

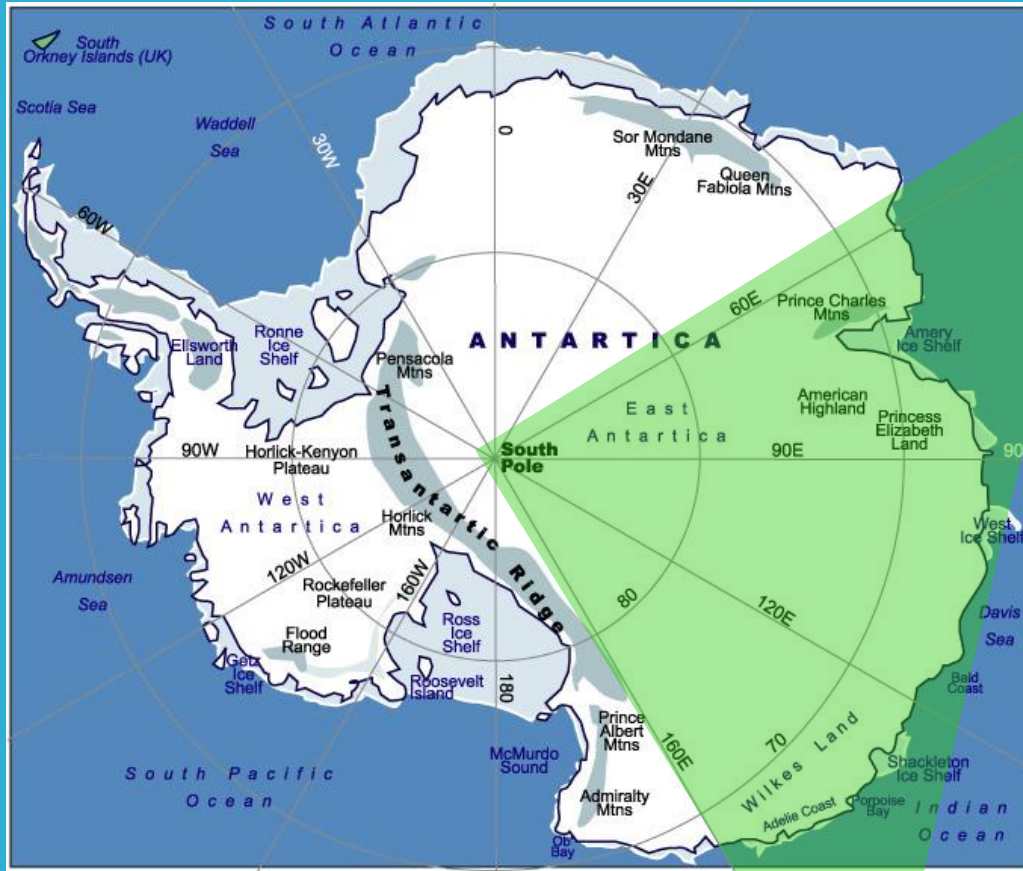


Institute of Marine & Antarctic Studies

“The vision of IMAS is to be an internationally recognised centre of excellence for marine and Antarctic research and education. By translating nature into knowledge, IMAS develops environmental understanding and facilitates sustainable development for the benefit of Australia and the world.”

- Established at the University of Tasmania in 2010

Why Antarctica?



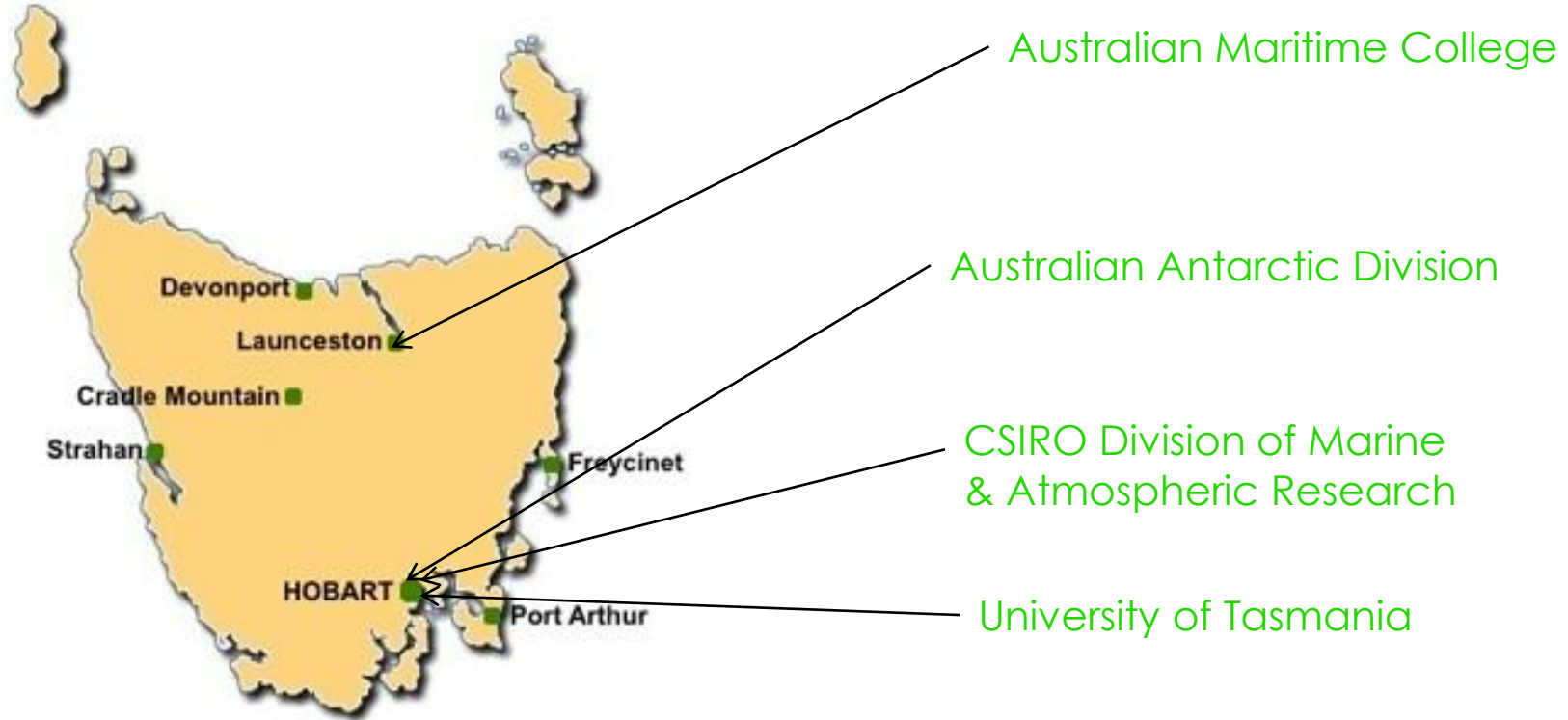
- Historical – Sir Douglas Mawson
- Australia claims 42% of Antarctica
- 5,896,500 km²
(Australia 7,692,000 km²)
- Fisheries
- Minerals
- 3 permanent research stations (I worked on all three locations)
 - Mawson
 - Casey
 - Davis

Why Antarctica?



