

An aerial photograph of Western Sydney, Australia, showing a mix of urban development, green spaces, and waterways. Overlaid on the map are various planning elements: a red line representing a proposed rail or road corridor, yellow lines for other infrastructure, and green shaded areas indicating parks or environmental zones. The map is the background for the entire document.

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WESTERN SYDNEY AEROTROPOLIS URBAN DESIGN AND LANDSCAPE PLAN REPORT

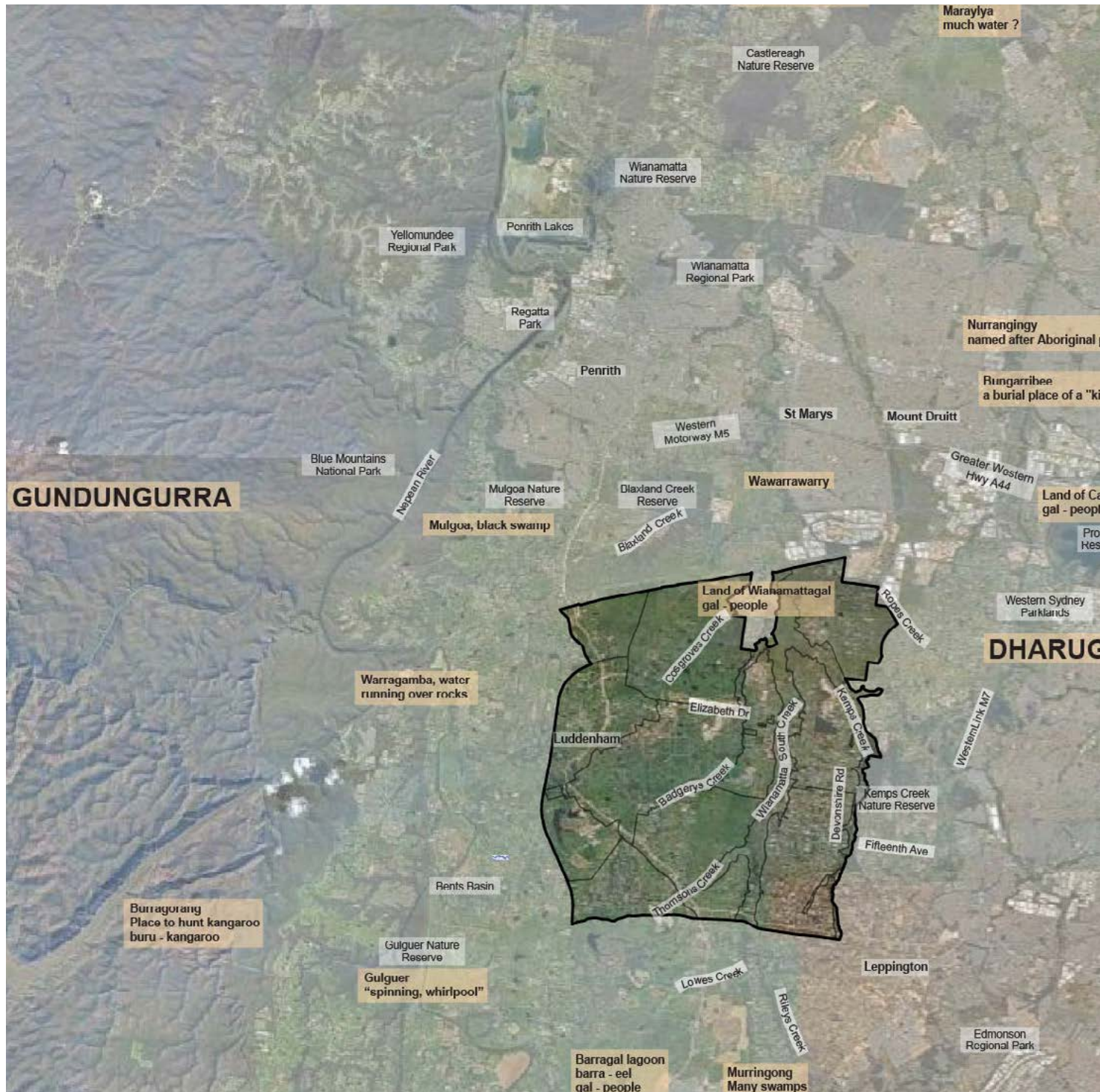
DRAFT FOR PUBLIC COMMENT

Prepared for
Western Sydney Planning Partnership

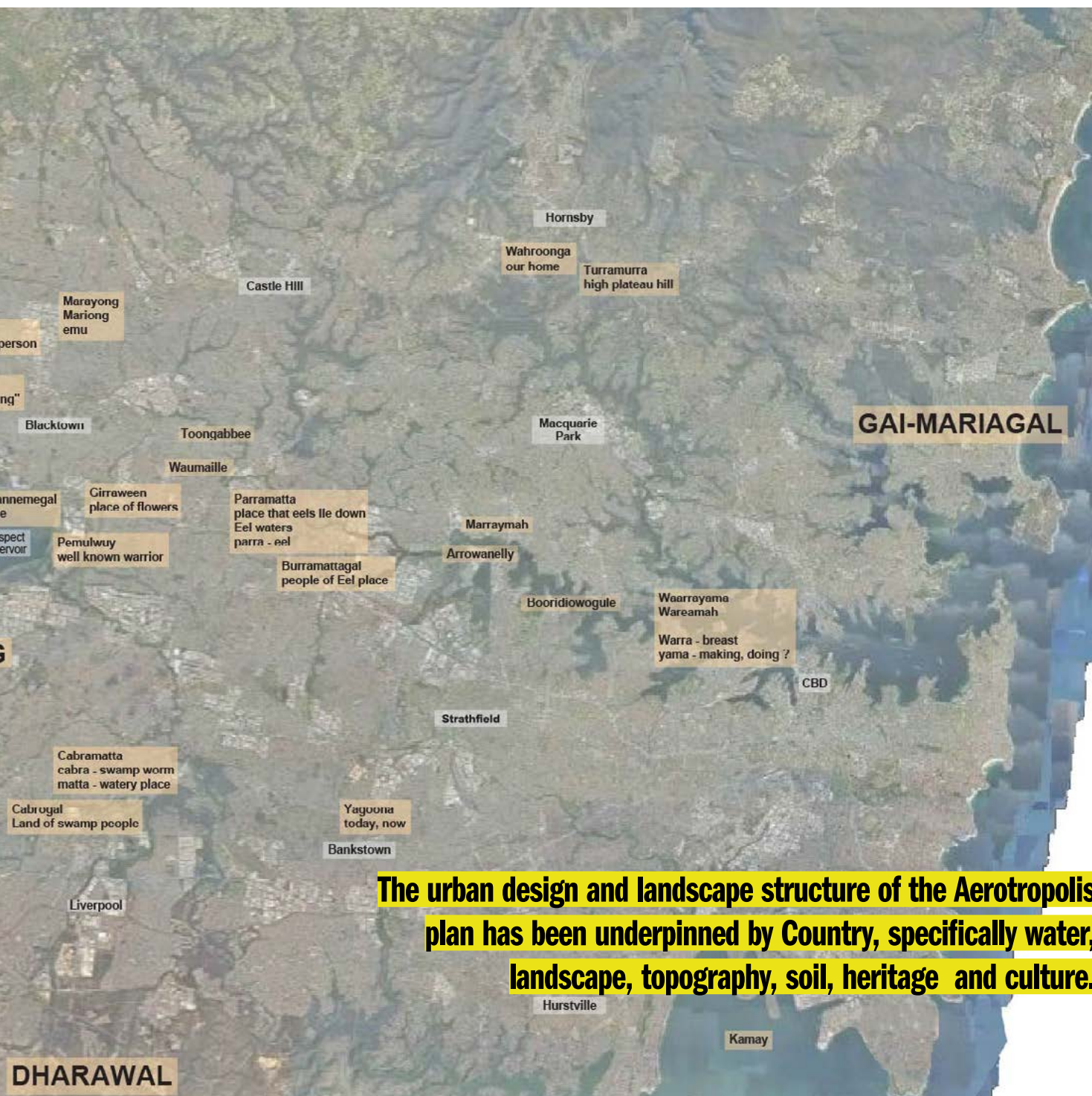
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November 2020

COUNTRY

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.



