

WPCA

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MANUFACTURING W COUNTRY

Acknowledgment of Country	Our Sydney studio is located on Gadigal country. We acknowledge and respect the Gadigal people as the original custodians of the land and water upon which we work. We honour their Elders past, present and emerging whose knowledge and wisdom has, and will, ensure the continuation of cultures and traditional practices.			
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Document Control							
Rev	Date	Approved By	Description				
01	12 Nov, 2021	LW	Design Report				

PROJECT VISION

Australia's Newest, Most Advanced, Green & Connected City

An integrated landscape and architectural response that embeds a deep understanding of place and ambitious approach to sustainability and the future of manufacturing.

Bradfield will set the agenda for sustainable city-making. With a 100plus year vision, the new Bradfield master plan has a focus on creating a new city centre for the Western Parkland City; one that provides opportunities for all of Western Sydney's future residents. The new Advanced Manufacturing Research Facility (First Building) is integral to this agenda. A catalyst for high-value jobs and new industry, this is the first building for Bradfield, and so it needs to exemplify the qualities of Bradfield - sustainability, design quality and designed with Country.

Our approach to and connection with country is embedded in our thinking from the outset. In collaboration with Daniele Hromek (Dijnjama) we developed a design that listens to and celebrates country. This is Dharug country, where the grassy landscape of the Cumberland Plain & the ephemeral creek network of the Wianamatta, are defining features. This was the 'Mother Place" in indigenous language, a place of importance for women. The water story and the maternal story in particular inspire the design response.

The design sets the benchmark for sustainability aiming to achieve 6 star Green Star and the Living Building Challenge. Both passive and active measures are implemented exploring efficient use of resource and lower carbon emissions.

The building touches the ground lightly with a timber structure embracing the character of its surroundings. Designed for disassembly, the building can be relocated, re-purposed or expanded in the future. The roof plane provides passive solar shading to the façade, energy generation, rainwater harvesting and contributes to biodiversity.

Importantly, the First Building has a role to inspire investment and should be welcoming and engaging. The design places manufacturing and innovation on show and invites the public into the heart of the building.

AMRF - First Building SSDA Architectural Design Report



Three Cities Diagram

PKLAND CITY



DESIGNING WITH COUNTRY Djinjama - Cultural Design & Research

Using the language for and of Country, we acknowledge the Traditional Custodians of Nura throughout Australia and abroad, and their continuing connection to culture, community, land, sea and sky. In particular we honour the Dharug peoples who have always cared for the Country of Wianamatta. We pay respect to their neighbours who also have relational care of this Country, the Dharawal, Gundungurra, Gurringai, Yuin, Darkinjung. We pay our respect to their Elders and Knowledge Holders and express our gratitude for their continued sharing of knowledge and culture. We acknowledge that sovereignty was never ceded, and these lands remain a contested space for many First Peoples.

Recognising Country, Elders and Custodians is a form of mutual respect between First Peoples. It is based on an ancient tradition which situates us in a living reciprocal action between people, narrative and Nura.





AMRF - First Building



- 1. Dr Daniele Hromek Budawang/ Yuin (Spatial Designer & Researcher).
- 2. Bernadette Hardy Dharug/ Gamilaroi (Interior Designer & Researcher).
- 3. Samantha Rich Wiradjuri (Architectural Designer).



Djinjama design process



SITE OVERVIEW



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DHARUG COUNTRY

Country-led urbanism is in part a question of how to design for recognition of, connection to, and care for Country; it is a question of how to design with a 1000 year mindset. Dharug Country is made up of a social, ecological, and economic systems, which shape and inform the cultural landscape the site is situated on.

At around 11 square kilometres, the Aerotropolis is large; but as a system, it extends beyond the project boundary. It is part of Country, the interconnected and complex system of water, landscape, geology, sky and culture important to Traditional Owners, and emerging as a critical concept to urban design. Here, Country extends from the mountains, across the plains and rolling hills to the sea and beyond.







A Place to Connect

A Watery Place

ett, View Upon The Nepean. 1775-182

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WIANAMATTA

From the Dharug language meaning 'Mother Place' (Wiana meaning mother and Matta meaning water place). A landscape of gentle undulations, with many subtle ridges and valleys creating a filigree of ephemeral creeks.

Western Sydney is both hot and cold. It is brown and green. It is dry, and it is wet. Its ephemeral creeks and water systems are a fundamental part of the landscape. It's part of a system that stretches from the Blue Mountains, flowing north to the Nepean, the Hawkesbury and eventually the ocean. It is complex, fragile and subtle. Water systems are vital to the environment and its biodiversity. They are also critical to social and economic functions of systems, and they help to keep the city cool. Protecting that, and retaining these waterways is fundamental to the urban design approach of this area. Here, urban design must respond to and protect the waterways. From the broad creeks of the Wianamatta - South Creek, to its most ephemeral arms. In this way a place connected to landscape, to the culture of our Indigenous Elders, and to resilience can be created.



1. Aerial photograph of watering hole 2. Early Settlement from Mud Bank Botany Bay to mouth of Cooks River, John Thompson 1830 (SLNSW)

3. View of Thompsons Creek (WSADR)



AMRF - First Building



CUMBERLAND PLAIN Grassy Sclerophyll Woodlands

The landscape of the Cumberland Plain is particular to this area. For the AMRF First Building, the opportunity is to celebrate a broader landscape and a design which connects thousand year old traditions to the more globalised future of the region. 'Singularly fine, level, or rising in small hills of a very pleasing and picturesque appearance. The soil excellent, except in a few small spots where it was stony. The trees growing at a distance of from 20-40 feet (6-12 m) from each other, and in general entirely free from brushwood (shrubs)' **Governor Phillip**



Cumberland Plain Woodland is distinguished by wide stretches of grass species with irregular stands of Eucalyptus.

This Country is, and always was, Parklands Country, where the landscape reflects a park-like setting of curated trees and grasslands. This was achieved through the use of sophisticated cultural land management, practiced by the Darug people for thousands of years. It was achieved, primarily through the use of fire to promote grass and control the spread of the gum tree. Restoration of the Cumberland Plain Woodland has traditionally relied on labour-intensive tree and grass planting alongside Bunnerong Creek.

1. Ant nest, Dharug Country (Djinjama Cultural Research & Design)

- 2. Grass plains, Dharug Country (Djinjama Cultural Research & Design) 3. Map showing the extent of the
- cumberland plains situated in Western Sydney Image source: www.researchgate.net 4. Photograph Cumberland Plains. Image source: https://greatersydneylandcare.









The landscape of the Cumberland Plain is particular to this area. For the AMRF First Building, the opportunity is for a building which celebrates a broader landscape. A design which connects traditions thousands of years old to the more globalised future of the region.

STRATEGIC CONTEXT Urban Environment

The strategic policy context establishes the high order directions for the area across State, Regional and Local planning frameworks. These policies drive the Western Parkland City, greening and sustainability agendas that are formative to the AMRF First Building.

The Greater Sydney Commission's Region Plan for Sydney establishes a metropolis of three cities; the Eastern Harbour City, the Central River City and the Western Parkland City Historically, the emphasis of jobs, amenity, growth and infrastructure has been on two of the three - the Eastern Harbour City focused on the Sydney CBD and Central River City focused on Parramatta.

The Aerotropolis sits at the centre of the Western Parkland City. It forms the core of the Western Economic Corridor, where the airport provides the foundation for defence and aerospace activities, trade, freight and logistics and advanced manufacturing.

The Sydney Metro provides critical public transit connections from the Aerotropolis to metropolitan Sydney, and with future connections planned to Campbelltown and Parramatta. The Western Sydney City Deal also establishes rapid bus transit links to Liverpool, Penrith and Campbelltown.

For each city across the metropolis, water forms the foundational amenity and place signifier. In the case of the Western Parkland City, the water system is far more subtle - the fragile and interlaced system associated with the Wianamatta Creek and Nepean River systems. Ephemeral waterways traverse the Cumberland Plain, offering an existing network from which to derive new parkland.





The Western Parkland City comprises a metropolitan cluster of centres including the Aerotropolis, Penrith, Liverpool and Campbelltown; and the amenity focus of its myriad waterways, all linked to the Wianamatta South Creek - the Mother Place.

