



# Passivhaus

Capability Statement

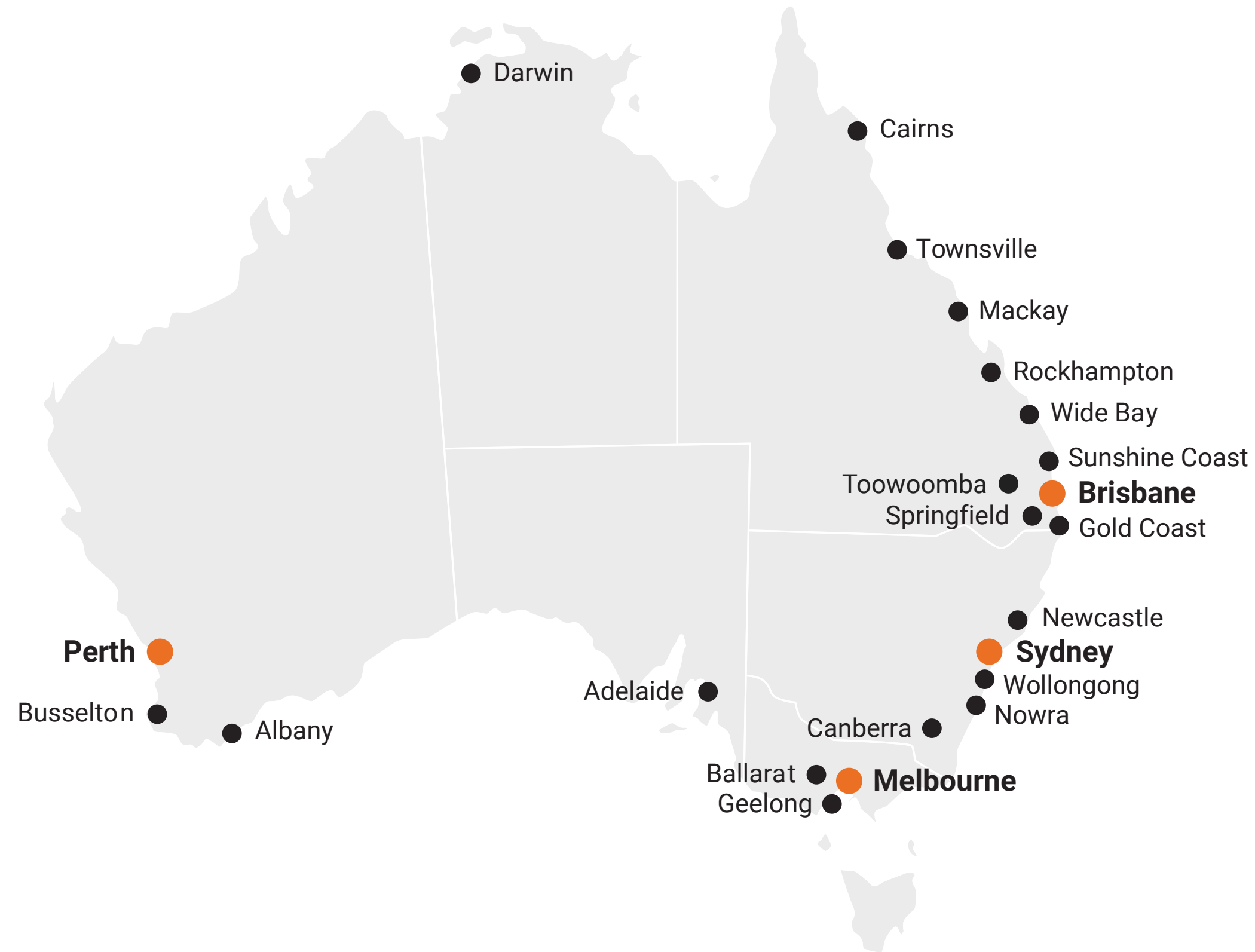


# Who we are

**STANTEC IS A TOP TIER GLOBAL CONSULTANCY. ACROSS AUSTRALIA, WE'VE BEEN HELPING CLIENTS BUILD COMMUNITIES FOR OVER 65 YEARS.**

We have consistently been at the forefront of planning, design and delivery of infrastructure and development in Australia.

