

# A new era of Antarctic endeavour

## Planning a modern Davis research station

The *Australian Antarctic Strategy and 20 Year Action Plan* sets out Australia's future engagement in the region. It builds on a rich history of more than a century of research, environmental stewardship and leadership on the continent.

In 2019, the Australian Government committed more than \$450 million to modernise Australia's Antarctic research stations and supporting infrastructure.

The Australian Antarctic Division (AAD) is planning to deliver sustainable, world-class facilities at Davis research station to support the future scientific and operational activities of the Australian Antarctic Program for decades to come. AAD's plans are informed by a vision for what the operation of Davis station would be like in 2050.



# The vision for Davis research station

In 2050...

Australia's Davis research station is the premier research hub in East Antarctica and, operates within one of the largest coastal ice-free areas on the continent, in the Vestfold Hills.

The year-round access provided by the Davis aerodrome has overcome one of the most significant barriers facing the Antarctic community – winter. It enables scientists to focus on answering critical questions of global significance.

The Davis aerodrome is East Antarctica's premier aviation hub – with year-round flights to the continent departing from the Antarctic Gateway City of Hobart. Expeditioners landing at the aerodrome are taken to Davis station, or transported to field camps and stations further afield through a network of intracontinental flights operated by Australia and other nations.

More reliable and regular access has enabled scientists to deliver more innovative science. Expanded teams of researchers undertake large-scale projects that link nations and several research disciplines. Enhanced mapping of the continent has facilitated greater exploration of the continent. Drones, autonomous underwater vehicles and robots equipped with sophisticated sensors conduct scientific campaigns from Davis station.

Observations are recorded during the transition periods between seasons. Data are available across the entire life cycles, breeding and non-breeding, of Antarctic species.

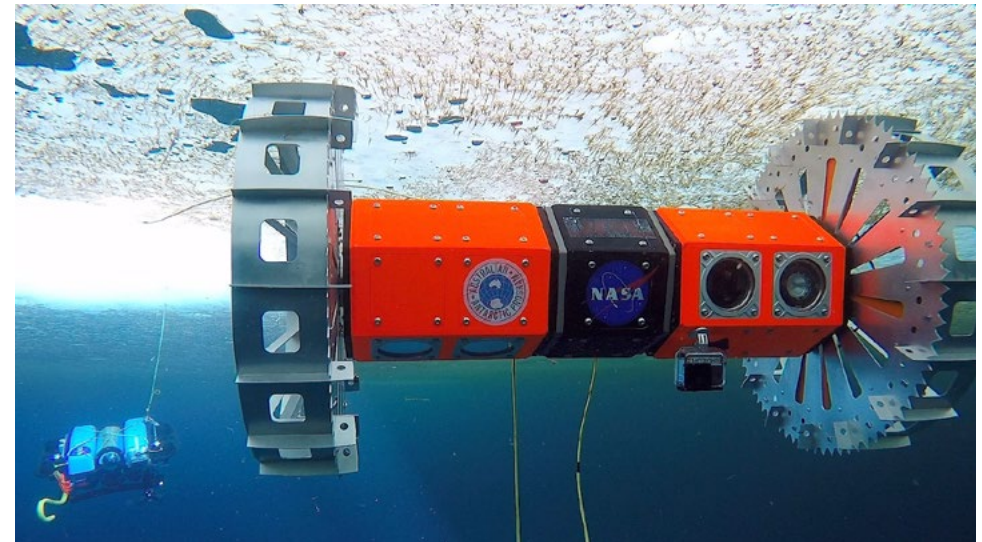


Image: NASA/JPL/SETI Institute/Australian Antarctic Division

***“Expanded teams of researchers undertake large-scale projects that link nations and several research disciplines”***

## The vision for Davis research station

In 2050...

More accurate and higher resolution datasets, and enhanced year-round ecological understanding has improved knowledge of species movements, and enabled identification of threats including invasive species.

A detailed understanding of ice sheet, weather, climate and environmental processes and trends has contributed to improved climate and weather modelling.

Winter access is supporting studies into human physiological performance and vehicle operations, enabling expeditions to be run more safely and efficiently.

Our enhanced understanding of the Antarctic environment has improved environmental management, and policy and decision-making.

RSV *Nuyina* has been successfully supporting science and logistics for several decades, providing scientists with access to the Southern Ocean and sea ice surrounding the continent. Ship-based expeditioners visit between October and April, using the direct aviation link with Australia to switch scientists and crew, and transfer scientific samples to research labs in Australia and across the world.

***“RSV Nuyina has been successfully providing scientists with access to the Southern Ocean and sea ice surrounding the continent”***



Image: Australian Antarctic Division



## The vision for Davis research station

In 2050...