- Aerotropolis
- ____ Aerotropolis precincts
- ----- Creek Lines
- - Wianamatta South Creek catchment
- 1% AEP flood zone
- Train Station
- Committed Train Link
- Train Link/Mass Transit Investigation 0–10 years
- Train Link/Mass Transit Investigation 10–20 years
- Liverpool to Aerotropolis Rapid Bus Network
- Rapid Bus Network Conceptual
- Connections
 Economic Corridor
- (Mapping based on GIS data provided by WSPP unless stated otherwise



Structure Plan for the Western City District (Greater Sydney Commission Western City District Plan)



Western Sydney Aerotropolis Structure Plan, 2020 (Western Sydney Planning Partnership)

Structure Plan

- Western Sydney Aerotropolis Western Sydney Aerotropolis Western Sydney International (Nancy-Bird Walton) Airport Key Network Upgrade M12 Motorway Corridor Proposed Transport Corridor Potential Intermodal Terminal Upper South Creek Advanced Water Recycling Centre Metro Station - Sydney Metro - Western Sydney Airport Sydney Metro - Western Sydney Airport Tunnel Alignment = = Proposed Future Rail Links Potential East-West Rail Link and Stabling Western Sydney Freight Line Corridor North South Rail Line Corridor Centre - Topographic Ridgeline Luddenham Village Agribusiness Environment and Recreation Enterprise Urban Land
- Mixed Use

SITE CONTEXT The Urban Environment

The site is situated just north of Thompson's Creek between Badgerys Creek (to the North) and South Creek (to the South).

The Aerotropolis Core, Badgerys **Creek and Wianamatta-South Creek** Precincts form a continuous urban parkland system. They will offer significant employment opportunities, propelled by their adjacency to the Western Sydney International (Nancy-Bird Walton) Airport.

The landscape is agricultural in nature and managed for thousands of years for the purposes of agriculture and hunting. Back burning has been an integral part of its preservation. As has water, due to the very few hard surfaces and primarily agricultural land water has been able to naturally filtrate into the ground and back into the creek networks. It is important this natural process is recognised and maintained as the area starts to develop in order to preserve the health of the creeks and the wildlife that they support.









Topography and landform

- \rightarrow A gently undulating part of the Cumberland Plain - a basin westward from Parramatta to Nepean River and from Richmond southward to Picton.
- \rightarrow Landform shaped and defined by water systems - Wianamatta – South Creek and Nepean River.
- \rightarrow Altitude ranging from 20 100m above sea level.
- \rightarrow Open topography exposes the area to winds from west and north west.
- \rightarrow Cultural landscape that has been altered by human activities



Water bodies

- \rightarrow Presence of water can help cool the environment of rising temperatures
- \rightarrow A trong focus on slowing water down so that it is naturally filtered through the soil and vegetation before returning to the creek network
- \rightarrow The area is defined and shaped by the by hydrological network
- \rightarrow Wianamatta–South Creek is a core spine element running through the area. It is the longest stream in Greater Sydney and a defining element of the region. It springs near Narellan, flowing north until its confluence with the Hawkesbury-Nepean River system near Windsor, creating a unique hydro-network.



- \rightarrow Cultural landscape shaped by human activities - region cleared for grazing and farming, hence
- \rightarrow Wianamatta South Creek supports number of rare species
- \rightarrow Creeklines provide continuous thread of remnant floodplain forest. Pockets of Cumberland Plain woodlands are present in these precincts. Both are of high ecological and aesthetic value.
- \rightarrow Combination of exotic and native vegetation is present within privately own land, generally around perimeter of the property.



little of the original Cumberland Plain remains



Movement network

- \rightarrow The proposed infrastructure identifies the planned roads, corridors and metro alignments
- \rightarrow It enables the alignment of future planned infrastructure to be considered as well as the transport hierarchy for the future Aerotropolis site



Airport easement

- \rightarrow The Western Sydney Aerotropolis Plan safeguards continued and 24 hour operations of the airport
- \rightarrow Detailed guidelines in the SEPP or DCP will need to ensure the responsibility for management and monitoring of wildlife and buffer areas within the 13km of the airport are clear, and including when the reporting is undertaken and to whom
- \rightarrow Permissible uses surrounding the airport, that are permissible from a wildlife management perspective, may inhibit some of the market uses. The wildlife strike areas may limit economic opportunities and job creation.
- \rightarrow To limit the potential of bird strike to aircraft controls on landscape and land uses are part of the Western Sydney Aerotropolis Plan
- \rightarrow New residential and other noise sensitive development will not be located within the ANEC/ANEF 20 and above contours

SITE CONTEXT Aerotropolis Urban Design Principles

The following urban design principles were developed for the Aerotropolis masterplan. Our response for the First Building will address and build upon these principles.

SUSTAINABILITY



Join landscape with water

- The Blue-Green Infrastructure Framework is implemented through retention of ephemeral creeks. application of high quality water retention within the landscape and application of multiple use drainage and open space
- 1% AEP flood zones are zoned for Environment and Recreation
- Streets are designed to provide appropriate WSUD outcomes in order to meet Wianamatta - South Creek urban water drainage targets
- Locate active and passive areas adjacent to water focused open space to enable an activated system
- Ensure the open space system is a connected network, providing amenity for employment areas and an active, green frame for dense mixed use neighbourhoods
- Water in the landscape can benefit urban cooling

Wianamatta - South Creek is an ecological corridor

- The Wianamatta South Creek, Badgervs. Thompsons and Cosgroves Creek system will be enhanced as a critical ecological corridor through the Aerotropolis
- High risk flood areas will be retained for existing ecology and water functions
- Medium risk flood areas will contain active transport, ecology and flood flow path functions
- Low risk flood areas may contain active open space, whilst also performing a flood flow path function
- The ecological function of the Wianamatta - South Creek system will be enhanced through a connected network of open space located to retain existing important vegetation

Ephemeral creeks retained in open space

- Creeks, including ephemeral waterways, are retained to their natural flow path and contours, in open space, from Strahler category 2 and higher
- The ecology of the ephemeral creek systems will be improved through local endemic species planting
- Planting and landscape design will ensure stormwater flow rates ensure the continued ecological health of the broader Wianamatta - South Creek system (inducing to limit corridor flows and erosion)
- Design of retained creeks and associated open space should enable existing soil profiles to be maintained so that salinity risks can be minimised

CONNECTIVITY

Maximise benefit of and connectivity to Metro

- Sydney Metro Western Sydney Airport Line stations will be supported by high quality public realm, dense mixed use neighbourhoods, an intensity of jobs and good connectivity with other forms of public and active transport
- Neighbourhoods are designed to offer walkable catchments to Sydney Metro Western Sydney Airport Line Stations
- Neighbourhoods are designed to enable connectivity from public transport to open space amenity

A connected and permeable Provide regular creek urban structure

- Streets across the mixed use and employment zones are designed to provide a connected, legible and permeable network, and designed to continue into future stages
- A hierarchy of street types is provided that enables highly walkable, comfortable and amenable streets
- Existing streets are utilised as existing infrastructure and built upon to expand and upgrade the network
- The broader street network offers good accessibility to public transport and active transport modes
- Access to public transport streets is no greater than a 400 metre walk from iob or living locations - Development blocks and buildings are designed to interface positively with all street types

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crossings

- The public realm and street network will be designed to enable convenient, comfortable and safe walking and bicycle access to the Wianamatta - South Creek, Thompsons, Badgerys and Cosgroves Creek systems
- Regular creek crossings will be provided to support walkable catchments, ideally every 400 metres
- Bridges and active transport connections within the creek corridors will be designed to access points of amenity such as centres, district and regional open spaces - Key active transport spines will be
- co-located with creek corridors to match accessibility with parkland amenity

PRODUCTIVITY AND LIVEABILITY



Centres provide a focus to all neighbourhoods

- All neighbourhoods, be they for employment or mixed use purposes, have walkable access to a centre, point of focus or recreation amenity
- Centres are distributed throughout the Aerotropolis according to hierarchv
- Centres are located to leverage public transport accessibility. and key transport spines provide walkable access to centres
- Centres are located to activate open space, and creek corridors
- Within the mixed use zone, centres should co-locate social infrastructure such as schools, libraries and community centres

Neighbourhoods are walkable to propel activity

- Neighbourhoods are designed to provide a site responsive and highly connected street network
- Street blocks are configured to support a walkable and permeable network
- Streets are designed to facilitate walking, cycling and public transport use
- Streets are aligned to provide direct accessibility to centres, creeks and open spaces
- All neighbourhoods, be they employment or mixed use in focus will employ Crime Prevention Through Urban Design principles to ensure safe and comfortable outcomes

Activity and amenity to creek corridors

- Neighbourhoods are designed to align areas of density with areas of high amenity, such as open space, creek corridors and public transport
- Neighbourhoods are designed to facilitate convenient accessibility from public transport spines to dense areas around open space amenitv

PLACE AND BUILT FORM







Urban structure responds to Country (land. water. skv)

- The urban structure is arranged across the Aerotropolis to respond to key landmarks and the natural topography / landform
- Important visual connections between landmarks in the landscape are maintained through arrangement of open space, streets and built form
- Ridgetops are recognisable within the urban form of the Aerotropolis
- Visual connectivity is provided throughout the Aerotropolis between water, land and sky
- Creek lines are maintained in open space
- Important sites of Indigenous Heritage significance are retained, protected and connected in open

Streets visually and physically connect with landscape

- The structure of neighbourhoods and the associated street system will provide direct views throughout to areas of open space, creeks or topography
- The scenic values of regional, district and local landforms are accommodated in the layout of neighbourhoods
- Movement systems provide a public interface to areas of open space

Urban development respects landform

- Connect ridgetops to creeks
- Ridgetops are recognisable in the urban layout of neighbourhoods
- Ridgetop parks should be provided to prominent hills and at coordinated points along longer ridgelines
- Urban streets are arranged to directly connect ridgetops with creeks
- Where possible, ephemeral creeks are used to connect ridgetops to the Wianamatta - South Creek system
- Large retaining between development lots and flood lines should be avoided
- Streets adjacent to creeks should as close as possible align to existing topographical contours

SITE CONTEXT Existing Context Photos

The existing landscape comprises a gentle landscape, with a filigree of ephemeral creeks tracing the ground towards both Badgerys and Wianamatta - South Creeks.

