

WESTERN SYDNEY
UNIVERSITY



FLIGHT PATH

OUR STRATEGY FOR WESTERN SYDNEY'S AIRPORT

The background of the entire image is a photograph of a university campus, likely Western Sydney University, tinted in a solid red color. The scene shows large, mature trees with dense foliage in the foreground and middle ground. In the lower portion of the image, there are outdoor seating areas with large, light-colored umbrellas. Several people are visible, some sitting at tables and others walking. The overall atmosphere is that of a busy, green campus environment.

WE ARE WESTERN SYDNEY

With respect for Aboriginal cultural protocol and out of recognition that its campuses occupy their traditional lands, Western Sydney University acknowledges the Darug, Tharawal (also historically referred to as Dharawal), Cabrogal and Wiradjuri peoples and thanks them for their support of its work in their lands (Greater Western Sydney and beyond).

MESSAGE FROM THE VICE-CHANCELLOR AND PRESIDENT

'Flight Path' is a comprehensive strategy that details Western Sydney University's long-term commitment to maximising the social, cultural and economic benefits of the Western Sydney Airport for our region.

Airports are hubs of transition. Their basic success is defined by their capacity to facilitate movement, transaction and exchange. But their deeper value is gauged by their ability to extend the notion of transition.

Great airports become a destination. Not just a point of transit.

The best airports drive large-scale economic pivots, they enliven social and cultural interactions, they provoke new ways of engaging places and ideas. Great airports become a destination. Not just a point of transit.

These are the structural characteristics Western Sydney needs to support if, as a region, we are to realise the full potential of Australia's newest airport at Badgerys Creek. It is this imperative that drove Western Sydney University (WSU) to develop a strategy to energise planning for the Airport and realise the broader opportunities this generational project presents.

The strategy shows how the University can use its collaborative network to coordinate, expand and intensify the best opportunities the Airport, Aerotropolis and Western Sydney City Deal present.

At its core, this is a report developed by and for the region. 'Flight Path' draws on the insights of nearly 50,000 students and researchers, and captures the voices of industry partners, government and — most importantly — our community.

This is a report unequivocally concerned with ensuring the West, our nation's third largest economy and fastest growing region, determines its own future.

Why us? WSU is embedded in the West. We understand it. We know its challenges, its achievements and its potential.

Preparations for a transformative piece of infrastructure like the Airport — even at this early stage — will ask hard questions of government. Policies and planning frameworks will be crucial to extending the Airport beyond its function as a transit hub.

Under the Western Sydney City Deal, federal and state governments have signed up to deliver 200,000 knowledge jobs by 2026.

The public will rightly demand to see just what measures are in place to optimise the Airport's support of Western Sydney's remarkable growth and momentum. There are no second chances. There is no time to lose in responding to these imperatives. The region's voters will react strongly to any deviation from the substantial commitments governments at all levels have confidently made.

The question of jobs is the most urgent. Under the City Deal, federal and state governments have signed up to deliver 200,000 knowledge



jobs by 2026. This strategy shows how, with targeted investment from government and industry, the University can drive the realisation of this objective. But Western Sydney has significant ground to make up.

'Flight Path' affirms that leveraging the Airport to redress the stark jobs-intensity divide between the West and the rest of Greater Sydney must be the project's central priority. Above all else, this report pursues that objective.

In mapping the way ahead to the Airport's opening in 2026, this report also highlights the opportunities that exist now. Focusing on the 'Aerotropolis Edge Cities' — Campbelltown, Liverpool and Penrith — 'Flight Path' looks at how these cities can, and are, leading in developing skills, labour market capacity and collaborative industry clusters to intersect with the Airport.

The University's existing engineering focus at the Kingswood-Werrington campuses, with its connection to the planned St Marys-Airport rail link, is identified as a pivotal site for early investment and rapid intensification, as is the WSU-Hort Innovation partnered, National Vegetable Protected Cropping Centre at the Hawkesbury campus.

The question of jobs is the most urgent.

'Flight Path' shows how the University can align with and drive the industry-attraction themes government signatories have set under the City Deal. This is where the University's highly-specialised and internationally-recognised research in fields like machine-human interaction, protected cropping and integrative medicine come to the fore.

The strategy also illustrates how the thematic positioning of this expertise in accessible and collaborative locations — like Liverpool, Hawkesbury and Westmead — is key to their successful integration with the Aerotropolis.

The University's Launch Pad start-up/scale-up incubator can activate this expertise by partnering with businesses to distribute the economic benefits of the Airport across the region.

Furthermore, the labour force required to drive new knowledge jobs will emerge from approaches to curriculum that embrace the changing nature of work and digital disruption pioneered by the University's '21st Century Curriculum' project.

The University's groundbreaking 'Western Growth' program of campus transformation maximises the University's networking capacity — a network that WSA can leverage to distribute the Airport's economic transition effects across Western Sydney. No other organisation has the depth, range and intensity of connections across every major Western Sydney centre. No other entity can attract, enliven and engage industry, government and community connections in the way the University can.

The University's world-leading vertical campus network is central to this value proposition. 'Flight Path' shows how this network can be strengthened even further through focused partnerships with other universities and education providers in highly-accessible, industry-themed and technology-rich areas.

WSU wants 'Flight Path' to be an early articulation of the region's strengths. We want it to assert that Western Sydney is not simply ready for the Airport: we are committed and capable of making WSA Australia's most transformative, impactful and innovative infrastructure project.

That's what the region deserves. This strategy shows how that outcome can be delivered.



PROFESSOR BARNEY GLOVER AO
VICE-CHANCELLOR AND PRESIDENT
WESTERN SYDNEY UNIVERSITY

MARCH 2019



Industries poised to feature
include aviation services,
advanced manufacturing,
smart logistics and agritech.

THE NEW AIRPORT AND AEROTROPOLIS CONTEXT

The coming Western Sydney Airport is more than simply a piece of infrastructure or logistical hub. With sustained investment and political commitment, it can become a global exemplar of innovation and economic transformation.

By 2030, the population of Western Sydney will be greater than the rest of Sydney, driving the need for a second airport. By around 2035, Kingsford Smith Airport will be unable to meet growing commercial and freight aviation demand. Western Sydney Airport (WSA) is essential.

These areas will be positioned to attract high-tech industries.

A new airport in the West is crucial to realising the industry, employment and economic outcomes promoted in the Greater Sydney Commission's 'Three Cities' model, a planning structure supported by the Commonwealth and NSW Governments. Further, priority growth areas have been identified in close proximity to WSA, with commitments from the NSW Government for accelerated rezoning and faster approvals.

These areas — along with the 'Aerotropolis Edge Cities'* — will be positioned to attract high-tech industries, and help shape the 'Aerotropolis', the 114ha zone around the WSA.** Industries poised to feature prominently will include:

- aviation services
- advanced manufacturing
- smart logistics and supply chain
- technology-supported peri-urban agriculture.

The rise of these industries around the Airport will disrupt the region's existing jobs and skills profile. This comes on the back of existing challenges. Job density levels in areas of Western Sydney are already exceedingly low, when compared — for example — to other parts of Greater Sydney.^ Equally, a pronounced funding, and policy-focus disparity exists between Inner Sydney and the West with regard to government support for industry innovation programs.^

If governments' economic-uplift promises for the Airport are to be met, then addressing existing and emerging labour market and access challenges must be a priority.