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Why Hobart, Tasmania?



CSIRO

UTAS

AAD

IMAS

COLLABORATIVE GROUPS

**Integrated Marine
Observing System (IMOS)**

**eMarine Information
Infrastructure (eMII)**

**Tasmanian Partnership
for Advanced Computing
(TPAC)**

CORE INCOMING GROUPS

Tasmanian Aquaculture and Fisheries Institute (TAFI)

Institute of Antarctic and Southern Ocean Studies (IASOS)

School of Zoology - Antarctic Wildlife Research Unit (AWRU)

School of Zoology - Marine Ecology

School of Plant Science - Aquatic Botany

**Antarctic Climate and
Ecosystems Cooperative
Research Centre (ACE
CRC)**

**Other future
collaborations**



IMAS Project Brief



“A marine research precinct on Hobart’s waterfront provides a major step change to Australia’s capacity to explore, exploit, manage and conserve its southern ocean and Antarctic territories.

By uniting UTAS and CSIRO in a single iconic marine science precinct, in partnership with the Tasmanian Government and the Australian Antarctic Division, IMAS provides Australia with a unique capability to better capture benefits from the economic, environmental and social resources conferred by its southern ocean and Antarctic territories and build a more competitive international profile.”

Location



IMAS

**CSIRO Division of
Marine &
Atmospheric Research**

IMAS Project Team

Client:	University of Tasmania
Architect:	John Wardle Architects/Terror
Services/Fire Eng:	Umow Lai
Sustainability:	Umow Lai
Structural/Civil:	Gandy & Roberts
Builder:	John Holland/Fairbrother Joint Venture





IMAS
INSTITUTE FOR MARINE AND
ANTARCTIC STUDIES





IMAS
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ANTARCTIC STUDIES

INSTITUTE FOR MARINE AND
ANTARCTIC STUDIES



IMAS



UTAS





IMAS
INSTITUTE FOR MARINE AND
ANTARCTIC STUDIES





IMAS Fast Facts

Project Value:

~**\$45m** (Aust Govt
Education Investment
Fund)

Area:

7,130 m² over 3 levels

Occupancy:

~**290 staff & students**

Completion Date:

November 2013

Laboratories:

PC1, PC2, QC2

ISO 7 (Class 10,000)
cleanrooms

Delivery Method:

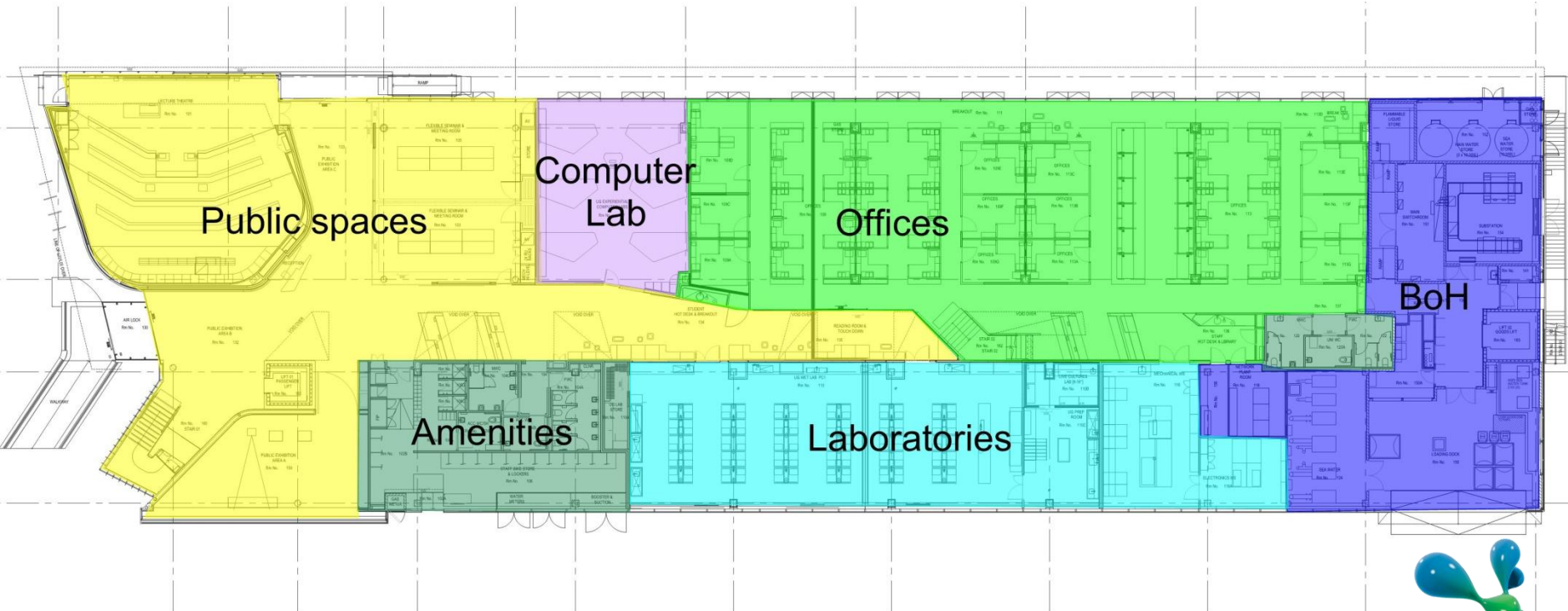
Construction
Management/GMP

GreenStar Rating:

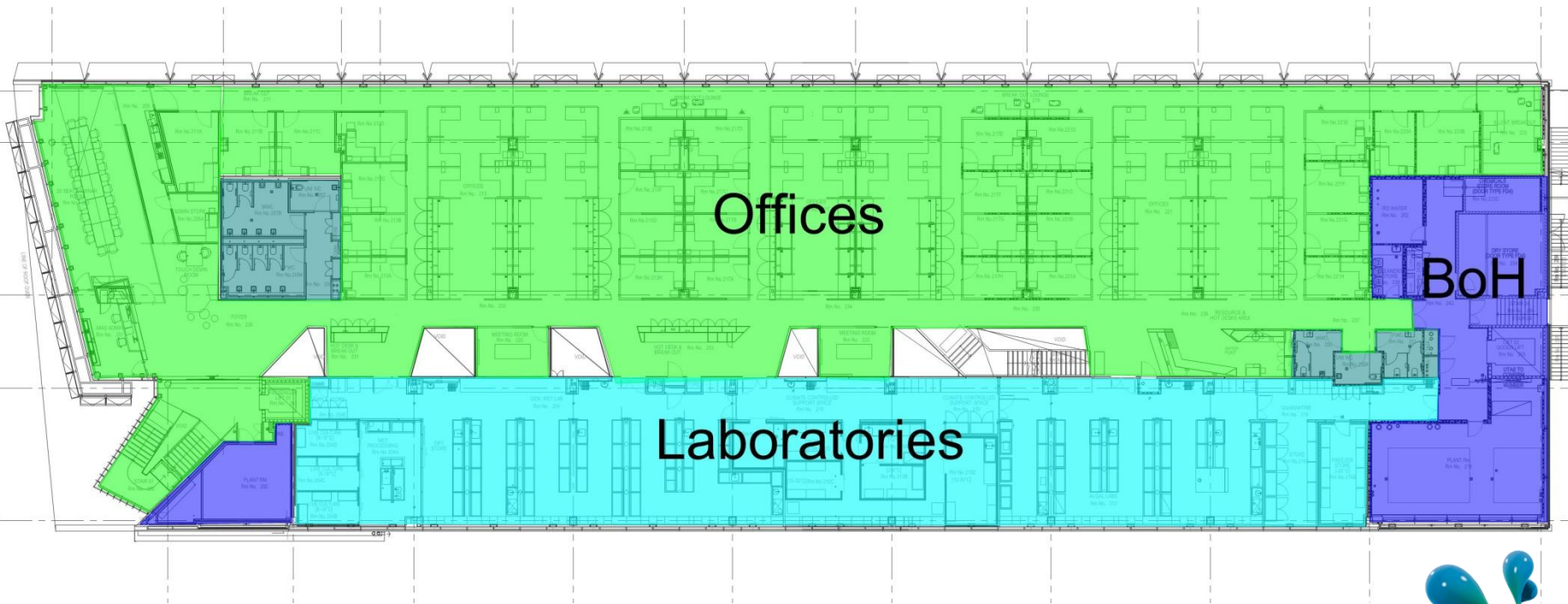
5 Star Education V1 Design



Level One



Level Two



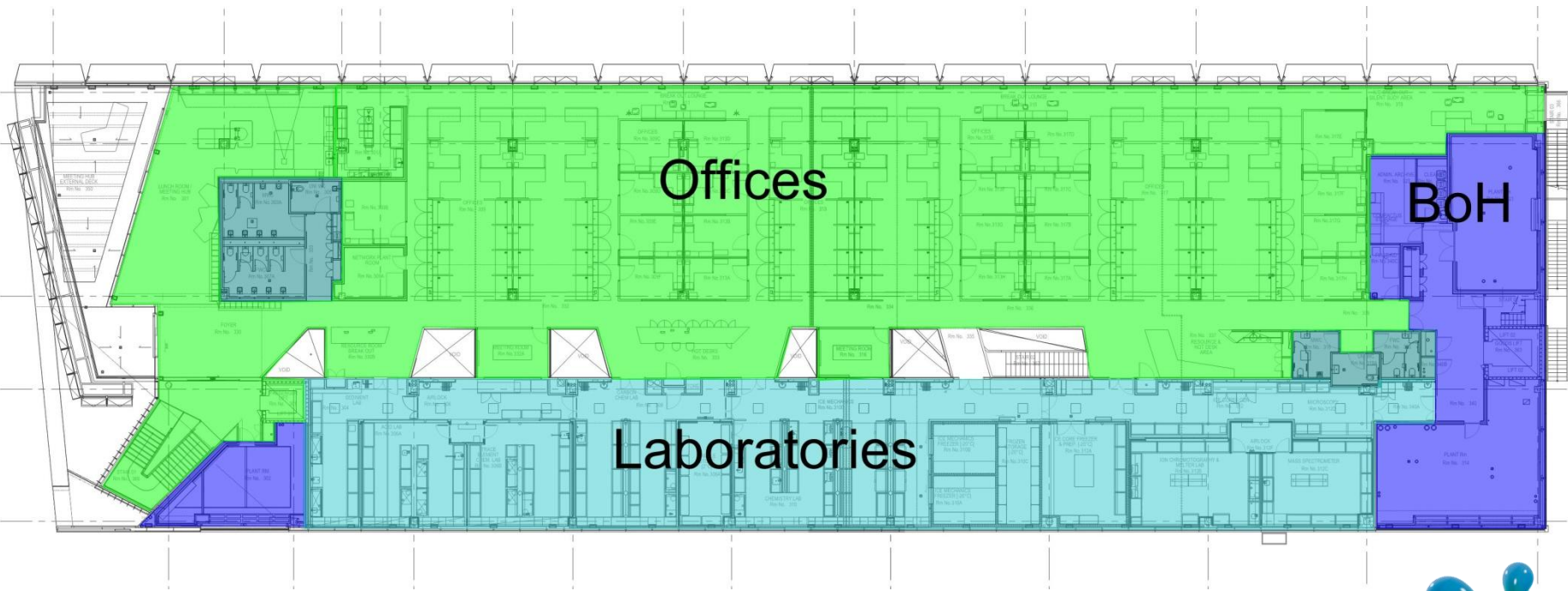
Offices

BoH

Laboratories

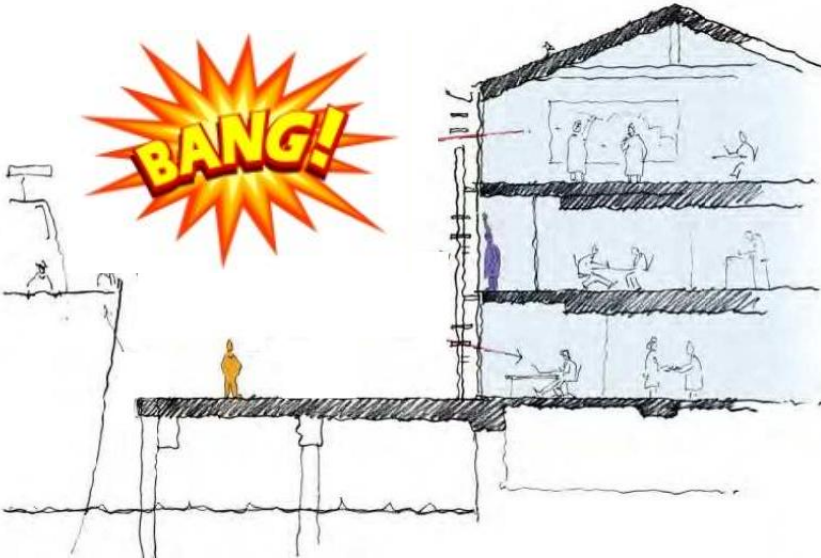


Level Three

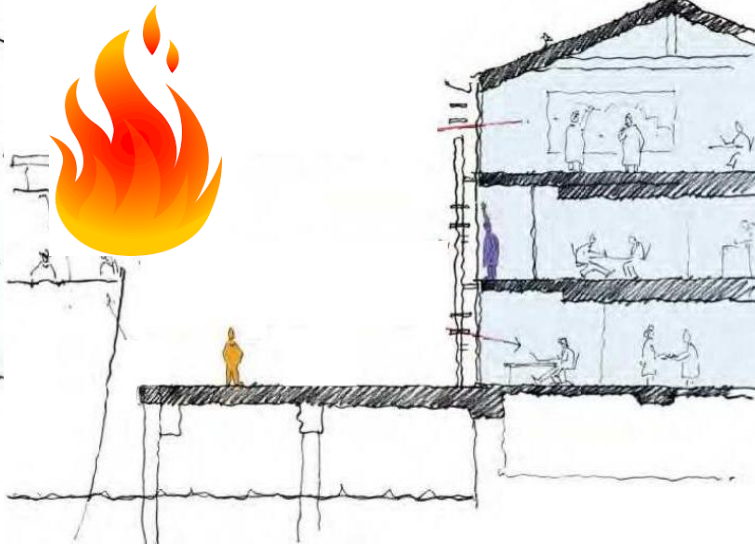


Challenges

- Ship colliding with wharf



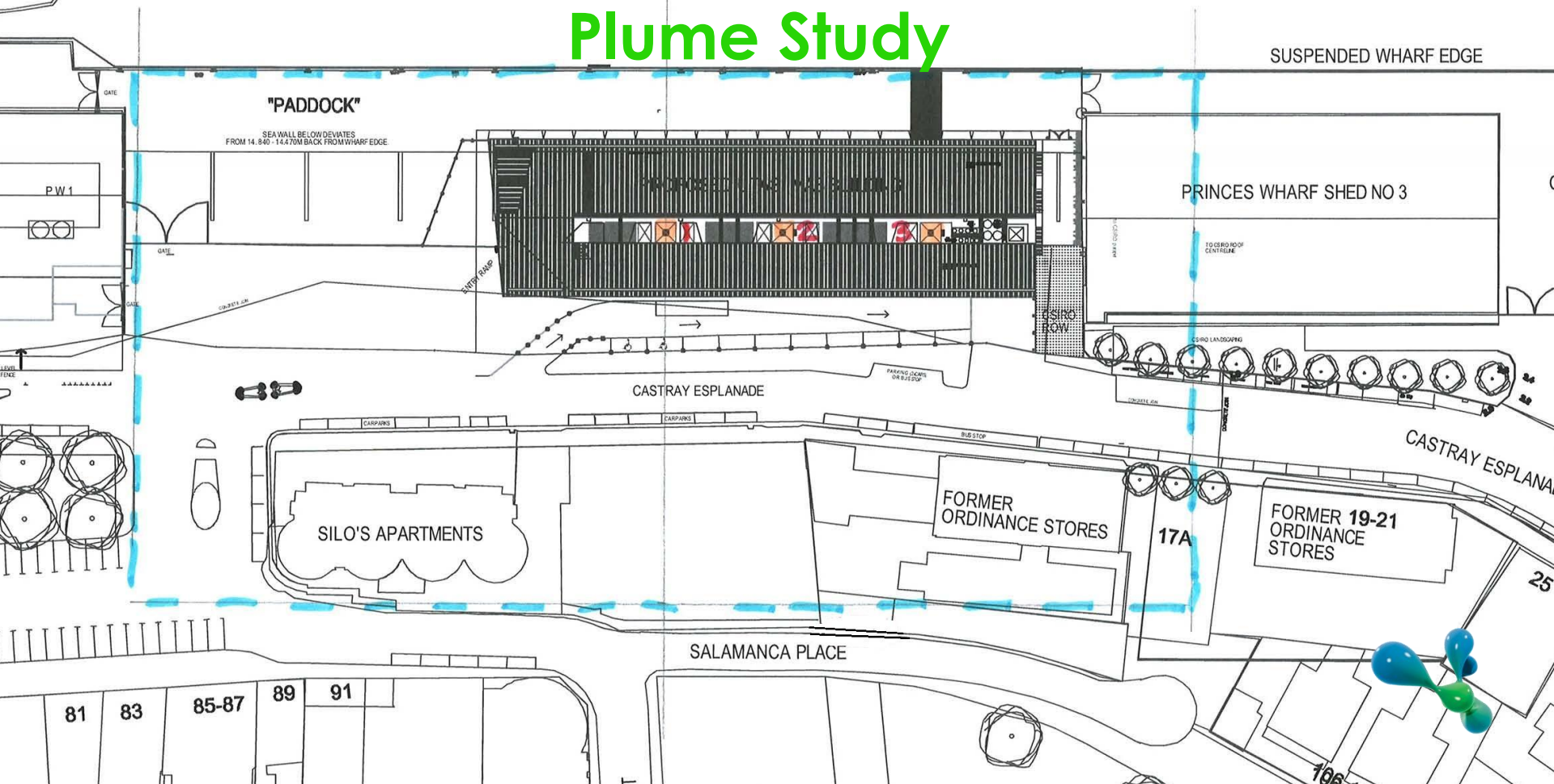
- Ship on fire



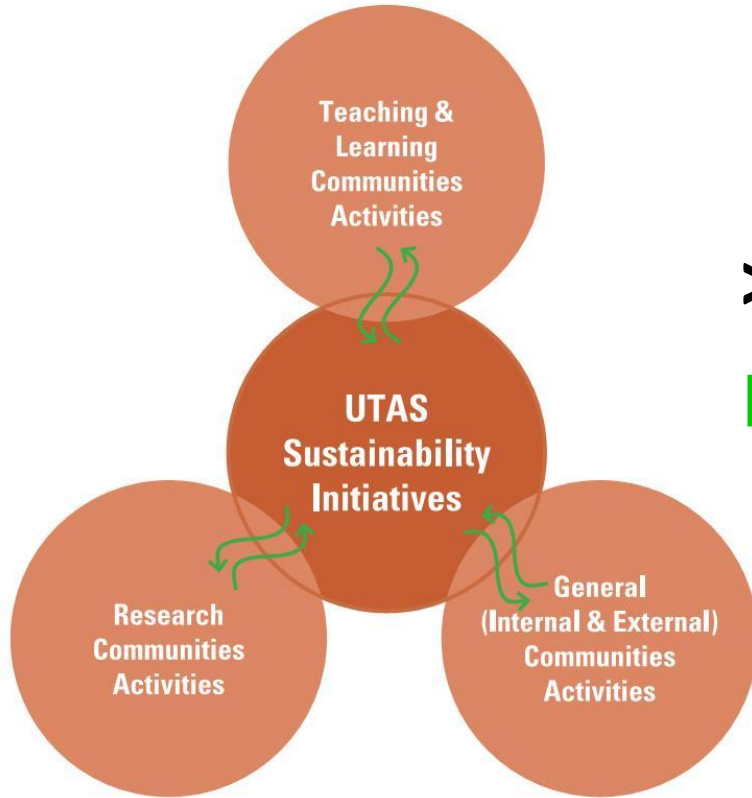
- Structural
- Heritage
- Emissions
- Acoustics
- Prominent location



Fume Cupboard Plume Study



UTAS' Commitment to Sustainability



> \$20m



5 Star Green Star
Education Design





Green Star recognises three levels of sustainability in buildings by awarding ratings of **4, 5 or 6 stars**, depending on the number of credit points achieved, as follows:

- **45 – 59 credit points** are required to achieve **4 Stars** – this is commensurate with “Best Practice” in sustainability.
- **60-74 credit points** are required to achieve **5 Stars** – this is commensurate with “Australian Excellence” in sustainability.
- **75+ credit points** are required to achieve **6 Stars** – this is commensurate with “World Leader” in sustainability.