We acknowledge and respect Traditional Owners across Australia as the original custodians of our land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past, present and emerging whose knowledge and wisdom has, and will, ensure the continuation of cultures and traditional practices.



The urban design and landscape structure of the Aerotropolis plan has been underpinned by Country, specifically water, landscape, topography, soil, heritage and culture.



View of the Blue Mountains from Luddenham.
Photography by Daniele Hromek.





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This report has been prepared for:

WESTERN SYDNEY
PLANNING
PARTNERSHIP



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EXECUTIVE SUMMARY

The Aerotropolis will change the face of Western Sydney. A massive opportunity across time and scale, the urban design frameworks for each initial precinct can shape for the world how sustainable urban form can be realised.

This report comprises the urban design, public realm and landscape recommendations informing the Precinct Plan for the Aerotropolis initial precincts.



Looking north east over the Aerotropolis Core, with Thompsons Creek to the right of the image.

A NEW CITY A NEW COMMUNITY A NEW APPROACH

Beyond business as usual

DESIGNING WITH COUNTRY

Country is a leading driver to urban design across the Aerotropolis. The plan and future phases will recognise Aboriginal cultural values in leading design outcomes, cultural heritage, and the approach to the urban system.

"Aboriginal culture is developing a stronger presence in the NSW planning system. Undertaking archaeological investigations and recording Aboriginal heritage is a well established part of the planning process, but response to Country and culture in the design of places is a relatively new idea."

(GANSW, Designing with Country, 2020)

"Country soars high into the atmosphere, deep into the planet crust and far into the oceans. Country incorporates both the tangible and the intangible, for instance, all the knowledges and cultural practices associated with land. Aboriginal people are part of Country, and our identity is derived in a large way in relation to Country. Our belonging, nurturing and reciprocal relationships come through our connection to Country. In this way Country is key to our health and wellbeing"

(Dr Daniele Hromek, 2020)

LANDSCAPE LED

Landscape, and parkland will be the defining feature of the Aerotropolis.

Located at the centre of the Western Sydney Parkland City, a fundamental approach to urban design is to be landscape led.

The whole landscape system needs to be understood and embedded as a key structuring element to the urban design frameworks. This goes beyond vegetation, to landform, to soils and geology, to water and to biodiversity.