NOTES

* For the purposes of this report: 'Aerotropolis Edge Cities' are cities 10km+ from Badgerys Creek that will benefit from having an airport in close proximity. The Airport will be a catalyst for growth in business and population due to increased jobs and infrastructure. Current metropolitan and economic centres including Liverpool, Penrith and Campbelltown all sit within close proximity of the Airport. Fast rail and road connections could also ensure Parramatta and Blacktown benefit as secondary edge cities.

** The 'Greater Sydney Commission' defines the 114ha site at Bringelly, under the City Deal, as the Aerotropolis. Circling the airport with a radius of 5–10kms, it will include connected infrastructure which will ultimately attract businesses directly associated with the Airport (namely aviation services, advanced manufacturing, smart logistics and supply chain, and technology-supported peri-urban agriculture).

^ P. O'Neill, *Addressing Western Sydney's Jobs Slide*, Centre for Western Sydney, Western Sydney University, 2017.

^^ T. Featherstone, 'The problem with start-ups clustering in capital cities', *Sydney Morning Herald*, Sydney, 9 August 2018.

A photograph of three people seated on a stage during a panel discussion. From left to right: a man with a beard and glasses in a dark suit, a man with glasses in a dark suit and red tie, and a woman with curly blonde hair in a dark blazer and red top. The woman is speaking into a microphone and gesturing with her hand. Behind them is a large screen displaying a diagram with the word 'CULTURE' and a dollar sign. The scene is lit with warm stage lights.

Western Sydney University
can bring locally-embedded
cohesion, focus and regional
knowledge brokerage.

L-R: Dr Andy Marks of Western Sydney University, Dr Tim Williams of Arup, David Pring of KPMG and Liz Ann Macgregor of the Museum of Contemporary Art Australia at the 2018 CatalystWest forum, where the panellists emphasised the importance of artists 'coming in at the design phase of infrastructure projects like the Airport, rather than the end'.

THE NEW AIRPORT AND AEROTROPOLIS OPPORTUNITY

Making the most of the Airport and Aerotropolis requires a fully informed and deliberative response. Western Sydney University brings locally-embedded cohesion, focus and regional knowledge brokerage to a planning, policy and development process that will only succeed with a grounding in evidence.

With its interconnected network of campuses, resources and knowledge, Western Sydney University (WSU) can drive the evidence-based realisation of the array of plans, investor guides and policy frameworks for the Airport and surrounds*. Importantly, WSU can ensure regional benefit is promoted ahead of other agendas.

Western Sydney University is significantly shaping the thinking on the Airport.

In its role of 'knowledge broker',** WSU is significantly shaping the thinking on the Airport and associated initiatives. It is drawing together different stakeholders both internally and externally to drive creative solutions to problems and challenges. This is an extension of an approach the University has long championed.

WSU has a unique legislated commitment to support the development of the West. Research is central in that regard. Among a range of strategic research initiatives, four particularly align with the industry-attraction objectives of the Aerotropolis. These include the MARCS Institute for Brain, Behaviour and Development; the Hawkesbury Institute for the Environment; the Institute for Culture and Society; and the Translational Health Research Institute. Respectively, these institutes corral globally competitive expertise in human-machine interaction, horticulture and health research translation.

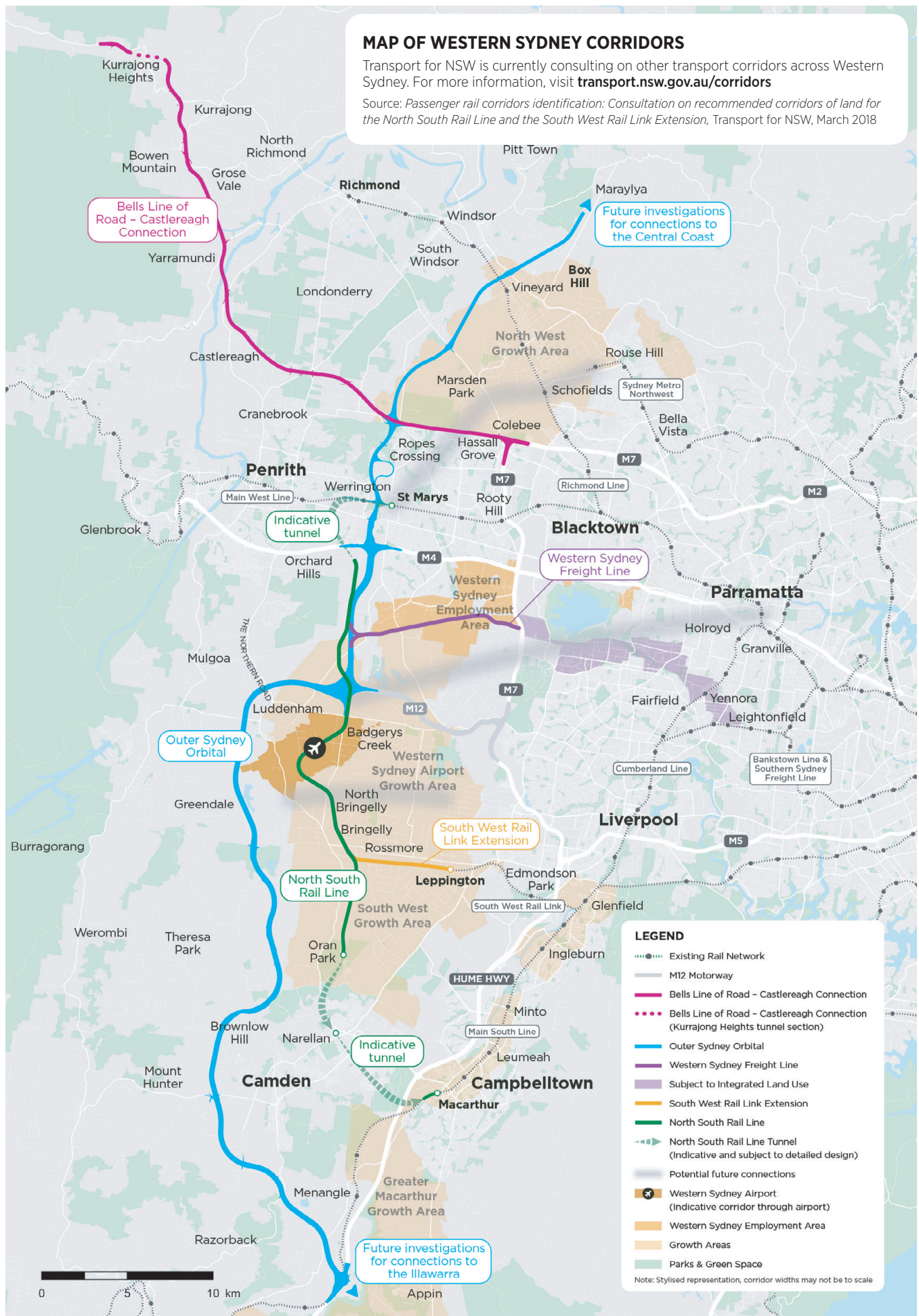
The Airport and Aerotropolis can draw on the expertise, knowledge, and resources of the thematically distinct WSU campuses across the network and, with adequate connectivity, a WSU Aerotropolis presence can be an agile teaching and research facility offering 'diffused learning' with co-located industry and other University partners.