Green Star benchmarks building environmental performance in:

- Management and Site Issues
- Indoor Environmental Quality
- Energy Efficiency and Greenhouse Emissions
- Alternative Transport
- Water Consumption
- Sustainable Materials
- Ecology and Landscape Issues
- Emissions to Infrastructure and Environment
- Innovation in Sustainability (Optional)



Seawater Heat Exchange

DERWENT RIVER ESTUARY

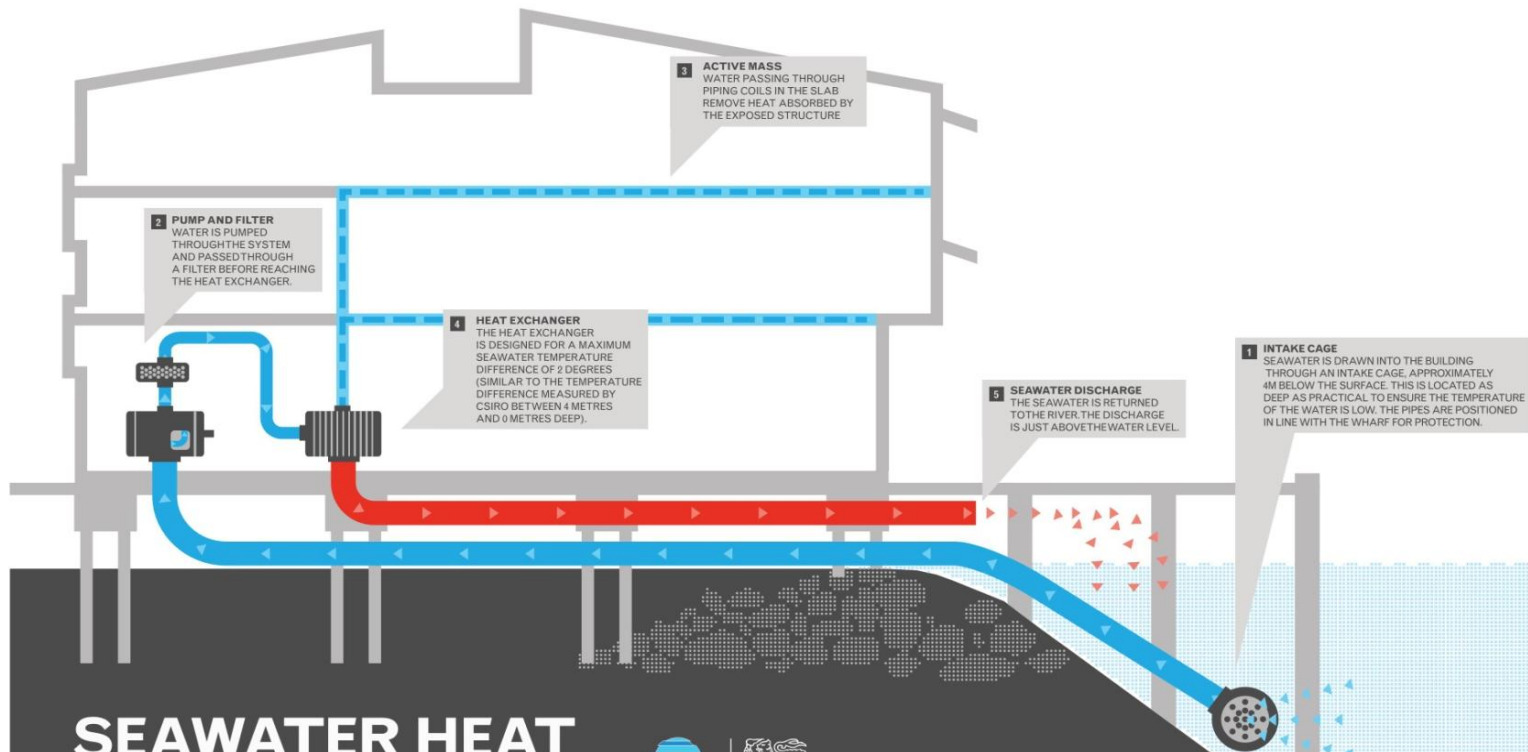
WEATER TEMPERATURES IN THE VICINITY OF SULLIVANS COVE
(Sourced from CSIRO, Hobart)

Sullivans Cove
(Central)

Depth	Temperature			
	Summer	Autumn	Winter	Spring
0.1	19.8	16.2		13.2
0.5	19.1	16.2	11.7	13.2
1	18.4	16.1	11.7	12.9
2	18.1	16.1	11.7	12.6
3	18.0	16.1	11.7	12.6
4	17.9	15.9	11.7	12.4
5	17.9	16.0	11.7	12.3
6	17.9	16.1	11.7	12.3
7	17.8	16.3	11.7	12.3
8	17.8	16.3	11.7	12.2
9	17.8	16.3	11.8	12.2
10	17.7	16.4	11.8	12.2
15	17.7	16.4	11.8	12.1

~ 2K temperature differential





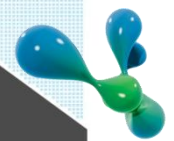
SEAWATER HEAT EXCHANGE



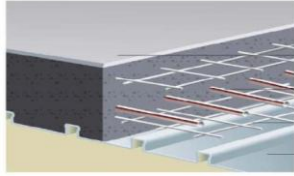
THE COOLING SYSTEM AT IMAS USES SEAWATER DRAWN FROM THE DERWENT RIVER. THE SYSTEM IS DESIGNED SO THERE IS VIRTUALLY NO AFFECT ON THE RIVER ECOSYSTEM.

WATER COOLED BY THE HEAT EXCHANGER IS USED IN THREE WAYS; TO AID THE ACTIVE MASS COOLING SYSTEM FOR OFFICES, PRE-COOL VENTILATION AIR AND CONDENSER HEAT REJECTION FOR THE WATER-COOLED CHILLER IN THE LABORATORY.

THERE ARE TWO INDEPENDENT SEAWATER INTAKES, EACH WITH ITS OWN HEAT EXCHANGER. THIS ALLOWS ONE SYSTEM TO BE OUT FOR MAINTENANCE WHILST STILL PROVIDING SEAWATER COOLING TO THE BUILDING. WHEN NOT IN USE, THE STANDBY SEAWATER INTAKE SYSTEM IS PRIMED WITH FRESH WATER TO LIMIT MARINE GROWTH.