With offices across Australia, we have a strong reputation for our work with both public and private sector clients on a diverse range of high-profile infrastructure and development projects.



# Stantec in numbers

**2300+**  
PEOPLE IN AUSTRALIA

**27**  
LOCATIONS IN AUSTRALIA

**31,000+**  
EMPLOYEES GLOBALLY

**450+**  
LOCATIONS GLOBALLY

**6**  
CONTINENTS

**#1**  
RANKED MOST SUSTAINABLE CORPORATION AMONG INDUSTRY PEERS  
(2022 Corporate Knights Global 100)

# What is Passivhaus?

## **PASSIVHAUS (OR PASSIVE HOUSE) IS A ROBUST STANDARD FOR ACHIEVING ENERGY EFFICIENCY AND THERMAL COMFORT IN A BUILDING TO THE GREATEST PRACTICAL EXTENT.**

Passivhaus is not simply a brand name, but a tried and tested construction concept.

It was developed in Germany in the early 1990s by Professors Bo Adamson of Sweden and Wolfgang Feist of Germany. The first dwellings to be completed to the Passivhaus standard were constructed in Darmstadt in 1991. It is now the fastest-growing energy performance standard in the world with over 30,000 buildings realised to date.

The standard defines strict criteria for space heating demand, total energy demand (heating, hot water, domestic electricity), air tightness and thermal comfort.

These are achieved through intelligent design and implementation of the Five Passivhaus Principles:

1. **Thermal insulation** – All opaque building components of the exterior envelope of a building must be very well insulated. For warm temperate climates like Australia and New Zealand, this means a heat transfer coefficient (U-value) of 0.30 W/(m<sup>2</sup>K) at most.
2. **High performance windows** – The window frames must be well insulated and fitted with low-emissivity glazing and filled (e.g. with argon or krypton) to prevent heat transfer. For warm temperate climates like Australia and New Zealand, this means a U-value of 1.0-2.0 W/(m<sup>2</sup>K), with g-values around 50% to optimise solar energy gains.
3. **Ventilation with heat recovery** – Efficient mechanical ventilation with heat recovery (MVHR) is essential for Passivhaus and promotes energy efficiency and

good indoor air quality. At least 75% of the heat from the exhaust air is transferred to the fresh air again using a heat exchanger.

4. **Airtightness** – Uncontrolled leakage through gaps must be smaller than 0.6 of the total building volume per hour during a pressure test at 50 Pascals (both pressurised and depressurised).
5. **Absence of thermal bridges** – All edges, corners, connections, and penetrations must be planned and built with great care so that thermal bridges can be avoided. Those that cannot be avoided must be minimised as far as possible.

The Passivhaus standard can be applied to both residential and non-residential buildings.

The Passivhaus standard applies to new-builds; its sister standard EnerPHit provides a low carbon standard for retrofitting existing buildings.



# What are the benefits?

## WHAT ARE THE BENEFITS?

Why pursue Passivhaus certification?  
Here are some of the benefits:

It provides an opportunity to **address two major challenges facing the AUS/NZ construction industry:**

1. Tightening Building Regulations
2. Many conventional building designs built in the past few years are demonstrating a performance gap (poor performance compared to predictions) in terms of energy use, ventilation and indoor air quality, and thermal comfort and overheating. Passivhaus overcomes this.

Though capital costs are higher than average, there are ways of reducing these to a minimum, and they should be offset by **reducing running costs**. Good design can simplify the building form / services, **reducing capital costs** as well as those associated with heat loss.

It provides a **(thermally) comfortable and healthy indoor environment** whilst minimising the energy demand of a building.

The target of 15 kWh/m<sup>2</sup>/yr heating demand means **a large reduction in space heating, carbon dioxide emissions and costs** to around one-tenth of typical levels. It also provides **significant improvement in thermal performance** (increasing thermal insulation, reducing thermal bridges) compared to regulatory requirements.