In September 2018, WSU, along with UNSW, Newcastle and Wollongong universities (the 'NUW Alliance') finalised a *Statement of Intent* with the NSW Government to establish a 'Multiversity' within the 'core' Aerotropolis site.

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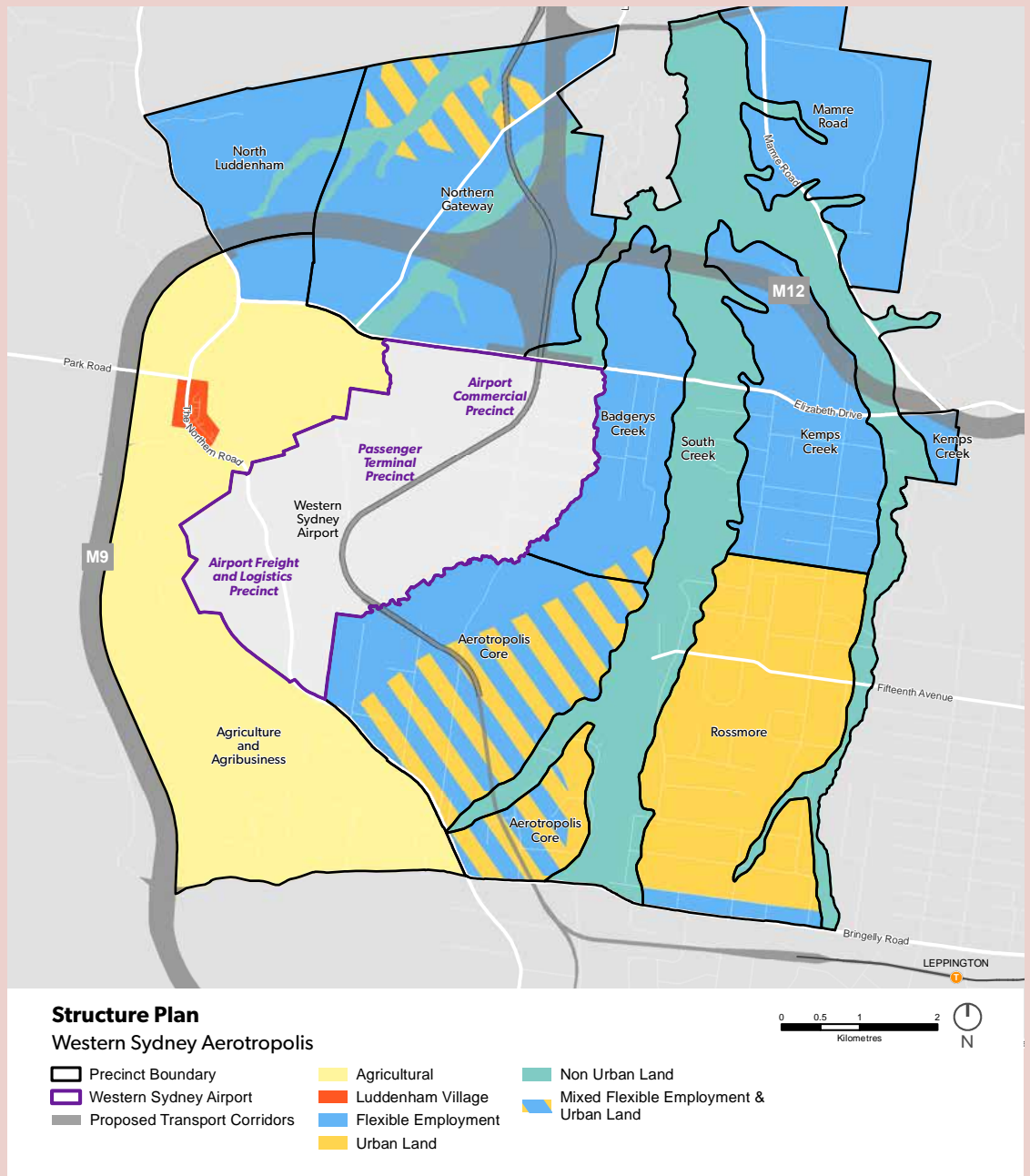
* Plans include, but are not limited to: *Western Sydney Airport: Airport Plan*, Commonwealth of Australia, 2016; *Western Sydney Aerotropolis Investor Guide*, NSW Government & Commonwealth of Australia 2018; *Western Sydney Airport Land Use and Infrastructure Implementation Plan: Stage 1, Initial Precincts*, Department of Planning and Environment, 2018; *Western Parklands City Deal*, Commonwealth of Australia, 2018; J. Kasarda, *A Western Sydney Aerotropolis: Maximising the benefits of Badgerys Creek*, NSW Business Chamber, Sydney, 2016.

** Western Sydney University's physical campus network spans 11 major presences across Western Sydney (refer to page 14). The University's network of research, teaching, virtual and collaborative assets complement and significantly broaden its built footprint.



SOURCE

Western Sydney Airport Land Use and Infrastructure Implementation Plan: Stage 1, Initial Precincts, NSW Department of Planning and Environment, 2018



IMAGE

Artist impression of the Western Sydney Aerotropolis

SOURCE

NSW Department of Industry, October 2018





Vertically-integrated educational models are considered an essential part of the 'Multiversity' presence.

AEROTROPOLIS MULTIVERSITY

Under the Skills and Education component of the March 2018, Western Sydney City Deal, the Federal, NSW and Local Government signatories called for ‘proposals from leading global universities and industry to form part of an integrated Aerospace Institute in the Aerotropolis’. Western Sydney University is now part of an innovative joint bid to take up this transformational opportunity.

Western Sydney University and the NUW Alliance (Newcastle, UNSW and Wollongong universities) were invited by the NSW Government to consider participating as foundational tenants in the Western Sydney Aerotropolis.

This collaboration will be a first for Australia, and an international exemplar in industry-engaged teaching and research.

Western and the NUW Alliance envisage a collaborative ‘Multiversity’ presence at the Aerotropolis. This collaboration will be a first for Australia, and an international exemplar in industry-engaged teaching and research. It will be a diffused presence, designed to support a new interconnected economic ecosystem.* Government’s timely provision of high-quality soft and hard infrastructure platforms and connections (including transport links) will be essential in catalysing the formation of an internationally competitive cluster of translational research and development.

This Multiversity will bring unprecedented scale, expertise and intensity to the task of driving innovation, collaboration and economic uplift at Australia’s first government designated ‘Aerotropolis’.

Industry will be able to co-locate with the universities’ globally-leading teaching and research expertise, across a highly specialised and thematically diffused site. To date, the NSW Government has secured agreements with several international firms to establish a presence at the Aerotropolis including Northrop Grumman, Hitachi, Mitsubishi Heavy Industries and Sumitomo Mitsui Financial Group.**

The Multiversity’s thematic zones of collaboration would reflect the NSW Government’s, Land Use and Infrastructure Implementation Plan areas of industry focus, which are

- Engineering, Aerospace and Defence Industries
- Health, Research and Advanced Manufacturing
- Food and Agribusiness
- Freight and Logistics
- Tourism and Visitation
- Building and Construction.