The site is located at 215 Badgery Creek Road, Bringely, Western Sydney.

The site is currently a paddock with small clusters of vegetation. There is approximately a 9m fall from West to the east.

The existing Precinct character is defined by the creek corridor - a generally thickly vegetated, but narrow corridor running south to north through the Aerotropolis. Largely in private ownership across hundreds of land holders, periurban activities abut the edge of the vegetated corridor.

The immediate landscape is predominated by wide stretches of grass species of varying type punctuated by cluster of Eucalyptus evident across the landscape.

Due to the presence of woodlands along Badgerys and Wianamatta - South Creeks, views to the Blue Mountains at ground level are not evident.





Images

 Ground condition on site, Dharug Country (Djinjama Cultural Research & Design)
 Ground condition on site, Dharug Country (Djinjama Cultural Research & Design) 3. Aerial map (Nearmap, 2021)

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SITE OVERVIEW Existing Site & Future Context

The future context will retain a strong connection to Dharug country and landscape yet be a new urban city centre. The first building is situated close to the new city centre, the metro and innovation square will be just to our south-east - and it will form part of the education and innovation quarter.





Images:

- 1. Tree canopies on site, Dharug Country (Djinjama Cultural Research & Design)
- 2. Flora and grass brush on site, Dharug Country (Djinjama Cultural Research & Design)
- 3. Grandmother Tree on site, Dharug Country
- (Djinjama Cultural Research & Design) 4. Grass lands on site, Dharug Country (Djinjama
- Cultural Research & Design)



SITE STRATEGIES Evolution of the site





Connect to Country

- This site is located on Dharug Country. We acknowledge and respect the Gomerrigal people as the original custodians of the land and water upon which this project site is located.











Led by landscape and water

 From the Dharug language meaning 'Mother Place' (Wiana meaning mother and Matta meaning water place), the site has a strong landscape presence of gentle undulations, with many subtle ridges and valleys creating a filigree of ephemeral creeks.

Contribute to the future city

 There is strong connectivity through the block, acting as a key transitional space between Innovation Square (Metro) and 15th Avenue. Buildings are clustered to active the streets and create a public space within the hearth of the block.

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Engage with the street edge

Buildings pushed to the site boundaries to create opportunity for highly activated streets. Ensuring moments of interest and engagement with the buildings and their programs.



Provide a permeable pedestrian network

 This block connects innovation square, metro and 15th Avenue. It is important that there are strong legible Cross block connections, a proposed network of public connections through the block orientate themselves diagonally through the site to assist on connectivity.

Promote scalable passive design

Understanding and utilising the environmental conditions. The first building is orientated with the long facade facing North to reduce solar heat gain from the West. This also provides the best natural light.

Inspiring moments

Through the creation of a diversity of scales, moments are created between landscape and built form, each with their own character, and function, connecting back to country, experience of innovation, places of the future.

Create a diversity of public spaces

The block has a variety of different type of public space, adding to the interest of the urban condition. To the South East corner facing innovation square an urban forecourt invites you into the site. In the centre of the block is a moment of relief with more landscaped urban realm. Intertwined with a series of active laneway's connecting the block.

SITE BLOCK STAGING Existing - 2026+

The below sequence of diagrams explains the evolution of the block as the block and city start to evolve.



Existing site

- Predominated by wide stretches of grass species
- Clusters of Eucalyptus



SSDA, 2023

- Completion of AMRF, First Building
- Above ground car park (temporary)
- Landscape to the South & East
- Through-site vehicle access
- Completion of primary roadway access



AMRF expansion, 2026

- Completion of Full AMRF
- Retained above ground car park (temporary)





Evolved master plan, 2026+

- Completion of Building 4 and 5

Note: Contextual built form is for representation purposed and indicative only.



CONCEPTUAL DRIVERS

CONCEPTUAL DRIVERS

Connected to Country & Unique to Place

Cultural research and contextual analysis greatly informed this Architecture of its place. Connecting the building to the broader landscape, context and history.

The collaboration with Daniele Hromek from Djinjama laid the foundations for a design response that listened to country and in turn produced an Architecture that is unique to this place. The themes developed derived directly from the site itself, understanding and respecting the character of Cumberland Plain and the fluidity of the Wianamatta.



Sustainability at the Core

The site is located on Dharug Country. A landscape managed for agriculture over along period of time. With a strong relationship with water. Looking back provides clues to the appropriate ongoing environmental consideration for the site and wider context. The importance of water management is key to our proposal, capturing water, for use within the building and irrigation for the landscape. Retaining water bodies on site, slowing water down to improve the health of the creek networks.

The large roof structure presents an opportunity for not just water collection but also solar energy generation, solar shading to the

façades below, and biodiversity through areas of green roof.

Our engagement with Djinjama, raised important cultural observations which the design response embraced, informing a softened building language with fluid lines running through the landscape and into the building.

With a strong public focused engagement the building is open and equitable with spaces to congregate, and experience the buildings inner operations.

Principles of the circular economy have been embedded deeply in the fundamental design thinking for the First Building. In terms of material selection, construction techniques and end of life consideration. Designed to be flexible and adaptable into the future, the timber structure constructed using prefabricated modular components mechanically fixed together like a 'kit of parts'. In saying this it has the ability to expand in the future, even 'self-replicating' using the advanced manufacturing hall to construct its own mechanical fixings used to bind the structure together. At the end of the buildings life it can easily disassembled, relocated to a new site. Designing



Circular Economy Principals

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Water Conservation Generation



Recycled Fostering Biodiversit Recyclable



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Flexible & Adaptable

for this level of flexibility, allows the building components to be repurposed and occupied with a new function. Using the 'kit of parts' the building could even take on a new form.

- → Expandable 'self-replicate'
- \rightarrow Re-purposed
- \rightarrow Recycled
- → Re-located
- → Re-configured



One of the interesting aspects to the scheme are the operations of the technology and machinery housed within the facility. Cutting edge technology used for industries such as: aviation, defence and medical. Revealing these operations and allowing the public and visitors to engage with these advanced manufacturing processes taking place presents an opportunity to inspire. Coupled with potential eduction offerings coming online in the future in the precinct there is a great opportunity to collaborate using this facility also as an educational tool

ncial Times Printing Plant: https://fineartameric

This project innovates in its ability to blend what are industrial activities in manufacturing and a building that moves away from the traditional industrial typology to a language that responds to country whilst maintaining all the required functionality.



As a building that has a large public interface, it is important that the it feels very welcoming and engaging upon arrival. The ground plane has been designed to be highly equitable with two entries into the building. one from the East and one the West Upon arrival the internal program and building opperations are highly visible, with the Manufacturing hall is accessible to the public on all four sides. This transparency is important in connecting back to country, trees beyond are seen through the building, with the landscape appearing to run through and under the roof structure. The cicular columns act as tree stands in the landscape, assisting the design in connecting to the character







of the Cumberland Plains.

The warm timber materials provide a soft tactile experience that welcome visitors and provide a connection back to country.

Revealing the Manufacturing processes, embraces the idea of what it means to manufacture with country. This spectacle becomes a backdrop to the public space and lobby in the centre of the plan, but also from the Parking arrival experience to the East, public & community space to the south and primary arrival experience from the West.



Being the first building of Bradfield City, the project presents an opportunity to act as a landmark and Beacon for the new city. Something that is distinct and memorable that gives Brafield an identity from day one. Whilst the First Building itself is a landmark in its unique typology as an urban pavilion, there is also opportunity to consider an element outside the building which showcases the key values of the First Buildnig and the city in relation to sustainability and connection to country.

Whilst the true form of this landmark feature may not necessarily come into fruition until the future we have

considered its benefit and possible functionality

- \rightarrow A marker for the innovation hub and Bradfield.
- \rightarrow A place for the community to gather. Hosting talks, exhibitions events
- \rightarrow Has a purpose a function, such as addressing the extreme conditions through evaporative cooling, via water, mist or wind generation.
- \rightarrow Constructed from materials that are advanced in their composition, possibly built using the new facilities.