By targeting an extremely low airtightness level, Passivhaus takes **full control of the ventilation strategy, reducing drafts and noise** and allowing for recovery of heat from outgoing stale air.

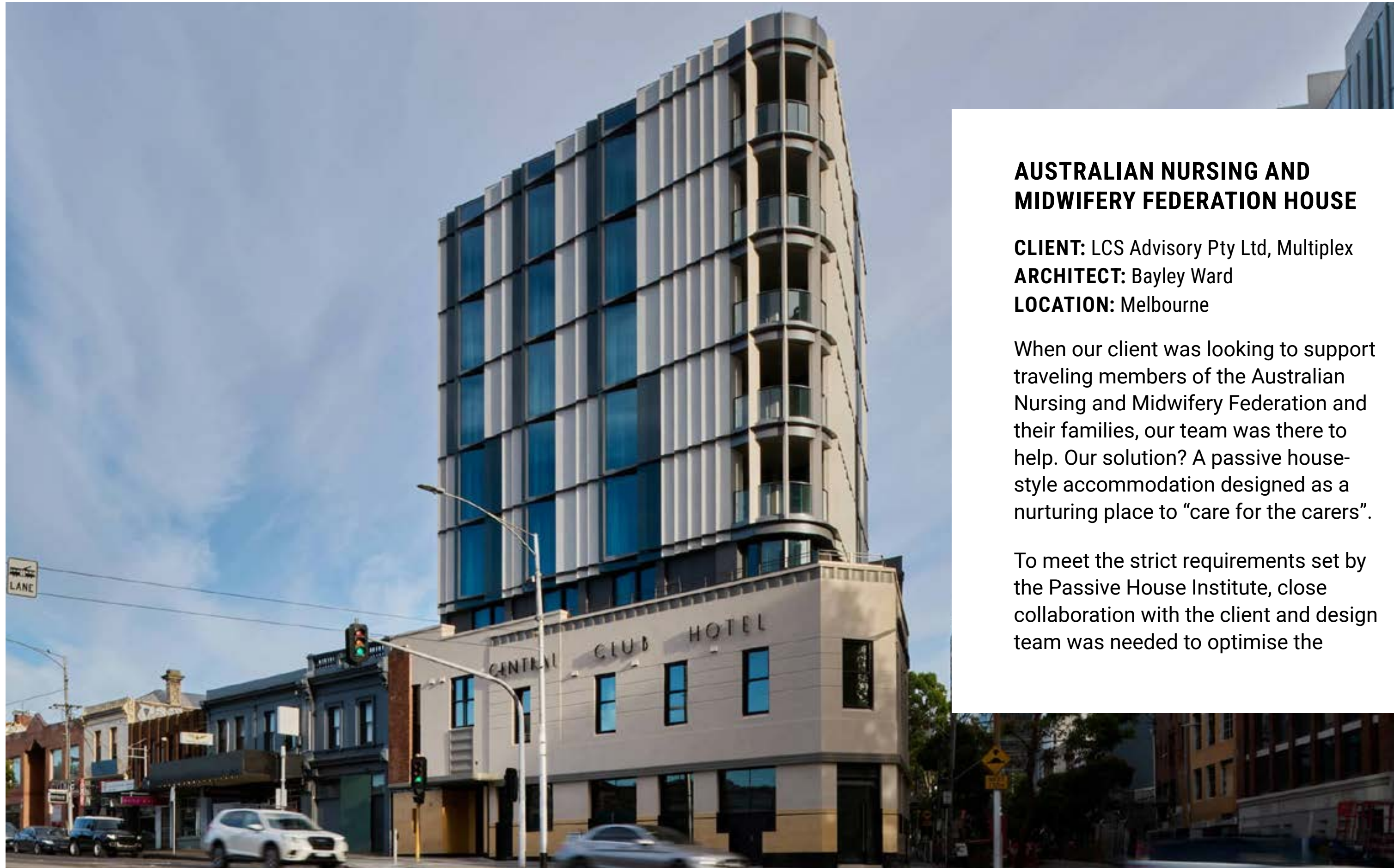
A project must clearly demonstrate that it meets the **validated quality assurance (QA) requirements** of the standard in order to be certified. The methodical QA process also **helps the team to work together**, as everyone understands what is expected of each of them throughout.