Vertically-integrated educational models — from early childhood, through to higher degree research stage — are considered an essential part of the Multiversity presence.

Western and the NUW Alliance are in negotiations with the NSW Government to finalise a non-binding Heads of Agreement document that will guide the next phase of discussions. The four universities remain committed to ensuring the Multiversity becomes a globally leading for industry-embedded site of research and teaching excellence.

NOTES

* Western and the NUW Alliance are also committed — at the Aerotropolis site — to achieving world-best across all aspects (including sustainability, amenity, infrastructure, transport, research and teaching). To achieve this, universities’ specialist expertise should be utilised throughout the planning, governance and development of the Aerotropolis. The design of the presence will draw on University subject matter expertise to create a world-leading, sustainable environment. It should be considered a nationally (and globally) significant test bed for bold new approaches to infrastructure and services.

** Additional commitments have been secured from: Urban Renaissance Agency (Japan), Vitex Pharmaceuticals and Sydney Markets.



The range of partnerships in development will give rise to new models of industry collaboration, community engagement and applied teaching and research.

KNOWLEDGE NETWORK

AN INNOVATION CORRIDOR

Western Sydney University began preparing for the Airport well ahead of then Prime Minister Tony Abbott's 15 April 2014 announcement the infrastructure project would go ahead. With its 2013 'Innovation Corridor' strategy, the University set out areas of thematically aligned teaching and research spanning its Hawkesbury, Penrith and Campbelltown network of Outer Western Sydney campuses.

The University's rationale for the strategy was to send clear signals to the community, industry and government of its capacity to collaborate in fields of regional relevance and priority. To summarise, the Innovation Corridor comprised health and medical expertise at Campbelltown; engineering and infrastructure at Penrith; and agribusiness, protected cropping, sustainability and solar energy at Hawkesbury. The Corridor also encompassed the University of Sydney's veterinary science site at Camden, the Celestino, 'Sydney Science Park', and a range of industry-attracting, knowledge job-generating initiatives in between.

The Innovation Corridor strategy was a precursor to the Greater Sydney Commission's designation of Outer Western Sydney as the Western Parklands. In many respects it set the agenda for government's re-orientation of planning and policy development frameworks to support increased activity and growth on Sydney's urban fringe.

The Innovation Corridor strategy and its policy antecedents is proof of the catalytic role the University can perform in driving the practical application of knowledge networks to support largescale and long-term socioeconomic shifts.

WESTERN SYDNEY INNOVATION CORRIDOR

HAWKESBURY AGRIPARK

Hawkesbury
Agribusiness
Protected Cropping
Sustainability
Solar Energy

WESTERN PARKLAND CITY

'THE QUARTER' PENRITH HEALTH AND EDUCATION PRECINCT

Penrith
Engineering
Construction
Infrastructure
Psychology

Werrington
Launch Pad
Engineering

AEROTROPOLIS

'Multiversity'
WESTERN SYDNEY AIRPORT
AEROTROPOLIS

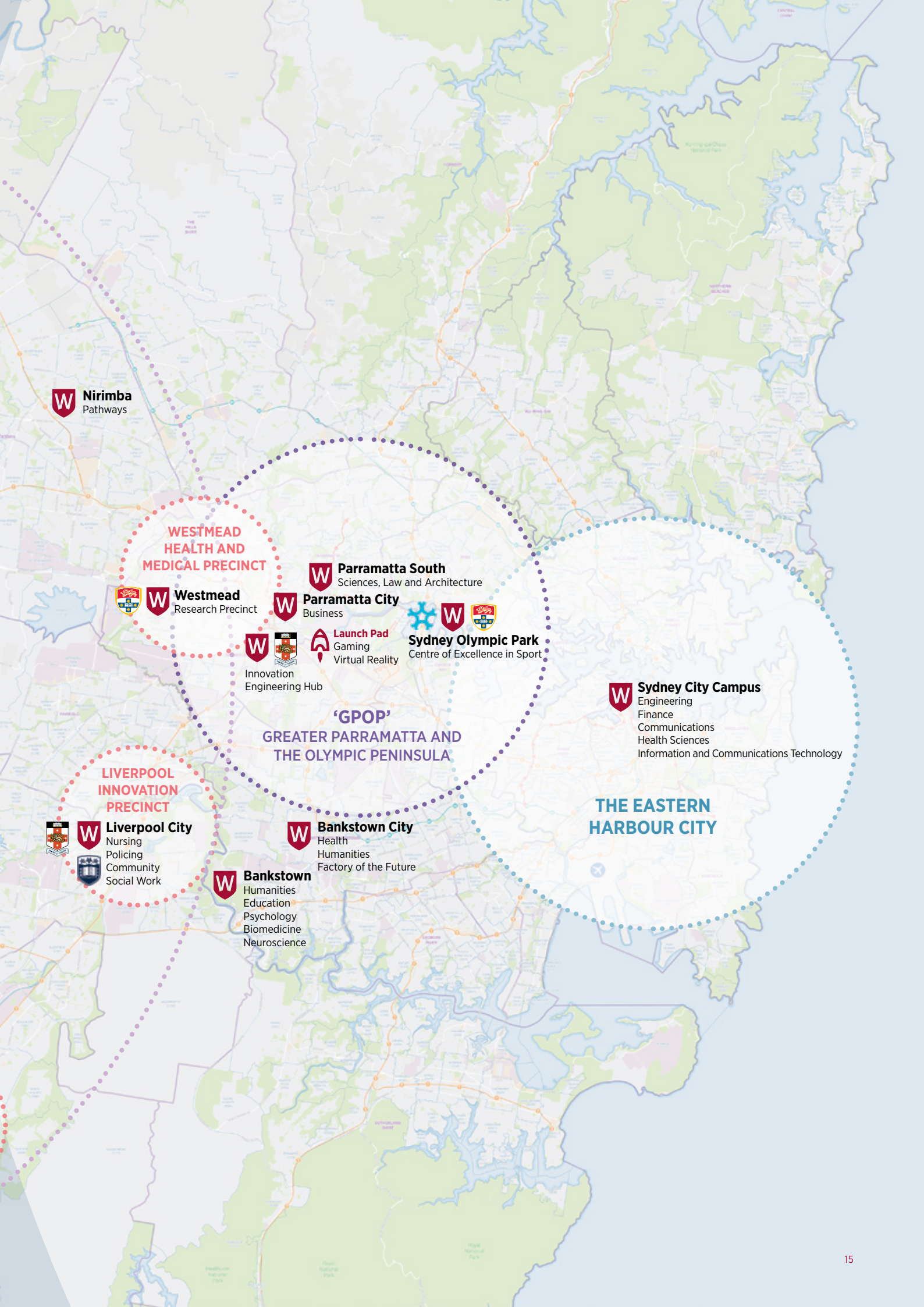
- University of Newcastle
- University of New South Wales
- University of Wollongong
- Western Sydney University

