Performative Design
Discovering the SAHMRI facades

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Services

Environmental Design Consulting
Daylighting & Façade Optimization
Energy Analysis
Benchmarking *(Greenstar, LEED, bespoke)*

Masterplanning & Infrastructure
Carbon Management
Lighting Design
Practice Principles

- Buildings and landscapes do more, systems do less
- Design from first principles
- Integrated design process and solutions
- Pragmatic strategies
Atelier Ten’s Role

• Help team establish goals early, then stick to them
• Brainstorm design options across a range of environmental issues:
  • Massing & orientation
  • Building envelope
  • Thermal comfort & conditioning systems
  • Lighting design
  • Equipment & plug loads
  • Energy systems & renewables
  • Water systems
  • Site & landscape design
  • Materials
  • Carbon emissions
• Assess design options and prioritize the most effective solutions
• Coordinate with team to implement solutions
• Benchmark performance
South Australian Health and Medical Research Institute
Adelaide, South Australia
Woods Bagot
Through careful daylight and energy analysis, Atelier Ten helped give form and dimension to the climate responsive façade of this next generation medical research building.

LOCATION: ADELAIDE, SOUTH AUSTRALIA
AREA: 21,618 GSM
COST: AU $200M
DATE: 2013

GREEN STAR targeted
SAHMRI Building Concept
SAHMRI Façade Vision

PRELIMINARY DESIGN SKETCH
Key Issues for Envelopes

Building envelopes: a lot happens in a few inches!

- Conductive heat gain
- Conductive heat loss
- Solar heat gain
- Thermal comfort adjacent to envelope
- Daylight access & distribution
- Glare control
- Condensation & waterproofing
- Natural ventilation
- Infiltration
- Acoustics
- Views
- Sustainable materials
- Structure
- Building expression
<table>
<thead>
<tr>
<th>Metric:</th>
<th>Used for:</th>
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<tbody>
<tr>
<td>Daylight Autonomy</td>
<td>Daylighting potential</td>
</tr>
<tr>
<td>Luminance, instant or average annual</td>
<td>Daylighting potential, visual comfort</td>
</tr>
<tr>
<td>Illuminance, instant or average annual</td>
<td>Daylighting potential</td>
</tr>
<tr>
<td>Annual glare potential</td>
<td>Visual Comfort</td>
</tr>
<tr>
<td>Peak insolation</td>
<td>HVAC system size, thermal comfort</td>
</tr>
<tr>
<td>Average annual insolation</td>
<td>Annual energy use</td>
</tr>
<tr>
<td>Façade/glazing temperature</td>
<td>Thermal comfort, material warranty</td>
</tr>
<tr>
<td>R-value &amp; U-value</td>
<td>Annual energy use, thermal comfort</td>
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<tr>
<td>Façade materials: embodied carbon</td>
<td>Carbon footprint</td>
</tr>
<tr>
<td>Façade materials: toxicity &amp; other characteristics (ODP, GWP, habitat destruction, etc,)</td>
<td>Human &amp; environmental health</td>
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<tr>
<td>Dew point</td>
<td>Waterproofing</td>
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</table>
Façades Resonate Culturally
Internal Program Requirements
Architectural Façade Precedents

Screen

Facets

Surface

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External Shading Options

1. Insulated Glazing Unit (IGU)
2. Insulated Glazing Unit with Backing Panels
3. Insulated Glazing Unit with Internal Shading
4. Lower Shade
5. Projecting Single Shade
6. Parallel Glass Shade
7. Parallel Mesh Shade
8. Cable System with Panels
9. Cable System with Vegetation

Preliminary Design Sketch
Proposed Façade Layer Combinations

**OPTION 1 (SINGLE LAYER)**
- Insulated façade
- Single (S1)
- Insulated Glazing Unit (DGU)

**OPTION 2 (PROJECTING OR PARALLEL SHADES)**
- Insulated façade
- Inner: insulated façade
- Outer: D1, D2, D4

**OPTION 3 (CABLE SYSTEM)**
- Insulated façade
- Inner: insulated façade
- Outer: D5, D6

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**SINGLE LAYER**
- S1: Insulated Glazing Unit (DGU)
- S2: Insulated Glazing Unit with Spandrel Panels
- S3: Insulated Glazing Unit with Internal Shading

**DOUBLE LAYER**
- D1: Lower Shade
- D2: Projecting Single Shade
- D3: Parallel Glass Shade
- D4: Parallel Nest Shade
- D5: Cable System with Panels
- D6: Cable System with Vegetation
External Shading Options
Solar Loads

- Goal: reduce solar loads by 40-50%
Annual Average Illuminance – Façade Shading Options

1. Lux @ Desk Level
2. Lux @ Set Distances
3. Glace Issues?
4. Secondary Shading Devices?
5. Glass Type?
10m Bay Analysis of Hoods vs No Hoods.