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CONNECTED TO COUNTRY Celebrating Country, the Cumberland Plain

The site is located on Dharug land, a landscape of "slow undulations, with many subtle ridges and valleys creating a filigree of ephemeral creeks.... a delicate system of water within the landscape".¹

The site sits within the catchment of the Wianamatta (South Creek), the "fragility of the South Creek system makes working with the natural water systems more difficult than in other areas of Sydney and requires a careful approach to working with the landscape in the establishment of a blue green infrastructure system"²

This project aims to celebrate the meandering and ephemeral water of the Cumberland Plain, reinstating the sites permeability collecting and filtering the building and site's runoff across and through a richly planted, landscape of Cumberland Plain species and water features.



Conceptual explorations of the meandering landscape of the **Cumberland Plain**

Source: Western Parkland City Landscape-Led Urban Design Guidelines, 2020. Tyrrell Studio for Infrastructure NSW





"It is important to protect all waters as they are connected - damage one and all are damaged".

Dharug Elders





DESIGNING WITH COUNTRY Narrative Matrix

The Water Story

Principles:

- \rightarrow The waters of Wianamatta are sacred
- \rightarrow The movement and fluidity of water
- \rightarrow Sweetwater Country
- \rightarrow Layers of mountains from which the waters come
- \rightarrow Learn to move with the flow of waters and Country
- → Water gives life and connects us all
- \rightarrow Relationality
- \rightarrow Women's business

/alues:

- \rightarrow Not about ownership, about landscape
- \rightarrow Importance of flooding
- \rightarrow Understanding change is going to happen
- \rightarrow Protecting water

The Maternal Story

Principles:

- \rightarrow Our mother the earth
- \rightarrow Understanding the role for women but also for men
- \rightarrow Creation (it takes two) male and female flowers \rightarrow Women's voice with men's
- support (elevating, protecting and giving space) \rightarrow Understanding role and
- purpose \rightarrow Values of motherhood

Values:

- \rightarrow Mother earth does not discriminate between her children
- \rightarrow Mother earth is inclusive
- \rightarrow People tend not to harm their mother
- \rightarrow Equality but not sameness

→ Birthing on Country

- \rightarrow Nurturing
- \rightarrow No further harm

Principles:

- \rightarrow Biodiversity
- \rightarrow Creating a place that welcomes \rightarrow Country already perfects emu
- \rightarrow Fatherhood supporting women to do their business and stepping up to look after the offspring (emu)

Values:

- \rightarrow Reciprocity
- \rightarrow Taming the inner emu only thinking about oneself, standing tall and dominating
- \rightarrow Collective

→ Family oriented

Healing Country Ingenuity of Country

Principles:

- \rightarrow Manufacturing with Country
- everything without being perfectionist
- Site is not in isolation as in Country, everything is interconnected, complex and entwined
- \rightarrow Quandong emu digests to soften and access nutrients

Values

- \rightarrow Country leading innovation
- \rightarrow Country driving robots
- \rightarrow Sharing power \rightarrow We need to educate machines
- to be mindful of Country \rightarrow Often Country has the solutions
- \rightarrow Beauty of tragedy
- \rightarrow Avoiding tawdriness and flashiness

Relational **Materials**

Principles:

- → Materials of place
- \rightarrow Respect for materials \rightarrow Recognise inspiration
- of Country behind manufacturing

Values:

- \rightarrow Expressing the materials expressing the nature of materials
- \rightarrow Intricate balance \rightarrow Protocols for caring for
- materials to avoid overuse \rightarrow Inclusive specifying
- → Embracing cultural practice.









Belonging

- Principles: by local mobs
- \rightarrow Yes and yes (and yes!)
 - \rightarrow Buildings belong to the place, not imposing on the landscape. \rightarrow Like receiving a hug or coming
- home.

Values: \rightarrow Inclusion

- \rightarrow Bring back emus who have belonging here (mariang,
- marawung, mariyong).

Principles:

 \rightarrow Feeling we are being welcomed \rightarrow Circular economy

Cycles

- \rightarrow Cycles of ecology \rightarrow Need natural flow of water to sustain itself (River Flat
- Woodlands \rightarrow Seed distributions (emus)
- \rightarrow What is missing as a result of the unbalance?
- \rightarrow Astronomy, night sky, looking up

Values:

- \rightarrow Everything is connected
- \rightarrow Affect the water, affect the
- ecosystems as a whole \rightarrow Water safety (platypus)
- \rightarrow Balance of female and male

UNIQUE TO PLACE What Makes a Place

Taking inspiration form the existing context and history. Selecting materials that connect to country, giving the building a characteristic that speak back to the Cumberland Plan and surrounding context.

Site visits took place early on in the project, this gave the team an opportunity to connect with the country. Members of Djinjama sang to country. Extensive site photography took place, documenting the smallest of details to fully understand and appreciate what makes this place unique. From these studies a certain colour tone and set of natural textures became evident. Informing the material selections and proposals which would follow.

Understanding the unique character of this place was vital to a successful and sensitive design response.

Picking up on the warm colours found in the ground and the pastel colours of the vegetation a tone for the project emerged.

Responding to the existing condition is of great importance to us, as it is our ambition to create a building that reflects the character of its place and is unique to its context. This project has the opportunity to lead the way in contextual responsive and country led design. Setting a precedent for future developments that follow.

Manufacturing and craft are widely practiced by the local community and Dharug people, the skill and understanding of the local materials and ability to beautifully manipulate them adds to the story of this place. Again an aspect that the First Building picks up on, with the timber joinery and crafted nature whilst on a much larger scale speaks back to these long standing traditions present within the locality.

> 1. Site photo - Bark, taken by Daniele Hromek 2. Site photo - Bark, taken by Daniele Hromek

> 3. Site photo - Bark, taken by Daniele Hromek

4. Site photo - Bark, taken by Daniele Hromek

Timber

Timber was chosen for its warmth and importance to country. Also with our strong focus on sustainability and principles of circularity, timber meets all these criteria. At the end of the buildings life the timber components can be easily reused, re-purposed or recycled. We will be seeking to use locally, sustainably sourced timber, to reduce embodied carbon related to transportation.

Timber has a natural texture and depth, a tactility unlike other materials. Requiring very low energy processing input, and being very easy to work with. Timber details and junctions allow for that level of craft to come through in the design, giving the structure even though on a larger scale a feeling of bespoke crafted architecture, which talks back to the practices used by the local people for thousands of years.

Rammed Earth

Using rammed earth from soil taken from the site or proximity, is a highly contextual and sustainable method of construction. The earth, if locally sourced reflects the colours of the ground condition found on site.

We are looking for opportunities to utilise rammed erath in the First Building. We are proposing the core walls are constructed with rammed earth and reinforced with steel to provide lateral support for the structure. Certain walls within the ground are aslo being considered in rammed earth.

This material has a beautiful natural texture, depth and variation and is very low in embodied carbon.

Transparent Glass

We will be focusing on glass performance and its colour and transparency within the landscape.

A neutral colour of glass is the ambition, with a high degree of transparency.

We will also closely judge the reflectivity and how this works within the landscape. To align with the concept we will aim to select a glass with reduced reflectivity. So that views are clear with a high degree of transparency through the building to assist in revealing it's internal workings.

The performance of the glass is important, as is where it is sourced these are all questions we will address moving forwards into the detail.

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The image below is of a net make by Daneile Hromek from Djinjama. The weaving technique has been passed down from Dharug people over many generations.

Our design explorations studied many interpretations of how the roof structure could express the sensibility of weaving. Picking up on the process of weaving and how threads are criss-crossed together, we took this concept and applied it to the structural beams which form the roof. So rather than all the structure being in the same plane we are proposing its layered on top of one another and mechanically fixed together so that the beams for a truss when bound together but in both directions to form a lattice. Achieving great structural efficiency and the sensibility of the weave. Working closely with our structural engineer to validate this system worked.

Woven Structure Natural Materials Colour & Hue

For this project the use of materials that have texture is important, this is key to connecting the building to its place. As the building is of a more human scale the eye can perceive more of the buildings surfaces.

People also have the opportunity to get up close to the structure, making it important that the finishes are warm and tactile.

Visiting the site and seeing the many different patterns and textures found in the landscape really inspired this response

From our site visits and documentation of the existing context, we have formed an appropriate colour palette to blend with its surroundings.

Taking inspiration from the fauna and flora, as well as the ground conditions, the colour of the earth and the mud.

Soft, muted pastel colours have been selected, colours and textures common to Cumberland Plain.

There has also been close consideration and collaboration in this regard with our landscape team, to understand the native plant species being proposed and how the building will mix with these.