## HOW CAN STANTEC SUPPORT YOU?

With a wide range of skills and experience, both within Australia and worldwide, Stantec can provide bespoke support for Passivhaus buildings from inception and masterplanning to detailed design, completion and certification.



# Project Experience



## AUSTRALIAN NURSING AND MIDWIFERY FEDERATION HOUSE

**CLIENT:** LCS Advisory Pty Ltd, Multiplex

**ARCHITECT:** Bayley Ward

**LOCATION:** Melbourne

When our client was looking to support traveling members of the Australian Nursing and Midwifery Federation and their families, our team was there to help. Our solution? A passive house-style accommodation designed as a nurturing place to “care for the carers”.

To meet the strict requirements set by the Passive House Institute, close collaboration with the client and design team was needed to optimise the

challenging existing heritage concrete façade. Additionally, sustainable building techniques such as using cross laminated timber for the building’s upper floors provide additional significant reductions of its embodied carbon (carbon emitted during a building’s construction).

Passive House is a specialised building system in which heating and cooling is virtually not required regardless of the external environment—no matter the outside temperature, it’s comfortable inside, with high air quality. The benefits include energy savings of up to 90% and occupant comfort and health.

With the work now complete, nurses and midwives in Melbourne will have an affordable, comfortable place for respite. The best part? The project has been officially certified by the Passive House Institute, meeting the strictest requirements in the world for energy efficiency of buildings.



Australian Nursing and Midwifery Federation House, Melbourne



**ELEPHANT PARK**

**CLIENT:** Lendlease  
**LOCATION:** London, UK

Elephant Park - formerly known as Heygate Estate – is a development designed around the creation of a new park at Elephant and Castle. It will provide 360 new high-quality homes and a central shopping street in the city’s greenest new place to live.

It is also an example of broad collaboration, with MAKE Architects completing the masterplan, MaccreanorLavington Architects working on the first-phase detailed design, Panter Hudspith Architects and

AHMM working on the second phase detailed design, dRMM working on Trafalgar Place, and Squire & Partners working on One The Elephant.

With an obligation to the Clinton Climate Initiative, the Elephant Park masterplan aims to be a climate positive development and is one of 17 founding projects from across the world to be part of the Climate Positive Development Program, set-up by the C40 Cities Climate Leadership Group.

Within South Gardens, there is a terrace of fifteen ultra-energy efficient town houses called “Futurehomes”. These award-winning homes achieved Passivhaus accreditation.

Stantec worked with the team to instigate a Passivhaus solution by combining the use of cross-laminated timber (CLT) as a sustainable building material, smart building technology and Passivhaus design enabling the residents to enjoy low carbon, affordable living in comfort.

They are the first of their kind in London’s Zone One.



*Elephant Park, Elephant & Castle, London*

## AGAR GROVE

**CLIENT:** Camden Council  
Hawkins/Brown and Mae  
**LOCATION:** London, UK

Agar Grove is the largest council community investment programme (CIP) scheme to date, as well as the largest Passivhaus scheme in the United Kingdom. This truly community-orientated project will deliver new high-quality homes for existing residents – it will also create rented, shared ownership, and private homes to make better spatial use of the estate to meet Camden’s future housing needs.

For this project, we supported the architect on engineering constraints, carrying out forensic engineering studies on the existing retained tower block and providing multi-disciplinary technical support for the overall master plan. This creates more liveable spaces between buildings, allowing people to move easily across, through and within the site. We also provided structural, civil, transport, geotechnical, noise, air quality and flood risk services.

For the client to address fuel poverty issues in the borough, it was also

important to minimise the heating and electrical demand for new units.

Stantec collaborated extensively with the Passivhaus Consultant (WARM) to **secure the Passivhaus certification** through our related services.