Seawater Heat Exchange



Active mass cooling



Office chilled beams



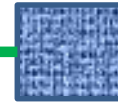
Chiller



Heat exchanger



Filter



Seawater inlet



Seawater return





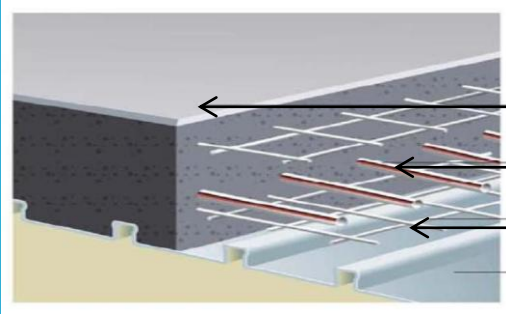
Seawater heat exchange
filter and pump



Seawater heat exchange piping
below wharf



Active Mass Cooling



← concrete slab

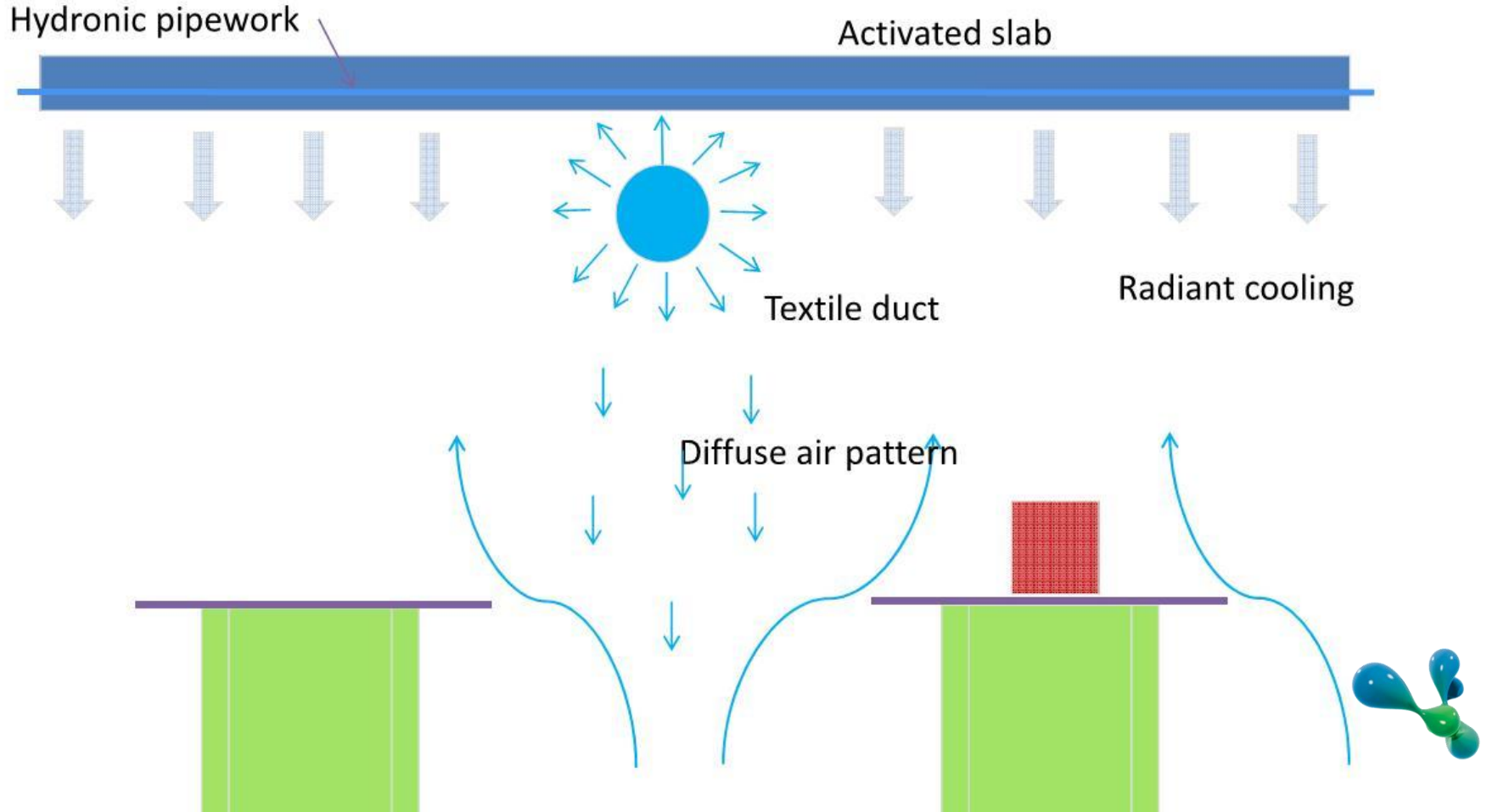
← pp piping

← reinforcement

- Polypropylene piping embedded in slab
- Cooling water passes through, removing heat absorbed
- Cold slab provides radiant cooling to below