Expeditioners live and work at a modern station, enjoying comfortable accommodation, living quarters and recreation activities. Health and safety is at the forefront of the station's design, and the priority of all expeditioners.

The use of new and emerging technology, including sustainable and efficient infrastructure, has reduced the per capita consumption of water, energy needs and waste generation, minimising the station's environmental footprint and operating costs.

Advanced communications systems allow remote recording, relay and real time analysis of data collected from the field and its transfer back to Australia and further afield, including

communication to and from satellites.

The processing of large datasets on station is undertaken with ease.

The ability to provide access to East Antarctica, state-of-the-art, flexible facilities and superior logistical support has made Australia the collaborative partner of choice for Treaty nations and national and international science organisations.

Australia is an active and well-respected member of the Antarctic Treaty System, recognised for its continued commitment to globally significant science, international cooperation and environmental stewardship of the continent.



Image: Hugh Broughton Architects

***“Expeditioners live and work at a modern station ... health and safety is at the forefront of the station's design and priority of all”***

# Developing the Master Plan

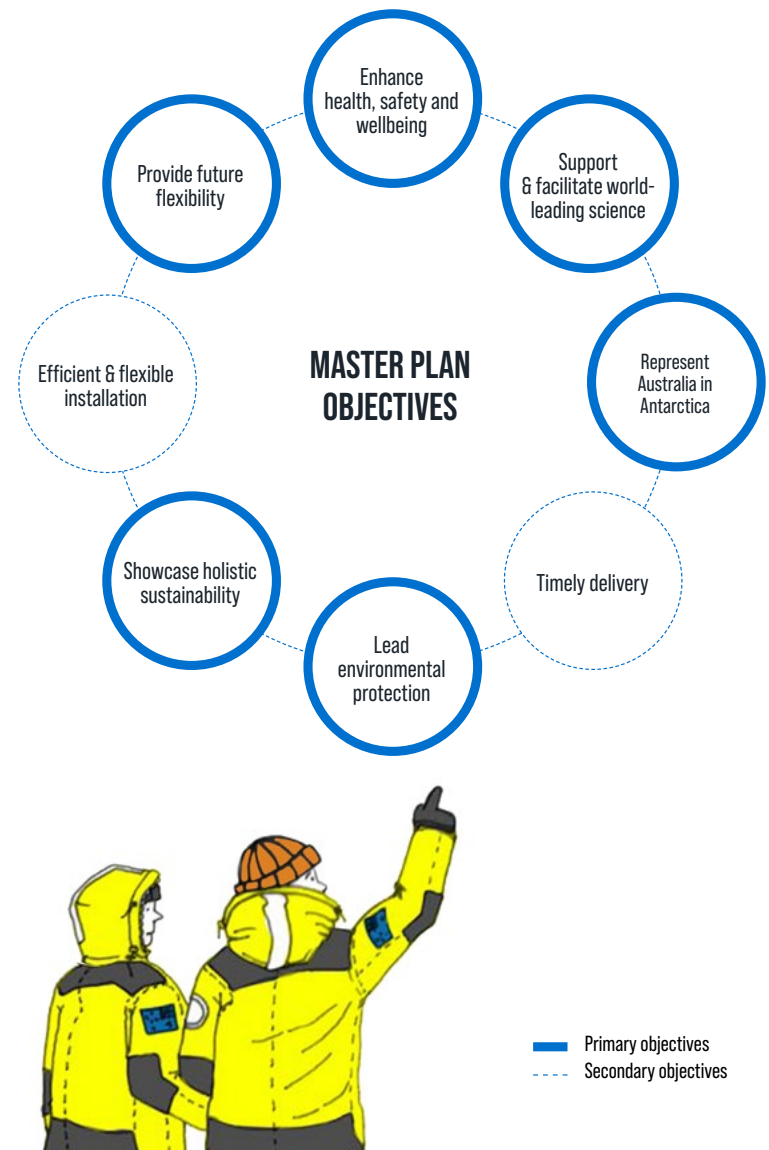
The AAD engaged expert planning consultants WSP and high profile Antarctic architect Hugh Broughton to prepare a Master Plan to start the journey towards achieving this vision for 2050.

The Master Plan is guided by the *Australian Antarctic Strategy and 20 Year Action Plan* and is informed by consultation with a range of stakeholders who are passionate about Australia's future in Antarctica.

This includes the Antarctic science community and partner organisations such as the Bureau of Meteorology (BOM), CSIRO, Geoscience Australia, Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), Australia's Nuclear Science and Technology Organisation (ANSTO) and the Australian Defence Force through Operation Southern Discovery.