Oran Park
Launch Pad
Construction-tech

University of Sydney
CAMDEN
Veterinary Science

CAMPBELLTOWN HEALTH AND EDUCATION PRECINCT

Campbelltown
Medicine
Nursing
Midwifery
Health Science



W **Nirimba**
Pathways

**WESTMEAD
HEALTH AND
MEDICAL PRECINCT**



W **Westmead**
Research Precinct



W **Parramatta City**
Business



W **Parramatta South**
Sciences, Law and Architecture



W **Launch Pad**
Gaming
Virtual Reality



W **Sydney Olympic Park**
Centre of Excellence in Sport



W **Sydney City Campus**
Engineering
Finance
Communications
Health Sciences
Information and Communications Technology



W **Bankstown City**
Health
Humanities
Factory of the Future



W **Bankstown**
Humanities
Education
Psychology
Biomedicine
Neuroscience



W **Liverpool City**
Nursing
Policing
Community
Social Work



W **Greater Parramatta and The Olympic Peninsula**



W **Sydney Olympic Park**
Centre of Excellence in Sport



W **Bankstown City**
Health
Humanities
Factory of the Future



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**THE EASTERN
HARBOUR CITY**

INTER-UNIVERSITY COLLABORATION

Ahead of the establishment of the Airport, Western Sydney University is central to the largest network of institutional teaching and research collaboration the Australian university sector has seen.

UNSW Sydney and Western Sydney University are establishing a joint Engineering Innovation Hub in the Parramatta CBD.* This is in addition, and in complement to the 'Multiversity', which WSU, UNSW, Wollongong and Newcastle universities are developing at the Western Sydney Aerotropolis. WSU, UNSW and Wollongong are also working together to design the region's newest innovation precinct, 20 kilometres down the road from Badgerys Creek at Liverpool.

This level of collaboration is unprecedented.

Roughly 30 minutes, drive to the north of the Airport, the University of Sydney and WSU are working hand-in-hand at Westmead, to transform one of Australia's largest concentrations of health and medical research expertise. This is a key site in the Greater Parramatta and Olympic Peninsula 'GPOP' zone.

Ten minutes back down the M4, at Sydney Olympic Park on GPOP's eastern edge, WSU, the NSW Institute of Sport, the University of Canberra and other partners are exploring the potential joint establishment of an internationally-facing Centre of Excellence in Sport. With coming Metro and Light Rail connections, these GPOP sites will have fluid and rapid links to support heightened investment, community involvement and commercial exchange.

This level of collaboration is unprecedented. The fact that it is occurring in Western Sydney reflects the extraordinary opportunity presented by the Airport and the region's broader growth trajectory. This has not been possible anywhere else in the country, despite many attempts, until now.

The range of partnerships in development will give rise to new models of industry collaboration, community engagement and applied teaching and research. The matrix of common interests will be of a scale and nature that identifies Western Sydney as a globally-recognised zone of inter-university collaboration. This status will make the region a compelling attractor of global industry, investment and talent.

NOTES

* With development partner Charter Hall, UNSW and WSU are developing a custom-designed, 15-storey, 27,000 sqm vertical Hub at Hassall Street in the Parramatta CBD — to be completed by 2021 — to house a joint undergraduate engineering program alongside Western Sydney University's architecture and business courses.

EDUCATIONAL AND SKILLS ALIGNMENTS

Western Sydney University is well advanced in aligning the educational attributes of its students with the skills profiles emerging at the Airport and Aerotropolis. This is among the most critical of endeavours in ensuring the Airport and related initiatives are able to deliver the ambitious employment outcomes three levels of government have committed to under the Western Sydney City Deal.

In the most recent national Employer Satisfaction Survey*, Western Sydney University graduates were rated the highest of all university graduates in NSW, with an 87.8% satisfaction rating (compared to 84.3% for graduates of all universities). WSU's graduates also ranked second across all universities in Australia for overall satisfaction from 2016–2018.

Western graduates are not simply job takers, they are job creators.

Understanding and responding to the expectations of employers is vital in the lead up to an industry-engaged venture of the level of intensity and scale we will see at the Airport and surrounds. Equally, developing skillsets that generate new business opportunities is critical. In this sense, WSU graduates are not simply job takers, they are job creators.

To achieve these ambitious skills-related objectives, flexibility in the context within which training is delivered must be complemented by innovation in teaching

methodology, with a particular focus on digitally-infused learning. This is the approach WSU has adopted via its '21st Century Curriculum' program of reforms and its physical transition — under its 'Western Growth' strategy — towards CBD, high-rise, technology-rich campuses.

WSU's major organisational shifts are augmented by a constant process of evidence-based evaluation, review and improvement of its teaching. It is a rapid and agile way to engage with the region's skills challenges. This is entirely necessary in the most intensive and dynamically shifting labour market in the country.

The skills matrix we develop needs to attend to all stages of the Airport's development. For example, the construction phase (2018–26),* WSU is expanding its alignments with anticipated labour market demand in fields related to construction management, building and engineering, urban planning and design, logistics, project management, architecture, robotics and IT.

NOTES

* Conducted by the Department of Education and Training's, 'QILT', the Employer Satisfaction Survey (EES). The EES is the first national survey that directly links the experiences of graduates to the views of their direct (employer) supervisors. The survey provides information about the quality of education provided at Australian institutions, by asking supervisors to provide feedback about the generic skills, technical skills and work readiness of the graduate employed in their workplace. See: qilt.edu.au/about-this-site/employer-satisfaction



EXAMPLES OF EXCELLENCE

CASE STUDY 1 CONSTRUCTION MANAGEMENT

More than 10,000 students are enrolled in construction studies at Western Sydney University, making it one of the largest built-environment skills development concentrations in the world. This capacity is essential at a time when our region is immersed in the largest range of infrastructure and construction projects the nation has ever seen.

Western Sydney University recently completed the first study in Australia exploring the use of collaborative robotics in construction.

Particular emphasis is placed on preparing students in Western's construction management programs to adopt new ways of mobilising resources. The focus is on fostering innovative and efficient methods of bringing together large teams of contractors, subcontractors and material suppliers to ensure successful completion of projects; a skillset of particular value in an initiative of the scale of the coming Airport.

The novel construction methodologies WSU programs develop — such as design-for-manufacturing, off-site prefabrication, and building information modelling — will play an important part of any megaproject such as the Airport.

WSU students have already engaged in regional projects, like the Sydney Metro and Parramatta Square (Peter Shergold Building) to study such topics as decision making and risk management, managing projects and stakeholders, and financial management of projects, as well as environment building assessment.

Students also have many opportunities to be involved with staff who are conducting leading-edge research projects funded by federal and state governments. In partnership with government, WSU's construction management team has recently completed the first study in Australia exploring the use of collaborative robotics in construction, as well as national research projects on digital collaboration and collaborative practice.

WSU is home to the Centre for Smart Modern Construction, an innovative industry-funded research engagement centre focussed on doctoral training and creating future leaders of the industry, and the Centre for Infrastructure Engineering, which develops innovation solutions that address the effective design, construction, maintenance and rehabilitation of civil infrastructure.