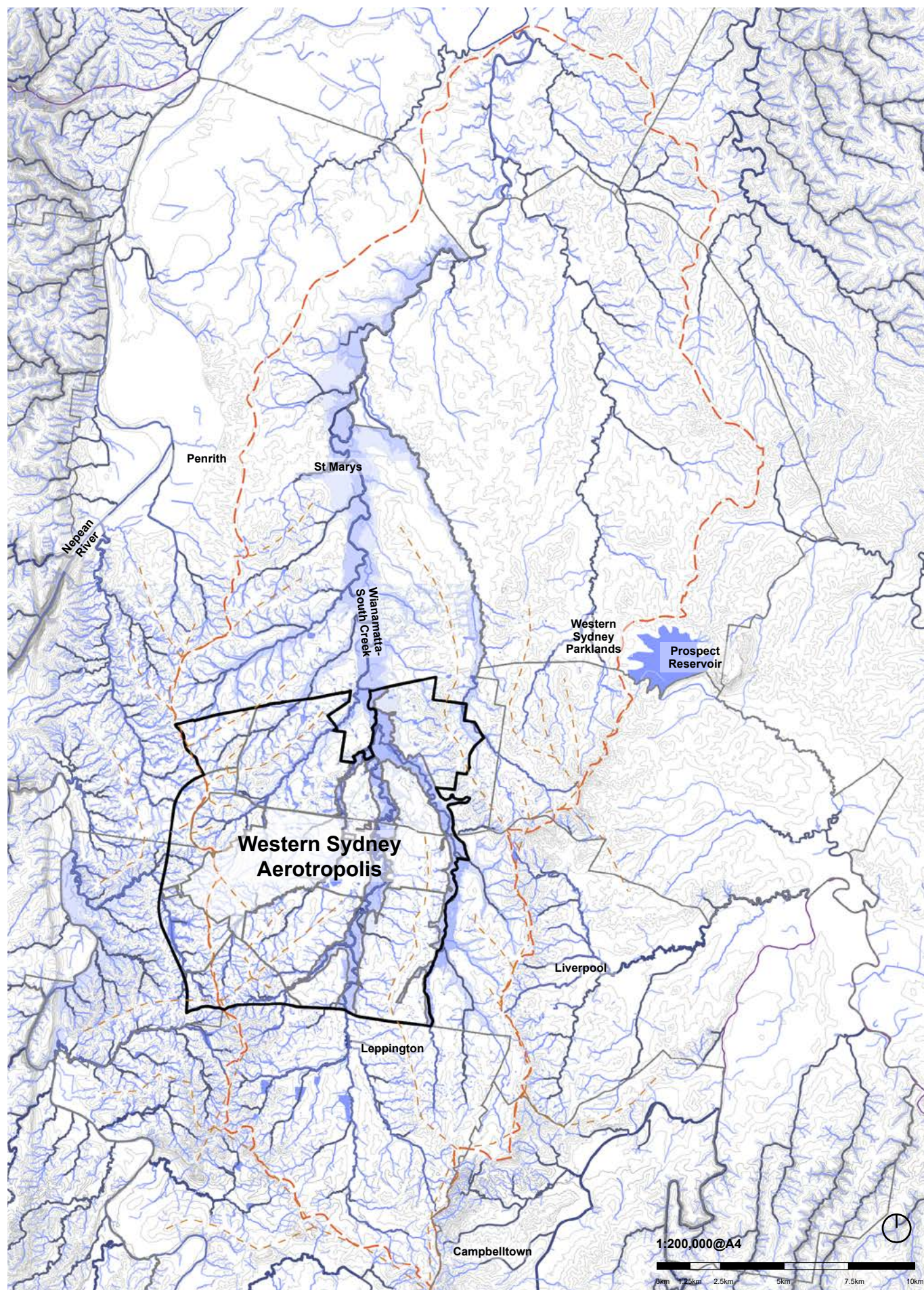
What we do here affects not just the site, but the entire system beyond our boundaries. Therefore a sentiment of custodianship needs to embed the planning, design and development processes.

SHAPED BY WATER

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 the Aerotropolis.

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.



