisation
Daylight Penetration Studies

- Stepped Atrium
- Strip Atrium & Green Slot
- Full Length Vertical Atrium
- Central Atrium

Katsieris Origami
Redevelopment Response

– Improved occupant amenity
– Improved facade performance & appearance
– Greater penetration of daylight within heart of building
– Good access to views
– Reduced environmental impact

Katsieris Origami
To Demolish or Not Demolish?

- Retain
  - Can significantly improve facade performance & appearance
  - Capture benefit of embodied energy
  - Higher overall environmental benefit
  - Cost less

- Demolish
  - Increase material / resource use
  - Net negative energy impact by losing embodied energy benefit
  - Can provide a high facade performance & slightly better NABERS rating
TOGETHER WE CREATE CHANGE IN THE WORLD