Active Mass Cooling In Laboratory



Laboratory



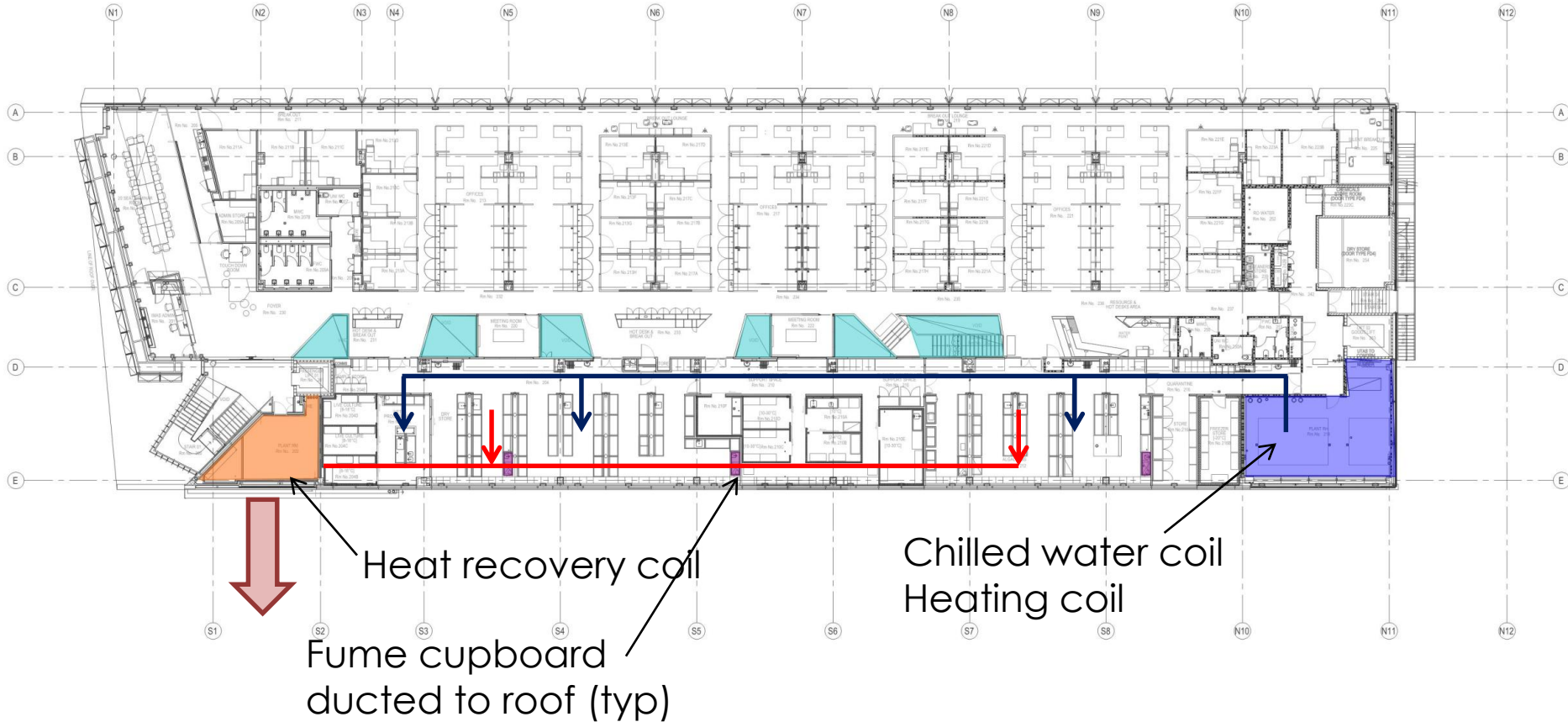
Radiant
slab

Textile
duct

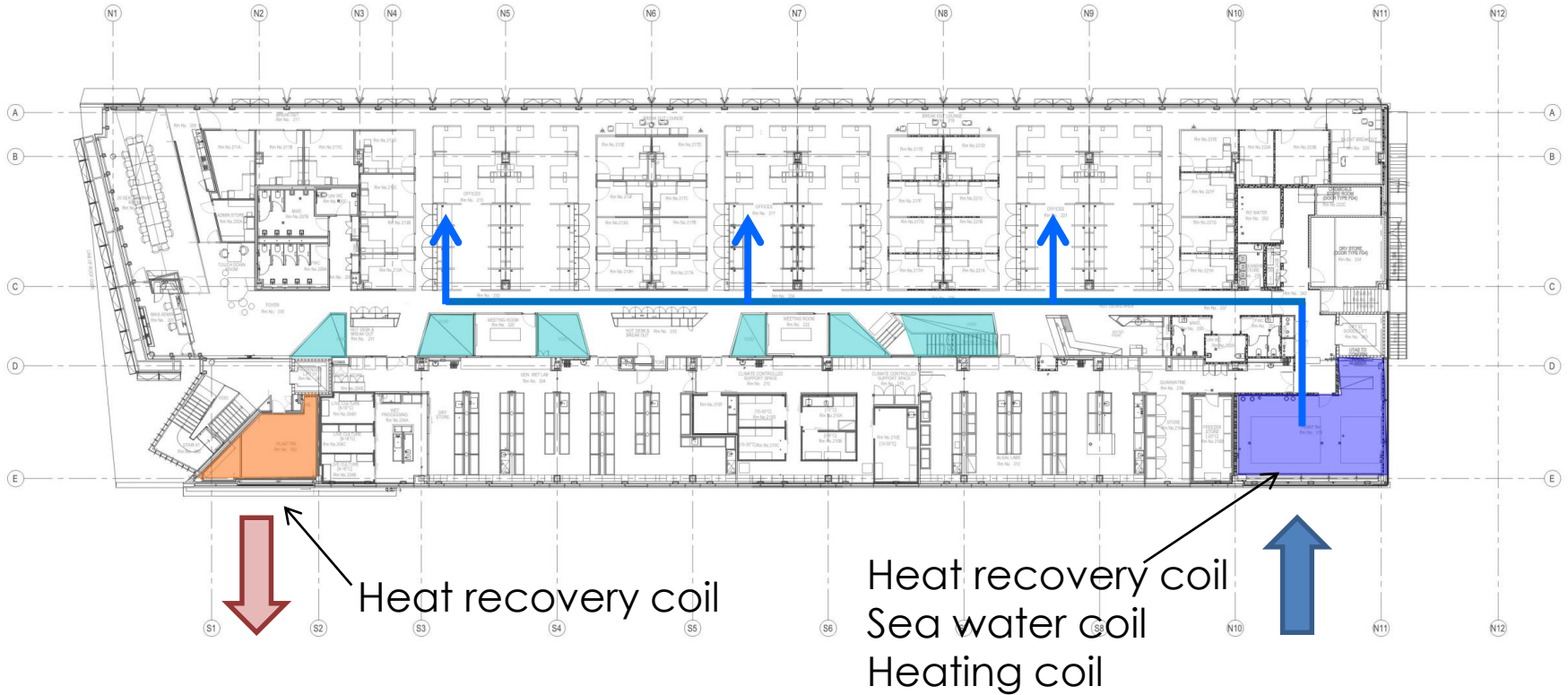
General
exhaust

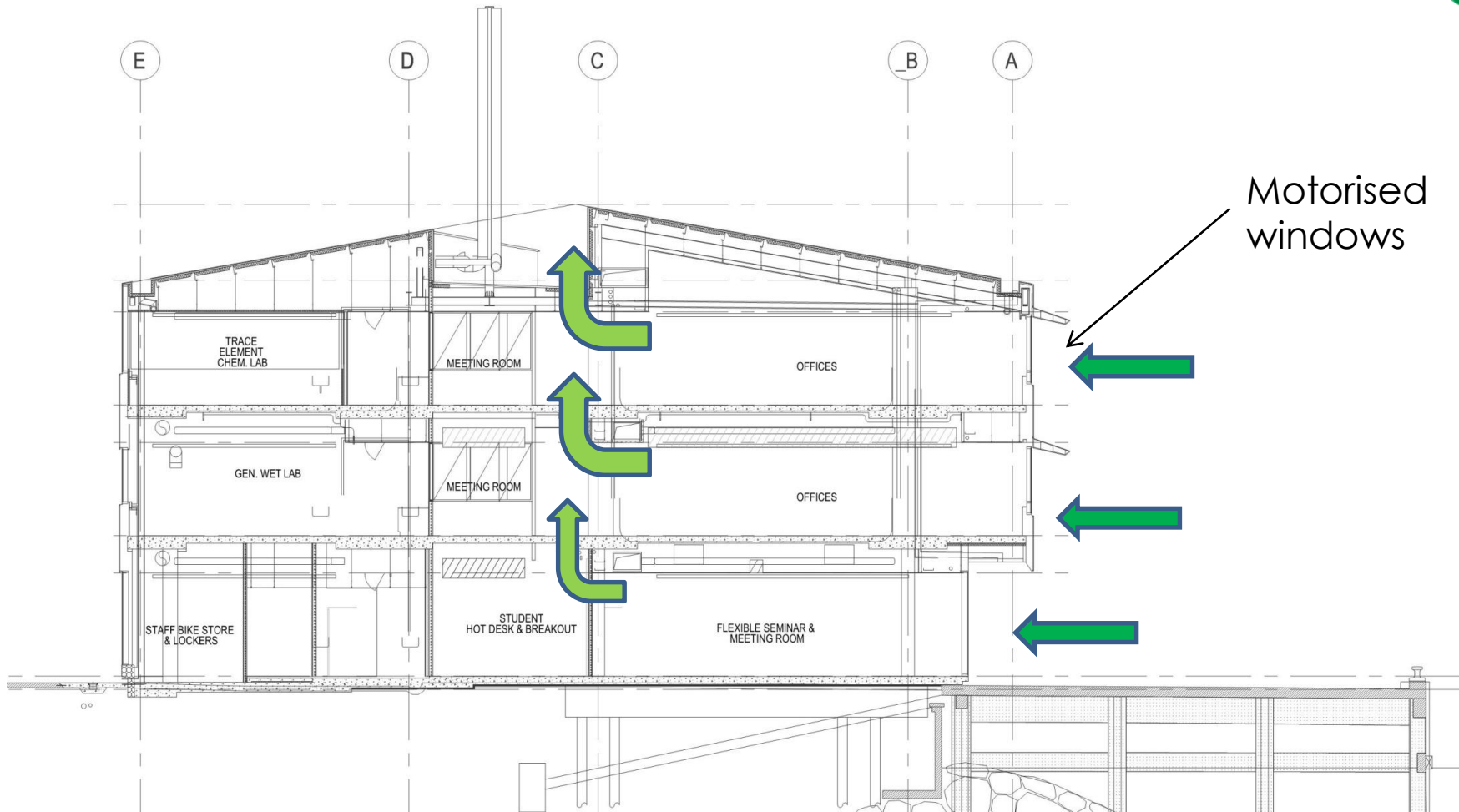


Laboratory Mechanical Ventilation



Office Mechanical Ventilation





Motorised windows

Office Natural Ventilation



Internal skylight & ventilation inlet

Skylight & ventilators



Office Natural Ventilation



Typical Office Zone

Radiant slab

Ventilation duct



Acoustic panels

T5 lights, high efficiency ballasts

Motorised window



Typical Office

Radiant slab



Entry/ lobby exhibition space



90 Person Lecture Theatre



Displacement air conditioning



Staffroom, Level Three



Hydraulic Services



Reticulated water systems:

- Potable and non-potable cold water
- Potable and non-potable hot water
- Treated rainwater
- Reverse osmosis water
- Sea water

Reticulated waste systems:

- Sewer waste
- Laboratory trade waste
- Sea water waste (AQIS)



Hydraulic Services



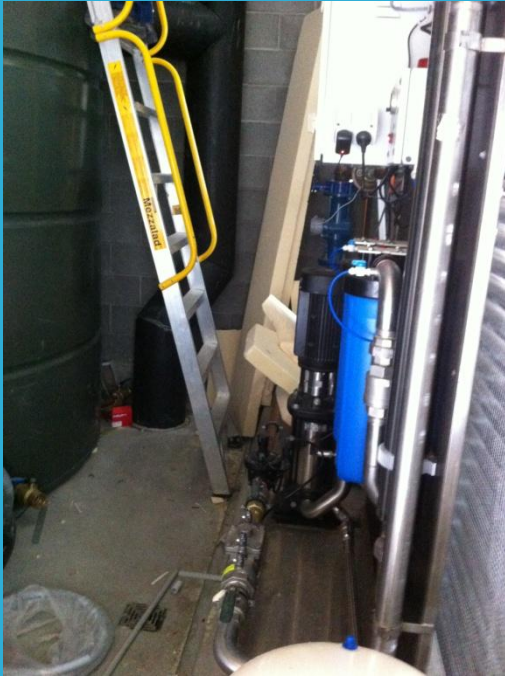
AQIS sea water waste tank



Gas boosted solar hot water system



Hydraulic Services



Rainwater tank and filters



Reverse osmosis water plant



Electrical Services

- Natural daylight
- Blinds for glare control
- Lighting control system
- T5 light fittings
- High efficiency ballasts



Cyclist Facilities

- Internal and external bike stores