SHAPING A SUSTAINABLE WESTERN CITY

REBALANCING SYDNEY'S THREE CITIES

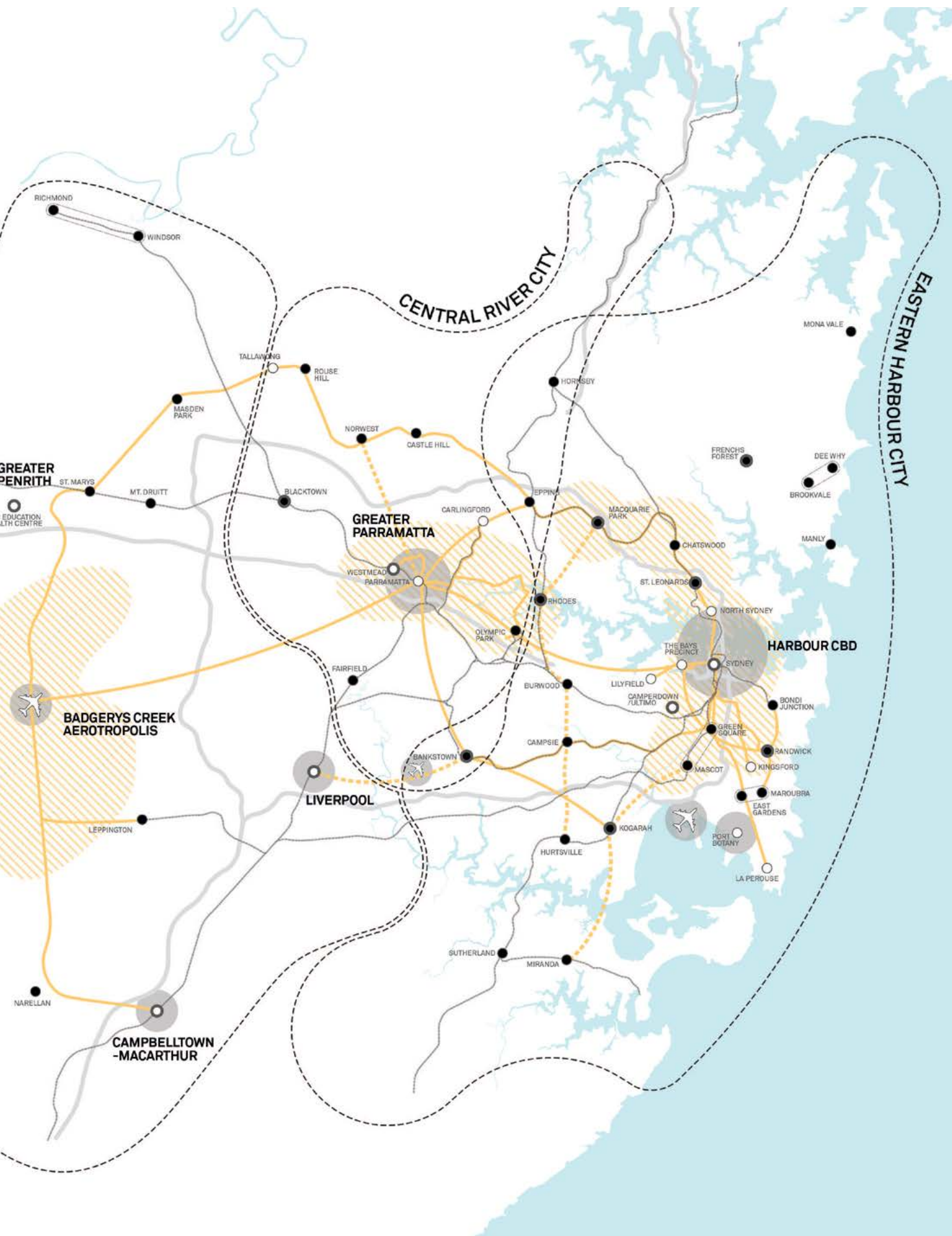
The Greater Sydney Commission has established a clear, overarching vision for Sydney - a Metropolis of Three Cities. Historically, the emphasis of jobs, amenity, growth and infrastructure has been on two of the three - the Eastern Harbour City focused on the Sydney CBD and Central River City focused on Parramatta.

The Aerotropolis will rebalance the Western Parkland City so that it has:

- High quality jobs that will sustain prosperity within the region
- Excellent access and connectivity, provided through public infrastructure (including through the construction of the Sydney Metro)
- Excellent liveability, where a 'beyond business as usual' approach will focus on creating a cooler and greener city - of which a key focus is early planning for the Wianamatta-South Creek Precinct as part of a broader Blue Green Infrastructure framework.

The Aerotropolis and Metropolitan Clusters of Greater Penrith, Liverpool and Campbelltown-Macarthur will connect to Greater Parramatta and the Harbour CBD to realise the vision for Greater Sydney as a metropolis of three cities. The urban design approach to the Aerotropolis urban design frameworks brings jobs, connectivity and liveability together to create a fundamentally sustainable city. By combining these elements, the Western Parkland City can be resilient and adaptable to the future.





THE AEROTROPOLIS

Propelled by Government investment in the Western Sydney International (Nancy-Bird Walton) Airport, Sydney Metro Western Sydney Airport Line and road infrastructure, the Aerotropolis will be the beating heart of the Western Parkland City.

The focus is fundamentally on establishing a 100 year vision for the precincts. This report establishes an urban design, landscape and public realm framework for a sustainable, liveable and prosperous city.