SUSTAINABILITY AT THE CORE A Holistic Approach

From the outset, the project established very ambitious sustainability targets:

Living Building Challenge 6 Star Green Star

Water

- Reduce reliance on potable water
- Rain water collection and reuse WSUD strategies for stormwater management and reuse
- Grey water reuse
- Water efficient fixtures
- Native planting and low maintenance vegetation for the landscape and the green roof

Place

- Restoring ecology of the site
- Biophilic connection
- End of trip facilities
- Surface parking area must be separated with planted areas
- Promote using stairs instead of elevators

Equity

- Universal Access
- Inclusion

Health + Happiness

- Healthy Interior Environment
- Healthy Interior Performance
- Access to Nature

Materials

- Responsible Materials
- Red List
- Responsible Sourcing
- Living Economy Sourcing
- Net Positive Waste

Energy

- Energy + Carbon Reduction
- Net Positive Energy

Beauty

- Beauty + Biophilia
- Education + Inspiration

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Circular Economy Principals

Embedded in the design of the AMRF - First Building, are principles of circularity. This is the consideration of the life cycle of all building materials and components. Asking the question of what happens when the building is no longer required?

In response to this the building is designed for disassembly meaning it can be taken apart relocated and reconstructed or re-purposed into a different building all together.

Also key to the circulatory is selecting materials that easily and widely recycled. The ability to recycle constantly advances, with more materials becoming easily recyclable

Recycled / Recyclable

The materials and construction systems chosen for the first building, embody the principles of re-use and recyclable components.

Timber is the primary structural material, using prefabricated elements either these can be repurposed for a different use entirely or broken down and recycled into a number of uses, or turned into energy as wood chip for biomass burners.

The rammed earth walls are easily broken back down and retuned back to the ground in which it came from.

MECLA (Materials & Embodied Carbon Leaders' Alliance) champion research into new ways to recycle such as Aluminium for example is now readily recyclable. Challenging the industry to think differently and use recycled materials rather then raw materials.

Low Embodied Carbon

The materials selected for the First Building are all very low in embodied carbon, not just in terms of their production or processing but also in terms of transportation. We hope to source the majority of the building materials locally, as close to the site as possible.

Materials selected such as timber and rammed earth bot have the ability to be sourced within Australia with the ambition to source these materials as close to the site as possible.

We will also look to utilise our experience with cement free concrete fro retraining walls, foundations and ground slabs.

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Energy Generation

The large roof area presents a fantastic opportunity to harness the suns energy, by powering regular building demand entirely (excluding manufacturing processes).

50% of the roof coverage will be in Photovoltaic's. We have researched methods of improving the efficiency of the energy generation, such as studies undertaken at the Bond building in Barangaroo. The study suggests that the addition of vegetation in and around the photovoltaics helps reduce the ambient temperate to more optimum levels for energy production.

Solar panels are optimised in terms in terms of orientation facing north and at the optimal angle 33.9 degrees.

000 Water

Conservation Water and water management is of great importance to this site and the wider context. As an environment that is subject to extremely hot conditions in the summer, the flora and fauna

relies on water for survival.

The First Building adopts a holistic approach to water, through capturing and storing rainwater for grey water use and landscape irrigation. Whilst also retaining water bodies on site promoting biodiversity, in turn slowing down water and run off, allowing for natural filtration into the ground, benefiting creek health. Permeable paving will also contribute to the reduction of surface run off.

Where possible water will be

Fostering **Biodiversity**

Djinjama set a challenge for this project, and that was how do we 'bring back Emu'. Emu's would previously occupy this landscape, however due to its intensive management for agriculture over many hundreds of years they are no longer present.

We have tried to address this in a number of ways. An under-story of native vegetation reintroduces a potential for a biodiversity more akin to its true character.

The roof structure will be planted where possible to further promote biodiversity and contribute to the reduction of the urban heat island effect.

celebrated to connect people with its importance. Wit the potential to express the transitional moment between capture and storage, through interesting drainage solutions.

SUSTAINABILITY AT THE CORE Low Embodied Carbon Materials

The market is growing increasingly sophisticated with the number of available low-carbon concrete products. Hassell pioneered the use of structural cement-free concrete at the Global Change Institute, and coupled with the potential for a timber structure, and rammed earth as the primary building materials a strong low embodied carbon story emerges.

One of the strategic design initiatives is to carefully consider the embodied carbon all materials used in the project. Timber has around 50% less embodied carbon than traditional concrete, also when you start to look at specific uses for the structural materials the benefits are even greater. For example Timber floor slabs have 16% of the embodied carbon than a concrete slab has.

Whilst timber can be utilised above ground, concrete will be required in the ground. Retaining walls, foundations and ground level slabs will be concrete. There are however low-carbon concrete productions on the market and we have experience in utilising it:

At the University of Queensland's Global Change Institute, Hassell pioneered the structural use of Wagner's cement-free, geopolymer

concrete. In this particular project, an estimated 72.600 tons of CO2 were saved in the construction the project compared to a typical concrete mixtures using Portland cement.

Wagner's is just one of many concrete suppliers that are accelerating the development of their low carbon concrete products offering great flexibility in the procurement process

We have also selected other materials that have very low-embodied carbon such as Rammed Earth. which has the potential to be sourced locally. even from the site itself. When sourcing materials the locality and transportation will be of great importance in minimising overall carbon footprint.

- 1. CLT Structure: https://nbww.com/ 2. Global Change Institute, Hassell
- 3. Green Concrete
- 4. Rammed Earth Wal

Sustainable Industrial

Sustainable industrial building typologies are becoming more familiar primarily due to the advancements in timber technology with larger spans achievable through CLT & MASSLAM to rival that of other structural materials.

Industrial buildings typically utilised concrete and steel for their strength able to span large distances with uninterrupted clear spaces below. Which gave the industrial buildings a reputation or association with being high in embodied carbon. However there is a new more sustainable industrial typology emerging. facilitated by recent advancements in timber technologies, allowing for greater spans and increased structural properties than previously possible with timber. This has therefore made it possible for industrial buildings with large clear spans to utilise timber and its low embodied carbon.

As we are proposing timber it was important for us to engage early on with a timber supplier, to inform the design decisions we were making in relation to what could be locally sourced and what types of

timber were available. We started a conversation with ASH timber, who source and supply timber across Australia. They provided an insight into the best types of Timber and Timber system to use for a project of this nature, they were also able to assist with some limitations providing a set of parameters for us to design to. This early engagement at the source will help ensure that what we design can be sourced locally here in Australia.

We acknowledge that the procurement process for a timber building has to be carefully considered, so that the material selection remains throughout latter stages of the project.

https://www.archilovers.com/ 2. AMJGS Architektur & Marti AG Matt: https:// woooooow.cn/ 3. Longfu Life Experience Centre: https:// architizer.com/ 4. Longva Arkitekter: https://divisare.com/ 5. Centre d'incendie et de secours: https://www archilovers.com/ 6. CLT Structure Library and Seminar Centre BOKU Vienna: https://www.archdaily.com/

1. Ateliers ECOTIM II - Rotherens / France:

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FLEXIBLE & ADAPTABLE Principles of Circularity

Designing for disassembly is at the core of the sustainability approach for the First Building. Providing flexibility into an ever changing future.

The first building is designed as a 'kit of parts' pre-fabricated modular structural components which are brought to site, craned into place and mechanically fixed together. This method of construction, the simplicity and repetition of components reduces construction times and cost considerably

This also applies to disassembly at the end of the buildings use. The structure can be taken apart quickly and relocated to a different site or components re-purposed for a different use/building typology.

Designing for disassembly plays into our holistic sustainability approach where re-use or re-purpose of the building materials and components to have much longer life spans. This also provides flexibility into an ever changing future, for example the building could be expanded in

the future with the idea that the manufacturing processes within the building could produce its own mechanical fixings so that the building can self replicate.

This flexibility also allows the building to completely move to a new site, whereby it can also take on a different form through its modularity.

The principle of construct then disassemble then re-construct is a circular process, which minimises the carbon footprint of the building by greatly extending its lifespan.

1. https://www.broxap.com/ 2. Timber end connector: https:/ architizer.com/ 3. https://www.pinterest.com

Pre-fabricted components kit of parts

Modular construction and prefabrication are key design strategies that feed in to the circularity story of the First Building.

Modular construction saves time, saves material and in turn reduces the carbon footprint of a building. The structure has been designed with this in strategy in mind, creating a very simple and repetitive system, reducing component production times and construction times and therefore cost.

The modularity of components lends itself to prefabrication, whereby the very few components are mass produced in a factory rather than on site. For example all the timber beams are pre-assembled with mechanical fixings off-site, allowing for rapid construction on site, assembled as a 'kit of parts'.