The Master Plan has six primary objectives and two secondary objectives, as shown in the diagram opposite.

The Master Plan aims to address the challenges of living and working in Antarctica such as weather, isolation, logistics and resource availability to enhance health, safety and wellbeing and provide facilities that support year-round world-leading science.



# Concept development

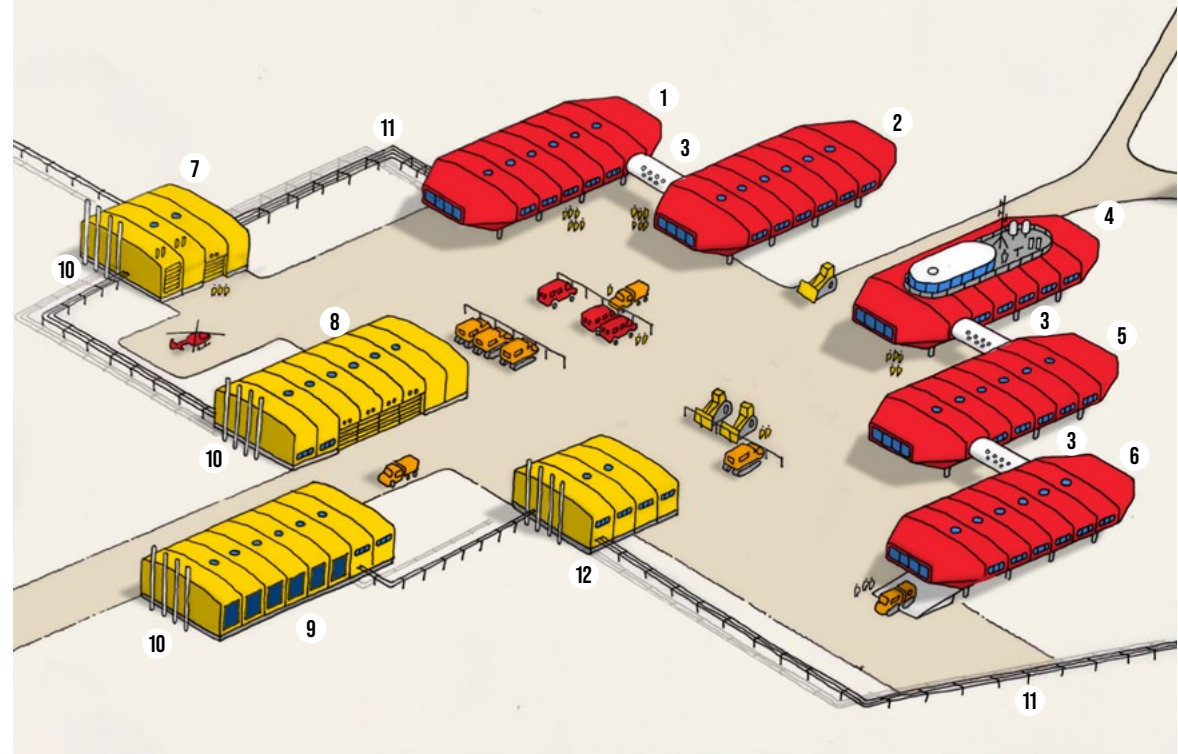
The Master Plan outlines an early concept for Davis station with a series of elevated, sustainable and efficient buildings hovering above the landscape of the Vestfold Hills.

Providing a resilient station that is a great place to live and work will be possible through aerodynamic and easily maintainable buildings, with open plan, well-lit interiors to support a strong sense of community.

Recycled water and wind and solar power will enhance sustainability, and ways to reduce environmental impact such as rationalising access roads are included.

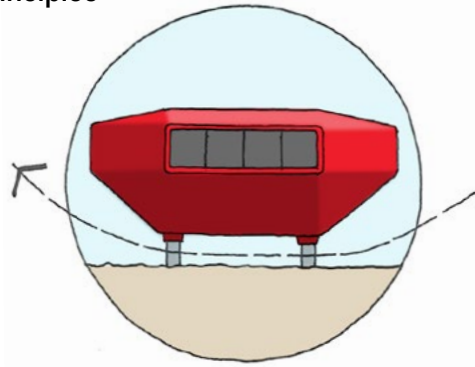
The new infrastructure will support future science, with a wide range of labs and provision for new technologies. The modular design allows for future flexibility to change the use of facilities and easy expansion.