A key focus of this was the structural engineering design and the requirement to **design-out or minimise thermal bridging and secure the strict airtightness rating** to reduce uncontrolled heat loss.

This included comprehensive detailing of below ground, perimeter and superstructure thermal bridges.



## BRUNEL ESTATE

**CLIENT:** Westminster City Council  
**LOCATION:** London, UK

Stantec is appointed by Westminster City Council (WCC) to provide engineering and technical multi-disciplinary services to support the redevelopment of the Brunel Contact Centre site. Brunel Estate is currently home to a disused single storey building, and is located south of the Great Western Railway / Hammersmith & City / Circle Line in Westminster.

Two options for residential-led redevelopment of the site are currently being considered:

- A linear tall building with a taller section to the west (up to 14 storeys) and a shorter section to the east (up to 6 storeys) providing circa 78 new homes.
- A dynamic tall ‘jewel-form’ building providing circa 75 new homes.



Agar Grove, Camden, London

Stantec has provided preliminary specialist advice (RIBA Stages 0 – 1) on incorporating early-stage **Passivhaus principles** to help shape both potential options and to **promote energy demand reduction and thermal comfort**, considering items such as massing, glazing distribution and building shape/ layout.

Stantec is now appointed to provide Passivhaus consultancy and energy assessment services up to RIBA Stage 4 (Technical Design).

## FORTWHYTE ALIVE BUFFALO CROSSING VISITOR CENTRE

**CLIENT:** FortWhyte Alive  
**LOCATION:** Winnipeg, Canada

Buffalo Crossing (BX) is a new low carbon, mass timber visitor centre at FortWhyte Alive in southwest Winnipeg, designed to promote awareness of the natural world and inspire sustainable living. BX will facilitate year-round programming, environmental education, and outdoor learning spaces with a floating walkway and access to water.

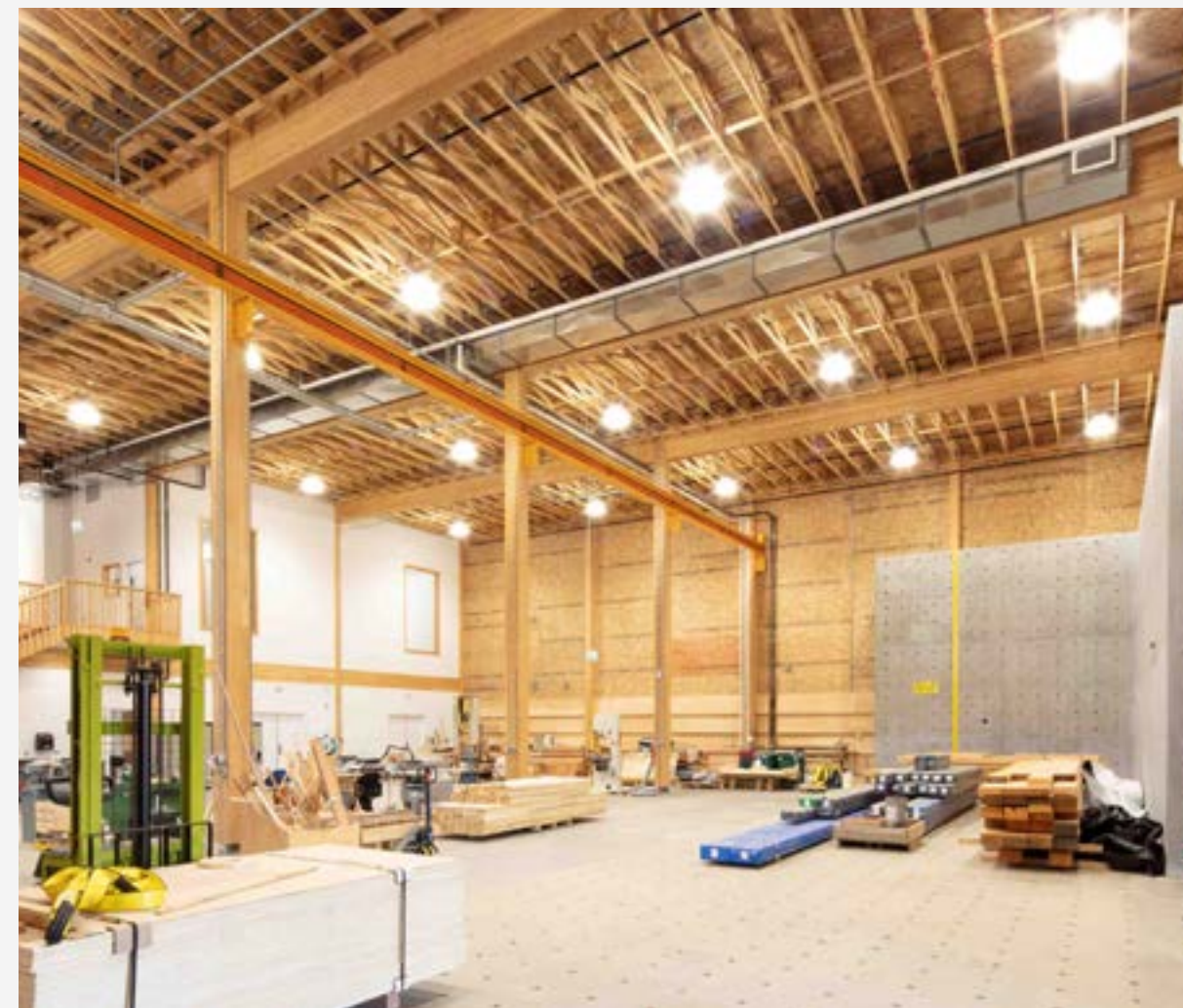
Warm and welcoming for all, BX will attract new visitors with its meaningful design and commitment to environmental stewardship. It will be Manitoba's first commercial building to achieve Passive House Certification and is also certified under the CAGBC Zero Carbon Building standard.