- Showers and lockers



Amenities



Green Star

Points awarded for:

- Management – all
- Ventilation rates
- VOC's
- Daylight, views and glare control
- Greenhouse gas emissions
- Metering
- Car parking
- Cyclist facilities
- Commuting mass transit
- Occupant water, heat rejection & laboratory potable water use
- Recycling waste storage
- Concrete, steel, flooring
- Loose furniture
- Reuse of land
- Refrigerant & insulants ODP
- Refrigerant leaks
- Stormwater, discharge to sewer
- Light pollution
- Legionella
- Innovation – exceeding ventilation benchmarks



Umow Lai Laboratory/Education Green Star Projects

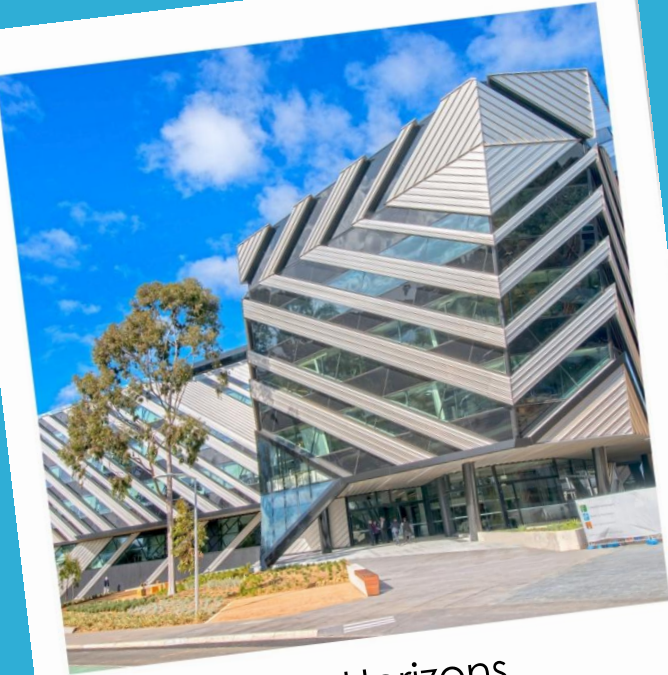
5 Star

- **Institute for Marine & Antarctic Studies – University of Tasmania***
- **Medical Sciences 2 – University of Tasmania***
- **Materials & Mineral Science (M2 Building) – University of South Australia***
- **National Life Sciences Hub (NaLSH) – Charles Sturt University***
- **Shepparton Campus Teaching Facility – La Trobe University**
- **Parkville Neuroscience – University of Melbourne (ESD only)***

* laboratories



Umow Lai Laboratory/Education Green Star Projects



New Horizons,
Monash University

6 Star

- Ingkarni Wardli (Innova 21) – University of Adelaide
- New Horizons – Monash University*
- Daniel Mannix Building – Australian Catholic University
- Architecture School – University of Melbourne

* laboratories





Thank You

Question Time.