**The concept so far ...**



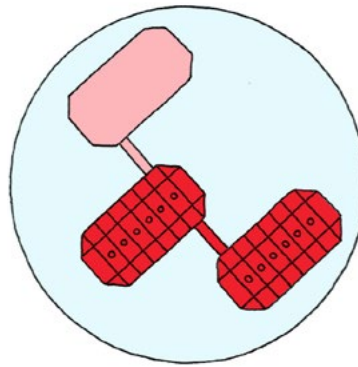
- |                                                                                |                                                                                                  |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1 Sleeping accommodation                                                       | 7 Pump house for treatment of new water source                                                   |
| 2 Living accommodation                                                         | 8 Vehicle workshop                                                                               |
| 3 Link bridges connect buildings                                               | 9 Stores building incorporating wall mounted solar panels                                        |
| 4 Science and technology building with 360-degree observatory and science deck | 10 Thermosiphons transfer cooling from the air into the foundation to keep the permafrost frozen |
| 5 Operations and administration building                                       | 11 Site services                                                                                 |
| 6 Water storage, waste treatment, utilities and general workshop               | 12 Emergency vehicle shelter                                                                     |

## Design principles



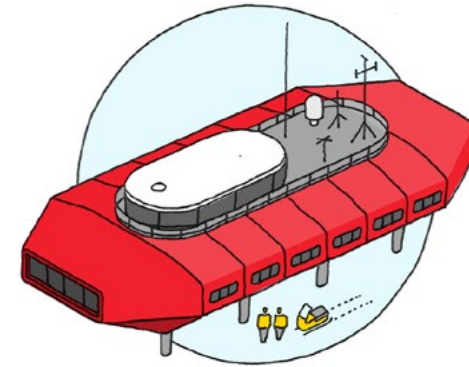
### **SNOW MANAGEMENT**

*Aerodynamic buildings for living, science, management and technology will be elevated above the ground allowing the wind to scour snow from underneath, reducing the time that needs to be spent clearing blizz tails.*



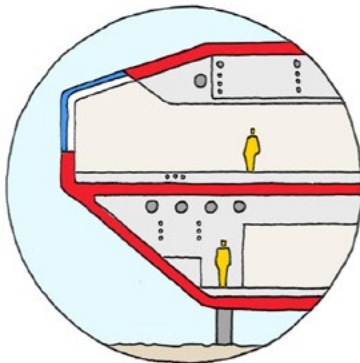
### **FUTURE FLEXIBILITY**

*The repeating modular design allows the interior of the buildings to be easily re-configured to suit changing science programs. When the population expands additional modules can be constructed and linked to the existing facilities.*



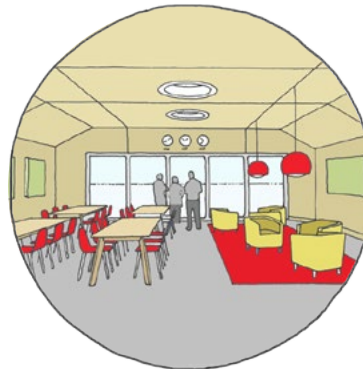
### **SUPPORTING SCIENCE**

*Future focussed infrastructure will enhance Australia's Antarctic Science Program. The new station will include a wide range of labs, an observatory and spaces for new technologies such as robots, drones and long-range submersibles.*



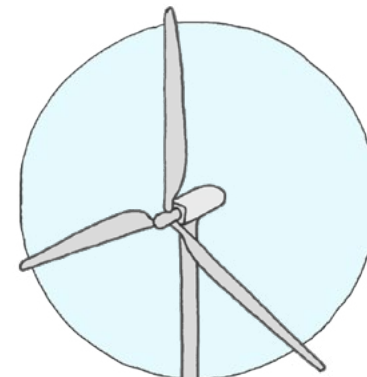
### **SIMPLE MAINTENANCE**

*Buildings will be designed using simple repeatable services systems which are easy to access and maintain. The same systems can eventually be introduced in the other AAD stations.*



### **WELL BEING**

*The interior design will provide a home from home for the residents. Natural materials will be complemented by good lighting. Free flowing open plan spaces will support a strong sense of community.*



### **SUSTAINABILITY**

*Wind and solar power will be the primary sources of energy and heating for the new station. Generators will only be included to provide emergency back-up. Water will be recycled and resilience will be significantly improved.*



# Proposed Davis aerodrome

The AAD is currently preparing detailed plans and an environmental assessment for a year-round aerodrome near Davis station.

A final decision on the requirements and timing of the delivery of a modernised Davis station depends on whether the Davis aerodrome is approved to proceed.

# Next steps

The next stage of the master planning process includes:

- Detailed site investigations
- Refinement of options
- Further engagement with stakeholders
- Further development of Master Plan.

[www.antarctica.gov.au](http://www.antarctica.gov.au)