Stantec's integrated design team of architects, engineers, and climate services specialists developed the triangular geometry, compact shape, and orientation for this project. This simultaneously facilitates significant transparency while substantially

reducing energy consumption by controlling solar radiation within the extreme Manitoba environment where climate conditions range from -40° C and 0% relative humidity to +40°C and 100% relative humidity.

BX has received multiple awards, including the 2023 Design Award from the Passive House Network, the Metropolis Planet Positive Award, and was shortlisted for the 2023 World Architecture Festival and World Architecture News Award.

→  
*FortWhyte Alive Buffalo Crossing Visitor Centre*



## UNIVERSITY OF NORTHERN BRITISH COLUMBIA WOOD INNOVATION RESEARCH LABORATORY

**CLIENT:** University of Northern British Columbia  
**LOCATION:** Prince George, Canada

University of Northern British Columbia's Wood Innovation Research Laboratory is the first Passive House certified industrial and higher education building in North America—a particularly impressive feat due to the cold climate in Prince George, the high spaces, and the unique building usage as a high-tech wood lab with CNC machines and experimental equipment. The facility features a wood structure and its expression of the building is inspired by passive design principles and wood innovation.

The laboratory responds to and complements its surrounding building forms. It is oriented to maximise passive solar heating within the

context of the urban landscape. The south side of the building accesses the sun and views, harvesting heat, and natural light for the office and seminar spaces within the building. The windows are shaded by external devices to reduce unwanted solar gain. It's also where outdoor air for the building will be drawn from, with the future park providing higher air quality than the road and laneway to the north and east.

Because the lab is designed to meet Passive House standards, it uses very little energy for heating while at the same time providing healthy amounts of outdoor air for ventilation. Students have a beautiful, modern facility to do research on new uses for wood, creating new jobs and markets in the forestry industry and helping British Columbia secure a sustainable future.



*University of Northern British Columbia Wood Innovation Research Laboratory*



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Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

Stantec trades on the TSX and the NYSE under the symbol STN. Visit us at [stantec.com](http://stantec.com) or find us on social media.

**Design with community in mind**