EXAMPLES OF EXCELLENCE

CASE STUDY 2 ARCHITECTURE

Western Sydney University's Architecture program was established in 2018 to give students opportunities to work on real-world projects that can impact the future of the Western Sydney region and beyond. The program was developed with an aspiration to partner with and contribute to the evolution and success of local partners and clients.

The Airport presents a generational opportunity for architecture students to contribute to the development and discourse of an internationally-significant project.

The Western Sydney Airport presents a generational opportunity for architecture students to contribute to the development and discourse of the project and wider precinct by providing a 'design laboratory' that can offer new solutions, counter-proposals or designs for realisation. This would see locally developed, world's best practice design applied on a local project of international standing.

Through a studio-based approach, Western Sydney University's postgraduate and undergraduate architecture students will produce work that is speculative, propositional, and pragmatic, and can be tailored to the range of programmatic and technological programs presented by the airport endeavour.

This can include work on the airport terminal, logistics buildings, offices, housing, manufacturing, precinct planning, and the public domain or public art. Themes such as the overall regional ecology, sustainability, densification, transportation and public access, new technologies, prefabrication systems, the future of work and industry 4.0 are just some of the areas that can underpin these investigations.



Discipline development programs in major urban centres like New York... approach curriculum by working on projects or contexts which are of present interest.

LIKE WESTERN SYDNEY UNIVERSITY'S APPROACH TO ITS ARCHITECTURE PROGRAM, comparable discipline development initiatives in major urban centres like New York, Los Angeles or Rotterdam/Amsterdam approach curricula by working on projects or contexts which are of present interest.

RELEVANT EXAMPLES INCLUDE:

- The Masters program at the Delft University of Technology, Netherlands, works on a different city or urban issue every semester: tudelft.nl/en/education/programmes/post-academic-professionals/the-berlage-post-master-in-architecture-and-urban-design
- Columbia University, United States, focuses on programs of regional relevance in New York: arch.columbia.edu/programs/9-m-s-architecture-and-urban-design
- SCI-Arc in Los Angeles, United States, has been working with the Mayor's Office on affordable housing concepts: sciarc.edu/institution/about

The Airport significantly strengthens the case for more efficient production of high-value produce lines where the benefits from rapid distribution can support the use of highly-efficient glasshouse and protected cropping systems.



EXAMPLES OF EXCELLENCE

CASE STUDY 3 AGRIBUSINESS & ENVIRONMENT

Western Sydney's expanding population and the completion of the new Western Sydney Airport will create immense demand for fresh food products that can be produced efficiently and distributed into local and export markets quickly.

Through its Hawkesbury-based National Vegetable Protected Cropping Centre ('the Centre'),* Western Sydney University (WSU) is nurturing the next generation of agri-food specialists at scale, and at an ideal location close to the new Airport.

Far greater yields with higher quality and consistency can be produced on a smaller land area.

The Centre provides a commercial-class glasshouse environment with world's best glasshouse operating systems to upskill protected cropping specialists. Linked to the coming Airport and Aerotropolis, the vast improvements in skills, innovation and production the Centre enables will see

Western Sydney take advantage of the globally significant scale and efficiency that glasshouse systems of this nature provide.

The major benefit of glasshouse and protected cropping facilities is the ability to precisely control inputs such as water and nutrients to counter the extremes of heat, wind and rain that can damage outdoor crops and reduce their productivity. The result is that far greater yields with higher quality and consistency can be produced on a smaller land area.

The Centre is exposing students from a diverse range of disciplines to new developments in crop control systems, nutrient management systems, pest and disease management, with broader scientific and business skills development in a live research environment.

The NSW Government's establishment of a selective STEM-Agribusiness high school at WSU's Hawkesbury campus will further boost the skills and technology pipeline in a key sector.**

With applied industry research projects, the Centre offers opportunities to train and educate students, industry specialists and growers in the emerging skills required to successfully operate advanced glasshouse production systems, complete with automation that improves efficiency and reduces costs.

The Airport strengthens the case for more efficient production of high-value produce lines where the benefits from rapid distribution can support the use of highly-efficient glasshouse and protected cropping systems. Collectively, this places WSU at the forefront of developments that connect urban demand for fresh foods throughout the Asia-Pacific with emerging skills and training close to the new Airport.

NOTES

* The National Vegetable Protected Cropping Centre (the centre) and its associated research projects, are funded by Hort Innovation using grower levies and funds from the Australian Government, with co-investment from Western Sydney University.

** In September 2018, Federal Labor Government committed to investing \$20 million (if they form government at the 2019 federal election) in a new state-of-the-art 'AgriTech' research facility that would complement the work of the centre.

EXAMPLES OF EXCELLENCE

CASE STUDY 4

NEUROMORPHIC ENGINEERING

Western Sydney University's MARCS Institute for Brain, Behaviour and Development's programs of basic science and translational research are designed to find solutions for humans in their interactions. Home to more than 120 PhD candidates and researchers, the Institute strives to solve the problems of utmost relevance to contemporary society. It does this through the themes: sensing and perceiving, interacting with each other, and technologies for humans.

The Aerotropolis can become an internationally-recognised test site where MARCS and its collaborators bring leading-edge approaches to Virtual Reality training, cognition and behaviour.

MARCS' expertise in engineering, 'human technologies' and brain sciences, is vital as aerospace, transport, security, communications and services become digital, automated, robotic, autonomous, augmented or virtual. This is the acute challenge and extraordinary opportunity the coming Airport and Aerotropolis presents.

MARCS' International Centre for Neuromorphic Systems (ICNS) is developing neuromorphic sensors, processors and algorithms directly attuned to the industry and research mix slated for the Aerotropolis.

The Institute's bio-inspired engineering solutions harness the advantages of biological systems and surpass conventional approaches. Imagine vision sensors that are robust and rapid, use low power, and respond autonomously to noisy, unpredictable environments. Researchers in the ICNS are developing neuromorphic solutions in defence, space and health.

Technology brings automation, autonomy and questions of trust. Cognitive scientists at MARCS are experts at analysing and evaluating trust of autonomous systems. For example, what factors support or impair trust of a humanoid robot, and what are the key factors in the optimal design of 'recommender systems'?

Globally, airlines need more than 635,000 new pilots over the next 20 years. The opportunity is now for virtual reality (VR) and 'Serious Games' informed by the latest 'science of learning' research. The Aerotropolis can become an internationally-recognised test site where MARCS and its collaborators bring leading-edge approaches to VR training and customised measures of communication, cognition and behaviour.



Imagine vision sensors that are robust and rapid, use low power, and respond autonomously to noisy, unpredictable environments.

EXAMPLE: SPACE SITUATIONAL AWARENESS

Tracking satellites, space junk, and other low-earth-orbit objects is vital for identifying hazards to in-orbit and ground infrastructure. Partnering with Defence, Western Sydney University has achieved measurements with 'event-based sensors' that cannot be done with other available technology, such as observation of the International Space Station from a ground-based telescope during bright daylight, using a neuromorphic camera on a satellite to look at space junk and determining the theoretical capabilities and limits of event-based sensors for space situational awareness, and their application to adaptive optics.

Image L-R: Associate Professor Gregory Cohen, program leader for Space Research and Colin Symons, Senior Technical Officer at the MARCS Institute's International Centre for Neuromorphic Systems.