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Useful Daylight

- Goal: provide ambient daylight to replace electric lighting
Visual Comfort

- Goal: minimize glare probability

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<th>Northeast Top Hood</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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Conclusion and Recommendations

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<th>Glass (baseline)</th>
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<th>Energy</th>
<th>Daylight</th>
<th>Glare</th>
<th>View</th>
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<th>Frit</th>
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<th>Exterior Shade</th>
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Interior Collaboration Zone
Interior Collaboration Zone
Conference Room
Internal Atrium
Internal Atrium
Entrance Atrium
Atrium
Main Assembly Building (MAB)
Tonsley Park, Australia
Woods Bagot + Tridente Architects
Main Assembly Building, Tonsley Park
Woods Bagot + Tridente Architects

Atelier Ten helped develop the environmental strategies to transform this former car factory building into passively conditioned business and technology innovation hub.

LOCATION: ADELAIDE, AUSTRALIA
AREA: 45,000 SQ MET
COST:
DATE: 2014 est.
Adaptive Reuse

Transform campus into mixed-use development

Transform Main Assembly Building (MAB) into academic and business innovation hub
Energy analysis

**Figure 1:** Studied 3-POD module with energy model rendering

**Figure 2:** Studied module configuration with MAB roof shading

**Figure 5:** Affected parameters with MAB roof shading
Daylight analysis
## MAB Roof Cladding Options

**6470 Tonsley MAB, November 14, 2012**

<table>
<thead>
<tr>
<th>Fully Open/Glazed</th>
<th>Partially Closed</th>
<th>Baffles</th>
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<tbody>
<tr>
<td>Option 1</td>
<td>Option 2</td>
<td>Option 3</td>
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### Section Sketch
- Option 1: [Image]
- Option 2: [Image]
- Option 3: [Image]
- Option 4: [Image]
- Option 5: [Image]
- Option 6: [Image]
- Option 7: [Image]
- Option 8: [Image]
- Option 9: [Image]

### Model Image
- Option 1: [Image]
- Option 2: [Image]
- Option 3: [Image]
- Option 4: [Image]
- Option 5: [Image]
- Option 6: [Image]
- Option 7: [Image]
- Option 8: [Image]
- Option 9: [Image]

### % Roof Solid
- Option 1: 0%
- Option 2: 100%
- Option 3: 25%
- Option 4: 50%
- Option 5: 75%
- Option 6: 100%
- Option 7: 0%
- Option 8: 100%
- Option 9: 100%

### % Roof Glazed
- Option 1: 0%
- Option 2: 100%
- Option 3: 25%
- Option 4: 50%
- Option 5: 75%
- Option 6: 100%
- Option 7: 0%
- Option 8: 100%
- Option 9: 100%

### Average Annual Illuminance (lux)
- Option 1: 25,000
- Option 2: 16,000
- Option 3: 11,000
- Option 4: 7,500
- Option 5: 7,500
- Option 6: 1,000
- Option 7: 14,000
- Option 8: 13,000
- Option 9: 1,500

### Average Annual Illuminance Distribution
- Option 1: [Image]
- Option 2: [Image]
- Option 3: [Image]
- Option 4: [Image]
- Option 5: [Image]
- Option 6: [Image]
- Option 7: [Image]
- Option 8: [Image]
- Option 9: [Image]
NOTE: THESE ARE PRINCIPLES FOR ZONES
YOU DO NOT NEED TO FOLLOW EXACT LINES OR %'S.

PROPOSED HYBRID SOLUTION

ZONING FOR GLAZING

25-40% MAX OVERALL GLAZED

0% GLAZING OPEN

GLAZING RE&D

SOLID 0% GLAZING RE&D

SOLID/0% GLAZING IF FACADE IS PARTIALLY GLAZED OR 10% IF FACADE IS SOLID

5-10% GLAZING

25% GLAZING

LARGE TENANCY ZONE

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Roof design
Main Assembly Building, Tonsley Park
Gardens By The Bay
Singapore
Grant Associates, Wilkinson Eyre, Atelier One, Atelier Ten
These distinctive waterfront gardens, located in the heart of Marina Bay, define Singapore as the world’s premier tropical garden city.

THE GARDENS AIM TO BECOME A NATIONAL AND INTERNATIONAL EXEMPLARY OF SUSTAINABLE PRACTICE.
Façade Shading
Esplanade Theatres on the Bay
Singapore
Michael Wilford & Partners and DPA
Facades Inspire