This also applies to disassembly and the potential for re-purposing, the modularity has the potential for different configurations, for example the building could be reassembled as a more linear structure which is twice the length and half the width.

Or it could be a square? The structural grid and column locations can also be adjusted within limitation of the maximum span design loads.

The modularity of the building fits into the principles of circularity, whereby the building creates little to no waste as it can be adapted, reused, recycled or even just relocated. Greatly extending the life of the building and all of the components of which it is made from.

ADVANCED, INSPIRING & INNOVATIVE Manufacturing on Display

Celebrating the circular processes through a degree of building transparency to give visibility and experience to the complexity of the operations as one of many parts in our ever-changing and intertwined cities.

One of the interesting aspects to the scheme is the complexity of the technology and machinery housed within the facility. The advanced manufacturing equipment and processes lend themselves towards an opportunity for display. By opening up and giving transparency to the building's facade on all four sides, the scheme seeks to reveal and celebrate the facility's operations. This in turn we hope will seek to inspire visitors and passers by.

The equipment is advanced and innovative which demands that the building response is also innovative To achieve this we are utilising new Timber technologies in combination with innovative structural systems. That at the same time speak back to our principles of designing with country.

Industrial buildings typically don't often reveal their mechanics and operations within. However as manufacturing evolves and the processes become more complex and processes. futuristic there is greater opportunity to showcase this cutting edge technology.

Aligned with the values of the city around 'Advanced' there is also an opportunity to showcase new technology in construction. The design explores 3D printing technology for portions of the building (rammed earth retaining walls.)

The precedent images on the adjacent page illustrate some of the advanced processes and technologies that may be utilised in the facility. Also well-known industrial buildings that have celebrated their purpose and functioning.

The design aims to redefine the relationship between industry and the surrounding city context by communicating the facility's

WELCOMING & ENGAGING Showcasing The Values of The City

A welcoming public, flexible space, with the potential to celebrate water. With an engaging backdrop of the Manufacturing Hall.

The central public spine is an internal link connecting the Parking to the East and the Western Entry. Public in nature, this space is naturally ventilated filled full of natural dappled light, with planting and the celebration of water. The soft undulating lines found in the landscape flow through this space connecting back at each end to the landscape. External surface conditions will also be used to add to its external sensibility.

The level transition form West to East is 2m, this central spaces addressed this level change through 1:20 slow ramps which provide equitable access and a museum like experience. Similar to that of the Tate Modern in London, UK. The shallow ramps are highly programmable, as places to gather, sit, house art work and sculptures even bespoke designed furniture and bench-tops could be utilised.

The space is 8m - 9m wide and highly flexible, functioning in many different ways. Everyday serving as a place for workers to have lunch, or an informal meeting. Its also becomes a show piece, a grand moment for visitors to walk through with the backdrop of the manufacturing hall. It has the potential to hold large events, opportunity for platforms, suitable for gathering around tables. The incorporation of a small amphitheatre seating arrangement will provide opportunity for Talks and presentations in this space. It can also function as an exhibition space housing plinths for sculpture and display objects.

In this regard security has been considered in terms of how this space would operate whilst maintain the required security.

During normal working hours this space would act much like a public lobby found in Sydney CBD, open to walk through however locking up after hours. There is a secure line raised at ground level between the cores leading the workplaces and a front of house reception point to monitor the more public space.

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ARCHITECTUR

ARCHITECTURAL EXPRESSION Key Design Responses

Character of Cumberland

Landscape Flowing Through

Tree Stands

Flow Through & Under

Responding to Country, and the character of Cumberland Plain. Columns articulated to reflect the tree stands and clusters of trees which are unique to this landscape.

A roof plane 'as the tree canopy' providing shade to the spaces below, allowing the building facade to be highly transparent allowing the sense of the landscape flowing and continuing underneath.

Production Spectacle

Manufacturing on Display

The building is designed to reveal and showcase the operations of the Manufacturing taking place within. Located to the South, facing the public heart of the block and landscaped community space. Accessible on all four sides, the public and visitors can come up close and circulate around.

Urban Pavilion

As the city evolves the building will become an urban pavilion, creating a space of relief within the city centre, naturally becoming very public and a place to gather as it is more human in scale.

ARCHITECTURAL EXPRESSION An Urban Pavilion Unique to Place

Designed for the existing day 1 context of paddocks and tree stands but also as an Urban pavilion in the future context of the city. A human scale building which acts as more of a public space providing relief from the denser urban context.

Bring the First Building and a low-rise structure in the future it will evidently become a place where the public congregate as the scale is more human. Providing relief from the larger scale urban context, forming a focal point for people to meet identified as a landmark.

As the First Building it sets a benchmark and ethos for the city of Bradfield to follow. Promoting design that is of its place and connected to country. Warm soft natrual materials that touch the ground lightly understanding where the 'Earth' (Wiari) meets the 'Sky' (Biari), the importance of this transitional space in which the built form occupies.

The Architectural expression is soft with no sharp edges, responding to this being women's place and the

ideas of water and fluidity. Inviting the Entry points are clearly identified by landscape in and under with a degree of transparency which promotes clear location façades. The entry façades views through the building connecting are also articulated slightly differently landscape and views. Views out from with glass louvres which contribute inside all have direct connection back to the natural ventilation strategy for to the landscape and country. The fluid lines found in the landscape design are brought into the First Building up and through the central public spine, also with the opportunity for planting internally in this space.

The expression of the roof through the cantilver projecting into the landscape and external spaces, inviting its surroundings in. This articulation helps create a welcoming and inviting experience for visitors also providing protection, both shading and from the

recessing and indenting the entry the main lobby and public spine. The fluid lines found in the landscape and external paving textures run inside the building through the entries, with the surface condition acting as a way finding devise. Combined these moves help direct visitors into the middle of the building.

FACILITY LAYOUT Ground Level Connection

The Building works with the topography using a series of level changes to connect the different functions and spaces, helping to animate the experience.

External Events

The Western forecourt is a flexible external space which is undercover and beside the main Western Entry along Innovation West. It functions as an arrival space with a backdrop of the Manufacturing Hall, and as an external events & exhibition space. With the opportunity for food trucks to pull up onto for

Public Spine

Flexible space for gathering, talks, exhibitions, events. A gently ramped gallery exeprience with a backdrop of the manufacturing hall.

Manufacturing Hall

Large 18m clear span hall housing advanced manufacturing equipment and materials storage.

EOT. VT & Plant

End of trip combined with the amenities at ground level.

Food Prep/Tea Point

Place to heat up food and sit. Also used as a prep space when catering for an event.

Independent Tenant

Ground floor level of a 400sqm independent tenancy.

AMRF Workspace

Dedicated workspace relating to Manufacturing Hall operations. Desk space for 30 people. Located on the ground floor with the closest proximity to the manufacturing hall entry point.

Loading

Level at RL79 with the manufacturing Hall. Equipment unloaded via a forklift through a large Automated door.

Community Space

A place within the landscape to gether, with a backdrop of the Manufacturing Hall. Potential for future landmark feature.

1. External Events

- 2. Public Spine
- 3. Manufacturing Hall
- EOT, VT & Plant
 Food prep / Tea Point
- 6. Independent Tenant
- 7. AMRF Workplace
- 8. Loading
- 9. Community Space
- 10. Boardroom
- 11. WPCA Workspace

The Mezzanine level is highly flexible in that it can support one or two tenancies. Or become a second level to a ground floor tenancy connected via a future interconnecting stair.

The Mezzanine floor has the opportunity to expand East and West in the future into the double height void spaces. This flexibility will allow tenancies to grow as required, with opportunity for tenancies across two levels with inter connecting tenancy stairs.

Amenities & Plant

There is a small shared amenities offering at Level 1. On floor plant servicing Ground and level 1 is also consolidated within the core at level 1.

Independent Tenant

The independent tenant could occupy the whole of level 1 or just one side becoming the mezzanine level to the ground floor independent tenancy.

WPCA Workspace

The WPCA workplace would occupy half the this Level 1 floorplate with the provision of 30 desk spaces. Located in close proximity to the boardroom, employees from this workspace would be using the boardroom the most.

Boardroom

The boardroom is independently accessible, a shared space, primarily used by the WPCA and AMRF workplace. But also as required for external events.

1. External Events

- 2. Public Spine
- 3. Manufacturing Hall
- 4. EOT, VT & Plant
- 5. Food prep / Tea Point 6. Independent Tenant
- 7. AMRF Workplace
- 8. Loading
- 9. Community Space
- 10. Boardroom
- 11. WPCA Workspace

FACILITY LAYOUT Following the Topography

The building programs are at varying levels stepping as the topography falls away to the East & South. These level changes add a dynamic and theatrical experience whilst maintaining equitable access and connectivity between the spaces.