What can we learn from the way global city regions, such as Hong Kong, Singapore and London, have integrated their airports into labour markets, supply chains, transport infrastructure and tourism?



EXAMPLES OF EXCELLENCE

CASE STUDY 5

CULTURE AND SOCIETY

How do we best understand and navigate the production and contestation of airport territory? What can we learn from the way global city regions, such as Hong Kong, Singapore and London, have integrated their airports into labour markets, supply chains, transport infrastructure and tourism? How has this integration been influenced, and in-turn shaped local cultures and politics?

How do we best understand and navigate the production and contestation of airport territory?

These are questions researchers from Western Sydney University's Institute for Culture and Society (ICS) have addressed in globally recognised studies on airports and their role in broader societies. In particular, Professor Donald McNeill,* of the Institute, has an international reputation in the field of airport development.

In his study of the 'Heathrow Hassle', for example, Professor McNeill shows how the contemporary airport is run by multiple stakeholders — airlines, customs staff, air traffic controllers, refuellers, in-flight caterers, cargo, car parking firms, and real estate developers — who typically all have very different goals and schedules.

If an airport is treated only as an infrastructure project it will become only an airport. Developing a sustainable, liveable and vibrant airport precinct requires more than good planning. It requires an approach that accommodates the full scope of possibilities, an approach ICS — the largest dedicated research concentration of its kind — is known for.

For example, the Institute's researchers have developed a method to assess the sustainability of cities that has led to a paradigm shift for many urban centres around the world. Whereas most sustainability benchmarking exercises emphasise economic and ecological issues, the Institute's method systematically integrates those domains into a holistic model that gives equal emphasis to the cultural and political domains.

Applied to the Airport, Aerotropolis and Western Parkland City, the Institute's methodology would afford these three zones a world's best, evidence-based sustainability framework.

NOTES

* Examples of this work include:

McNeill, D. 'Airports and territorial restructuring: The case of Hong Kong', *Urban Studies* (online), 2014.

McNeill, D. 'The airport hotel as business space', *Geografiska Annaler: Series B, Human Geography*, 91 (3) pp. 219–228, 2009.

McNeill, D. 'Behind the 'Heathrow hassle': a political and cultural economy of the privatised airport', *Environment and Planning A*, volume 42, pp. 2,859–2,873, 2010.

WESTERN GROWTH

Western Sydney University's commitment to a collaborative presence at the Aerotropolis — with UNSW, Newcastle and Wollongong universities — is linked to a large-scale WSU educational infrastructure initiative called 'Western Growth'. This transformative program is bringing the highest quality educational opportunities and world-class research expertise to match the expectations and promise of Australia's fastest growing region. The Aerotropolis will be a central beneficiary of that network.

Under its Western Growth strategy, WSU delivered the state-of-the-art Peter Shergold Building at Parramatta Square, opened by the NSW Premier, Gladys Berejiklian, in May 2017. This was followed in June 2018 by the Ngara Ngara Building in the Liverpool CBD, opened by Australian Prime Minister, Scott Morrison.

These high-rise, urban embedded campuses are among, if not the most, technology-rich and digitally-immersive teaching and research spaces in Australia.

Home to over 9,500 of the University's 46,000 students, these innovative campuses — by design — connect students and researchers to business and the community, with the Parramatta and coming Bankstown vertical campuses featuring shared spaces for government, industry and community groups.

Western Growth embodies tenancy and design principles, unambiguously directed at redressing Australia's research-industry collaboration challenges. Combined with WSU's '21st Century Curriculum' reforms, these measures are also building industry-collaboration into undergraduate programs in digitally-enhanced teaching settings.

In addition to the coming Bankstown CBD campus at Paul Keating Park, the University is engaged in a major redevelopment of its Westmead campus, within Australia's most research-intensive Health and Education Precinct. True to form, the Westmead initiative is again seeing the University create co-located collaborative spaces for business and researchers in which innovation is supported by design. This complements the major investment and development being undertaken by longstanding partners at Westmead, the University of Sydney.

The Parramatta CBD will be the site of a further collaboration with UNSW Sydney, where Western will partner in the establishment of the city's second high-rise campus, one of critical importance to the Airport, the Engineering Innovation Hub.

Taken as a whole, and connected by coming Metro, Light Rail and broader transport infrastructure improvements, Western Growth is creating a network of world-leading educational infrastructure, critical to bringing globally-competitive innovation to the fore at the Aerotropolis.



INNOVATION ECOSYSTEM

Western Sydney University is planning for a major Airport-aligned redevelopment of its Werrington campuses that will cluster business, industry and workers around world-leading education and knowledge job infrastructure. The new urban campus at Werrington will be the cornerstone of 'The Quarter', Penrith Health and Education Precinct.

The redevelopment will see the site's student numbers exceed 18,000 by 2036, along with the creation of 15,000 knowledge jobs. WSU will achieve these targets by intensifying the campus' focus on engineering, smart, modern construction, bio-engineering, e-health, dementia, and memory and ageing. These teaching and research strengths will drive collaboration with TAFE, and the world-renowned public and private hospitals within The Quarter.

When combined with the broader Western Growth strategy, the Werrington campus' direct high-speed transport access via the North/South rail link to the Airport, will create an innovation ecosystem, with The Quarter being among the first large scale points of activation.

The campus will be the anchor of a 'knowledge network' linked with Western's other campuses and a 'gateway' to the Aerotropolis, an exemplar of vertically-integrated education and a 'living laboratory' for education, research, innovation and commercialisation, supporting a healthy and sustainable community.

STUDENT DATA

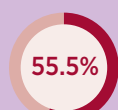
Key Data¹

44,815 STUDENTS



Domestic Students

And 13.3% international students



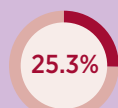
Female Students

And 44.5% male students



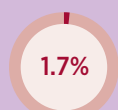
Undergraduate Students

With 16.7% postgraduate students and 1.9% studying other type of courses



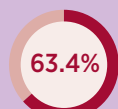
Low SES Students

Out of the total WSU domestic students



Aboriginal and/or Torres Strait Islander Students

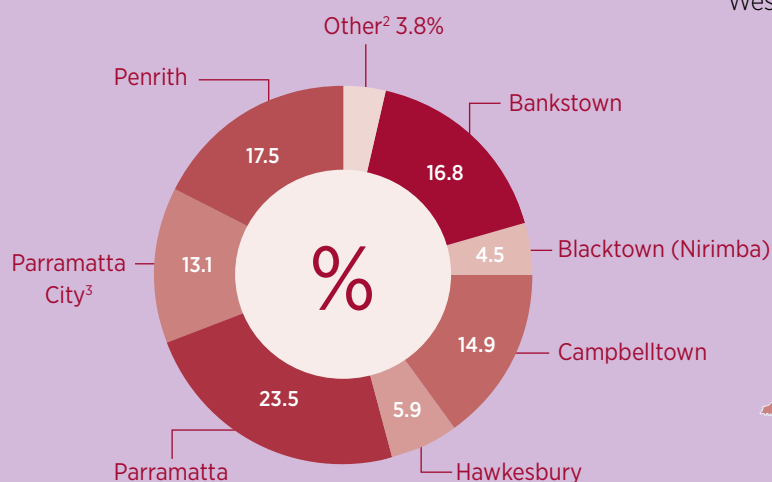
Out of the total WSU domestic students



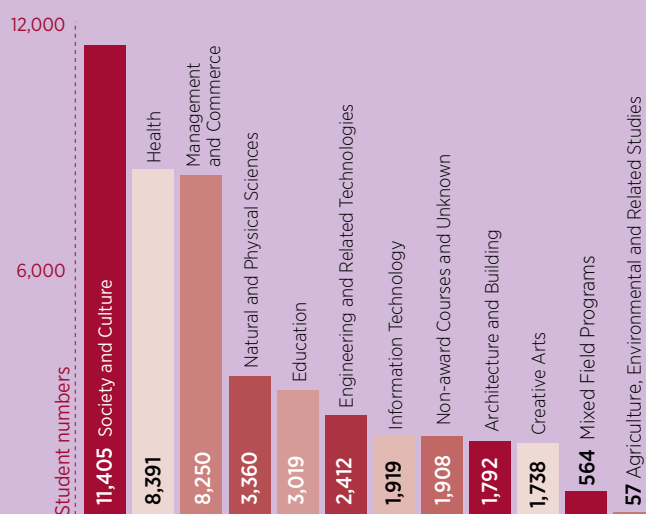
First in Family

Out of WSU domestic students, percentage of students whose parents do not have a tertiary qualification

BY CAMPUS

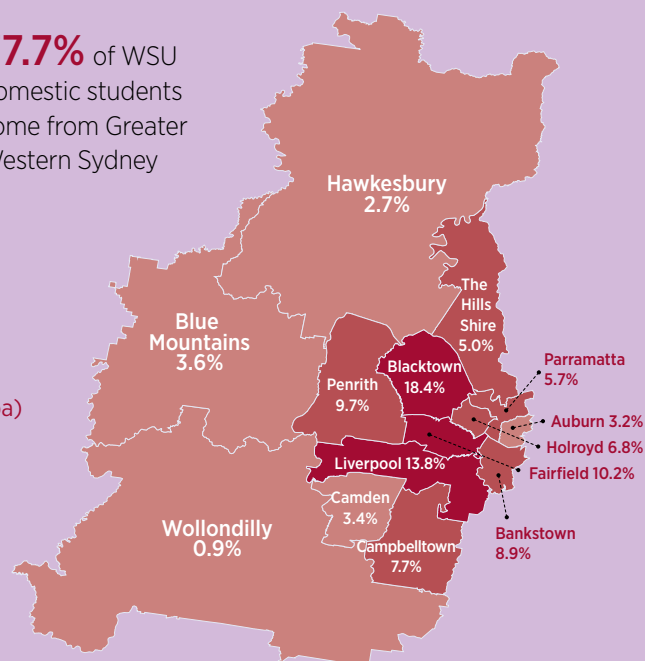


BY FIELD OF EDUCATION



AREAS WSU STUDENTS COME FROM

77.7% of WSU domestic students come from Greater Western Sydney



¹ As at December 2017

² Includes External, OffShore, Sydney City, Lithgow, Online and Other

³ Includes 169 Macquarie Street and 100 George Street Parramatta

TIMELINES

Jobs for NSW 'Jobs for the Future' Strategy 2016–2036

Universities Australia Indigenous Strategy 2017–2020

Australia 2030: Prosperity through Innovation 2018–2030

State Infrastructure Strategy 2018–2038

Western Sydney City Deal 2018–2038

TfNSW Future Transport Strategy 2018–2056

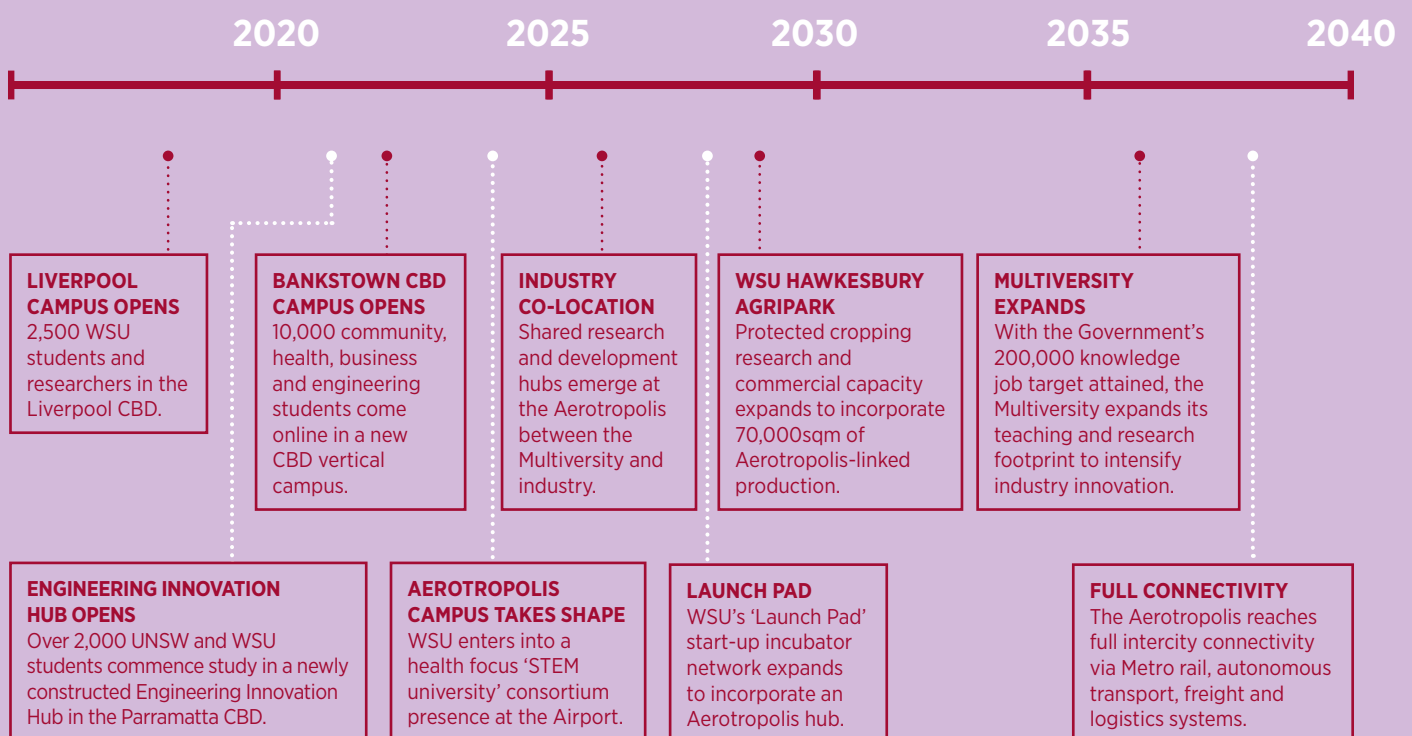
A Metropolis of Three Cities Plan 2018–2058

North South Rail Link from St Marys to Western Sydney Airport Construction 2019–2026

Sydney Metro West Construction Starts 2022

Sydney Southwest Metro Line Opens 2024

Western Sydney Airport Opens 2026



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