The layout, orientation and configuration of the facility was determined on the following basis:

The primary objectives were:

- → Orienting the longest facade to the north minimising solar heat gain.
- → Locating the workplace to the north for optimal natural daylight.
- → Potential for expansion in the future, the building is modular and can grow to the East if required.
- → Achieve at grade loading. To do this the manufacturing Hall is cut into the topography to achieve flush loading at RL 79.0 to the East.

- → There was much consideration into the locations of entries. Designing for day one when most occupants will drive to the site and park to the East.
- Then in the future 15th Avenue will be a transport corridor with bus stops and highly activated streets to the West of the site. Whilst also Metro to the South East will come online in 2026. This meant there was a strong case for a dual entry, one from the east and one the west. This also played into creating a more pubic events and exhibition space in the middle of the building whereby the manufacturing hall could be visible on all four sides.
- → There is also opportunity in the future to add a third entry to the north. However this does diminish the flexibility of the workplace.
- The manufacturing Hall was located to the south as it had the largest amount of glass therefore solar heat gain is largely reduced on the South. Also situated on the south allows it to be highly visible from the public landscaped and community spaces to the South. When the full AMRF follows in the future having the manufacturing hall face another manufacturing facility will allow the two buildings to engage with one another.

The proposed architectural building massing for the SSDA submission delivers a design-excellence outcome that respects 'country' and is unique to its place.

The building massing is very simple, consisting of a large roof plane and programmed boxes below. The roof plane projects/cantilevers past the facade line, providing solar protection and shade. Its important to create external shaded spaces in Western Sydney as it experiences extreme weather conditions.

The western forecourt (1) is located beside the main entry to the building, this space has a multitude of functions: serving as an external component to the internal exhibition space, a place where the public can take shelter, a viewing window into the manufacturing hall, and opportunity for events where food trucks can pull up to the edge of the space. This is also the ideal location for a public art or sculpture piece.

The highly transparent facade further accentuates the hovering roof plane supported by columns that characterise themselves as tree stands within Cumberland Plane. These moves are simple but allow the building to really connect with country and speak back to the landscape it sits within.

The roof structure is the primary Architectural form, with lightweight transparent boxes sitting underneath gently meeting the underside of the roof. The Manufacturing Hall sits under the roof like a 'jewel' protected whilst highly visible along 3 elevations. A spectacle in the landscape at day 1 and then in the urban context of the future.

- 1. External Events
- 2. Public Spine
- 3. Manufacturing Hall 4. EOT, VT & Plant
- 5. Food prep / Tea Point
- 6. Independent Tenant
- 7. AMRF Workplace
- 8. Loading
- 9. Community Space
- 10. Boardroom
- 11. WPCA Workspace

FACILITY LAYOUT Mezzanine

The mezzanine floor like the roof structure is designed to be modular, and can expand if required in the future. This floor level is comprised of two tenancies and a boardroom suspended in the centre of the plan overlooking the manufacturing hall

The mezzanine floor provides a generous workplace for 60+ staff and can be configured as one tenancy or split into two tenancies.

On this level there is a shared boardroom centrally located and accessed from a shared lift lobby and informal breakout space. Accessed without the need to go through any dedicated tenancy space. Suspended over the central public spine the boardroom projects across to the Manufacturing Hall facade achieving visual connection to the equipment operating below.

The preliminary test fits on the adjacent page indicate potential configurations for each of the tenancies. Incorporating workspace informal meeting spaces, medium sized meeting spaces, large meeting spaces, storage, utilities and food

prep. Depending on the type of tenant that occupies the 400m² the shared informal lobbies might be reconfigured also with potential for an introduction of interconnecting tenant stairs if one tenancy is split across two levels.

The design is flexible for this reason that it can support many different scenarios including a split of up to fours tenancies.

When the various tenancies have potential occupiers further conversation and development of the floor-plates will take place, for example could food prep space be shared or whether each tenancy requires dedicated space within the tenancy.

Ground Floor Test Fit

ROOF CONCEPT Harnessing the Sun's Energy and Light

The building's roof area cover's approximately 3,500 sqm metres and offer an ideal opportunity to capture the sun's energy and daylight for the spaces below.

The roof structure is the primary architectural feature for the design of the First Building. The roof does all the hard work, in terms of structure, building performance and sustainability

- → Providing shade to the spaces below.
- → Providing solar protection to the façade, enough to significantly reduce solar heat loads on the glass.
- → Harnessing the suns energy through 50% Photovoltics roof coverage.
- → Rainwater harvesting, capturing water for use as grey water and landscape irrigation.
- → Contribution to biodiversity via roof top planting. Which also contributes to the increased efficiency of the PV's
- → Incorporation of a viewing platform.

The roof will be able to capture and store enough energy to power the building entirely (not including the manufacturing equipment). The efficiency of the solar panels on the roof are increased by the incorporation of planting in and around the Photovoltaic's, studies have proven that greenery helps reduce the ambient temperatures making the photovoltaic cells more efficient.

The roof will also capture enough rainwater to irrigate the landscape and flush the toilets. The roof will play a big part in the water story of the site, overflow run from the water storage tanks will assist in filling the on-site water retention in the landscape, helping support Biodiversity.

> Daramu House by Tzannes: https:// architizer.com/
> Concept modular Roof Section

Explorations of a woven roof structure.

We undertook a series of different design studies exploring interpretations of weaving within the roof structure. We tested each of these with the structural engineer, to determine viability and material efficiency, along with other considerations such as the details for the moments where facade and wall meet the underside of the roof.

Through these exploration we also thought about interpreting the idea of weaving in other ways through simply the layering of srtucureal members, to form a lattice. The structural properties of the lattice proved excellent, creating an efficient woven structure with a minimal amount of material. For a roof of this size reducing the material through structural efficiency aligns to our sustainability strategy.

The roof structure will continue to evolve as we move into more detail, but we think the foundations are set for an innovative structural solution that speaks to country and is like no other.

- 1. Woven roof exploration 1
- Woven roof exploration 2
 Woven roof exploration 3
- Layering & weaving of structural components
- Photo by Daniele Hromek

 Indigenous woven fishing net technique.

ROOF DESIGN Providing Shade and Solar Protection

The building's roof cantilevers beyond the facade line, providing shade to the spaces below and solar protection to the façades reducing solar heat loads.

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AMRF - First Building

FACADE Natural Ventilated Mix Mode Spaces

Natural ventilation will be utilised in the First Building, with opportunity for mixed mode spaces in the workplace and the public spine & main lobby to be fully naturally ventilated, with the addition of spill from the workplace if required.

We are exploring the best way to natural ventilate this building. There is potential to bring air through the facade and into a floor plenum, and then exhausted at high level between the beams of the roof structure.

The workplace will be mixed mode, able to switch between natural ventilation and ducted. In yellow on the adjacent diagram highlights the optimum locations for operable windows in the facade, away from the noise of the busy road.

However the central public spine and lobby can be fully naturally ventilated. On a really hot day it will be able to close down and use spill from the workplace to cool the space. If water is celebrated here that also presents an opportunity for natural cooling to contribute to the cooling of the space.

An Integrated holistic servicing strategy. **RL90.1** Lighting & Sprinklers The adjacent concept section between beam diagram indicates possible strategies structure that we will explore in more detail. We are designing a beautiful timber structure and this should be celebrated as much as possible **RL85.5** to do this we have to be clever in 400mm raised integrating services discreetly. A raised access floor would allow the access floor for reticulation of services and assist in services and providing a mixed mode workplace mechanical intake natural ventilation whilst also incorporating ducted air conditioning Lighting and sprinklers can be concealed between the structural beams. Finding ways to integrate services within the building fabric will **RL81.5** expose more of the beautiful timber structure. 400mm raised access floor for services and mechanical **Concept Section**

MATERIALS PALETTE

Materials matter.

The building's embodied carbon is addressed to ensure the building is resilient and 'purposeful'.

Embodied carbon from the building industry makes almost 30% of the carbon generated by fossil fuels. With efficiencies in operation and the de-carbonisation of the electricity grid through an influx of renewable energy sources, the importance of addressing a building's embodied carbon is a critical focus to address climate change.

There are two primary components to dramatically reduce the embodied carbon of the proposed facility - the structure and its roof.

The building's enclosure proposes a materials palette that is derived from three key aims:

- \rightarrow A response to its local context \rightarrow A holistic approach to considering the embodied carbon and potential for recycling
- \rightarrow A high degree of transparency

Annual Global Building Sector CO₂ Emissions

- 1. Timber
- 2. Natural Textures and Hues
- 3. Rammed Earth
- 4. Glass
- 5. Steel
- 6. Light Grey Concrete

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EAST & WEST ELEVATION

NORTHERN ENTRY OPTION Flexibility into the Future

As the city evolves into the future we have considered strategies for additional entry points. The flexibility of the design future allows for the building program to adapt and respond to the changing context.

Following the SDRP a comment was raised about the future flexibility of entry locations. It was raised that in the future when the city develops around this building, 15th Avenue would become a main transport corridor, potentially making an entry point on the northern facade desirable. We explored the potential for this as a future scenario determining a central location was best entering between the cores splitting the ground floor tenancy. We resolved the viability of this option in terms of the level changes transitions and equitable access.

However there is a draw back for a northern entry this being a diminished flexibility of the workplace, as the northern entry point would split the ground floor tenancy into two, reducing the future flexibility and adaptability of the workplace, with the option of one tenant taking the whole floor-plate for example.

The dual entry from the East and West provide that flexibility and

connectively into the future with the potential of a northern entry introduced at a later date to align with the evolving city and the possible subdivision of tenancies.

PUBLIC VIEWING PLATFORM

As part of the public engagement response, the design incorporates a viewing platform. A place to look towards the creek line and watch the city evolve over time.

- Hassell Bicentennial Park -Precedent for look and feel of viewing platform
 Diagram illustrating views to the
- 2. Diagram illustrating views to the creek line

LANDSCAPE PLAN

The landscape response to AMRF - First Building will demonstrate how contemporary urban landscapes can successfully represent, be informed by, and celebrate the ecology and landscape of the Cumberland Plain. As the AMRF - First Building, and by extension, the First Landscape, it is vital that this landscape sets a clear precedent for future development of Bradfield.

Site planning design decisions focused on maximising the extent of permeable and planted ground to enable natural processes to occur, but to also immerse the user and visitor to AMRF within the beauty of the Cumberland Plain.

This has been physically expressed on site with meandering footpaths and flowing plaza areas through Cumberland Plain inspired gardens. The water story of the Cumberland Plain will be demonstrated through rain gardens, open and moving water expressed in the landscape. This functional aspiration also plays an important role in re-creating an ecological identity for the site and a greener public image.

This overarching aspiration has guided all decision making and ensures that all landscape components have purpose and contribute to the ecological health and function of the site, as well being attractive, beautiful and contribute to the well being of Bradfields residents and workers. The overall landscape must be flexible to the changing context of the First Building. As the city grows, and the adjacent blocks are built upon the scale, function and setting for the First Building will need to adapt and mould to these changes.

The meandering forms and overall concept of being immersed in Cumberland Plain, allows for these changes to occur without a loss of identity or function.

The measure of success of the landscape outcomes of this project should be its contribution to the broader restoration of the Cumberland Plain, its representation within Bradfield and its ecological function.

LANDSCAPE AND BIODIVERSITY Strengthening the Site's Ecological Identity and Function

The project aims to celebrate the Cumberland Plain through immersing users and activities within a richly planted, permeable ground plane of locally, underused species. This will play an important role in re-establishing an ecological identity for the site and set an important precedent for future development of Bradfield

100% indigenous plant palette

The site will be planted with species from the Cumberland Plain community, contributing (in a small way) to broader restoration efforts of this important ecological community.

Planting with Purpose

Planting will not be designed to simply 'furnish' the space. The planting must be proven to function in many ways, with 1m² of planting having a multitude of uses, including:

- $\rightarrow\,$ Biodiverse, with many species / m^2
- \rightarrow wsud
- \rightarrow Urban cooling
- \rightarrow Seasonal and floral
- ightarrow Improving wellbeing

Maximise site permeability

The regeneration of the site will enable us to re-plan the existing approach to ground plane finishes and materiality. The site planning will aim to:

0 00

- → simplify & minimise extents of hardscape finishes;
- → reduce the extent of impermeable surfaces;
- \rightarrow maximise the sites permeability and porosity and
- → maximise areas of deep soil and planting.

Vanilla Llly (Arthropodium milleflorum)

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ADVANCED LANDSCAPE

Just as the building will be a demonstration of the latest technologies, the landscape must demonstrate an advanced approach to landscape design.

Taking learnings from 60,000 years of history, the landscape will reflect global trends for intricate naturalistic planting design that is regenerative, biodiverse and not there to simply fill a space with green stuff.

Soil and substrate design will follow the lead of projects such as the Barangaroo Headland Park with reduced fertility and increased drainage and water holding that reflects the natural condition.

The approach to Water Sensitive Urban Design will reflect current research into natural treatment of water, and will be expressed in the landscape as an educational, and beautiful landscape response

Landscape that is there for a purpose, not just to fill space

Landscape that regenerates, accepts change and understands seasons.

Landscape that is diverse and encourages biodiversity

Landscape that responds to **Climate Change**

Landscape that is immersive

environment

Landscape that cools the

Landscape that is educational, monitored and recorded

Landscape that is productive

GROUND RULES

As the landscape proposals for AMRF - First Building are developed, the following ground rules will be followed in order to ensure the project lives up to the aspirations of Bradfield and respects the millennia old history of the site

No water intensive lawn

All surfaces to be permeable and cooling

Embrace water in the landscape

Immersive and human scaled

Working with the land, not against it

This is not an acceptable outcome

DESIGN WITH COUNTRY

Amongst the seven narratives that Djinjama have identified, the importance of the Water Story and Healing Country to the development of this project. These will guide the form, materiality and movement of the landscape of AMRF - First Building

Djinjama have suggested the following principles and design opportunities in relation to Water -

- \rightarrow The waters of Wianamatta are sacred
- \rightarrow The movement and fluidity of water
- \rightarrow Sweetwater Country
- \rightarrow Layers of mountains from which the waters come
- \rightarrow Learn to move with the flow of waters and Country
- \rightarrow Water gives life and connects us all
- \rightarrow Women's business
- \rightarrow Fluid lines, no sharp edges, meander, layering, designing for water change

Djinjama have suggested the following principles and design opportunities in relation to Healing Country -

- → Biodiversity
- \rightarrow Creating a place that welcomes emu
- \rightarrow Fatherhood supporting women to do their business and stepping up to look after the offspring (emu)
- \rightarrow Sustainability
- \rightarrow Contribute to keeping waters clean
- → Returning Cumberland Plain
- → Addressing climate change and urban heat island effect
- \rightarrow Cleaning water, cleaning land
- \rightarrow Re-use waste (water and other)

DESIGN WITH COUNTRY

Stands of trees

Grassland understorey

The Water Story

Bulbine Lily (Bulbine bulbosa)

THE WATER STORY

The development of the landscape plan focused on maximising the extent of permeable surfaces and minimising the extent of hard/impervious paving surfaces. This also aligned with the ambition to maximise the amount of planted surface.

These conceptual approaches will b developed and tested in future proied stages. Technical requirements and details will refined in collaboration with Hydraulic and Civil Engineers.

Image source: Rod Simpson

THE WATER STORY

Water will be celebrated in numerous ways, serving both ecological and social needs. The presence of water will be made visible as it moves across the surface of the site.

Beautiful green infrastructure

Connecting across the landscape

Tactile and expressive art features

Creating moments of delight

WSUD PRECEDENTS

The Ponds

A benchmark project in creek rehabilitation, The Ponds features creates a new ecological corridor and improved water quality management within a residential development.

Sydney Park Water Reuse Project

A 1.6ha stormwater-management project that incorporates artistic and interactive elements to create a landscape where the public engages with water

AMRF - First Building

OPPORTUNITIES

Archibald Ave Waterloo

A combination of raingardens, passive irrigation and permeable paving are used as WSUD strategies in this service laneway.

Permanent naturalised basins

Sculptural and interpretive water elements

Raingardens, swales and passive irrigation

PLANTING STRATEGY

AMRF - First Building will follow the principles laid out in the Western Sydney Aerotropolis Development Control Plan 2021. and Appendix 2

The planting strategy for the AMRF First Building will utilise advanced horticultural techniques to create a highly diverse, highly floral native landscape. A combination of planting and seeding strategies for permanent and temporary landscape areas will be used.

These conceptual approaches will be developed and tested in future project stages. Technical requirements and details will refined in collaboration with Horticultural and Revegetation specialist

mberland Plain Wildflower Meadow

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PLANT SPECIES

The AMRF First Building landscape will re-establish endemic species of the Cumberland Plain into new communities. This will ensure a landscape that is low water use and supports a diverse range of local fauna.

The approaches to planting will demonstrate and will set precedent for how planting can be approached across Bradfield at different scales. From the manicured "garden' style, to low maintenance and temporary landscapes. All utilising Cumberland Plain species

Naturalistic, native garden planting

Low maintenance naturalistic native planting

Permanent and Temporary Cumberland Plain wildflower and grass land seeding

Example - Jiwah Rooftop Garder Redfern. Svdnev

Example - Woody Meadow planting by Uni of Melbourne. Melbourne

Example - Cumberland Plain seeding by Paul Gibson Roy, Camden

Nahlenbergia strict

Bursaria spino