The initial precincts addressed are:

- Aerotropolis Core
- Badgerys Creek
- Wianamatta - South Creek (adjacent to Aerotropolis Core and Badgerys Creek)
- Northern Gateway
- Agribusiness

With this 100 year mindset, the key framework elements of the Aerotropolis are:

1. Country and its landscape form a key structuring element. Ridgetops, creeks, ephemeral streams, remnant vegetation, culture and heritage are retained and enhanced through the Blue-Green Infrastructure Framework.
2. Jobs and mixed use intensity are highest around the Sydney Metro Western Sydney Airport Line stations at the Aerotropolis Core and Luddenham Road (within the Northern Gateway). Here, the centres focus amenity to open space and the creek corridors, embedding place at the heart of the city.
3. The Wianamatta - South Creek and its tributaries, Badgerys, Cosgroves and Thompsons Creek, as well as Duncans Creek, which flows to the Nepean, form the Environment and Recreation spine of the Aerotropolis. These corridors carry critical environmental, cultural and recreation functions to boost liveability and establish the primary elements of a cool, parkland city.
4. New patterns of development will occur throughout the Aerotropolis to fundamentally change the nexus between urban landscapes and water. To maintain and enhance the flood and ecology of the Wianamatta - South Creek, a new approach to water management is required - integrated at a precinct wide scale. It is critical an integrated and connected network of water and open space is coordinated across the Aerotropolis.
5. Movement throughout the Aerotropolis is founded on creating great places. Centres will be people focused, with Metro and bus transit providing frequent connections to broader Sydney. The larger arterial corridors are important connections directing goods to the airport. These are directed around centres, maintaining a focus on place, amenity and liveability, whilst at the same time providing an efficient network.

Note: This project has considered the extent of the Wianamatta-South Creek corridor adjacent to the initial precincts. Future precinct planning work throughout the Rossmore and Kemps Creek precincts will consider appropriate land use, urban design and landscape outcomes for the additional parts of the Wianamatta-South Creek corridor not addressed in this report.

1. Aerotropolis Core City Centre
2. Thompsons Creek Regional Park
3. Luddenham Road Metro Station
4. Luddenham Village
5. Western Sydney International (Nancy-Bird Walton) Airport terminal
6. Western Sydney International (Nancy-Bird Walton) Airport business park





A perspective visualisation of the Aerotropolis Core.



THE PLANS

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.

AEROTROPOLIS CORE

The Core contains the City Centre for the Aerotropolis, forming a complementary centre to the metropolitan cluster of centres including Penrith, Liverpool and Campbelltown.

The City Centre and its Enterprise frame comprise a Parkland City in the true sense. It is a dense urban neighbourhood focused on both the new metro station and Wianamatta - South Creek system. Thompsons Creek will form the regional park, complemented by a network of linear corridors associated with retained creeks.

The Aerotropolis Core precinct has the capacity accommodate 50,000 to 60,000 jobs and up to 24,000 residents by 2056.

Annotations

1. An intense, large centre with several nodes - one at the Metro Station; a northern focus integrated with creek parkland and Fifteenth Avenue; a Kelvin Park centre.
2. Lower order, but still intense employment land lies north and west of the centre - each with its own focus amenity.
3. West of Badgerys Creek Road, development is coordinated over time to achieve creeks and existing vegetation in linked open space.
4. Open space aligned to existing ephemeral creeks.
5. Larger ridge top parks help share views and connect Wianamatta - South Creek to the urban core.
6. Kelvin Grove is provided impetus via a potential additional Metro station (not a government commitment).

BADGERYS CREEK

The Badgerys Creek precinct is entirely employment focused. It will complement the role of the business park within the Western Sydney International (Nancy-Bird Walton) Airport as well as the Northern Gateway employment functions.

Flanked by Badgerys Creek and the Wianamatta - South Creek, these major green corridors will provide the amenity for future workers. Centres providing conveniences will help to activate these corridors and the employment zone. The precinct will comprise logistics, commercial industry, high technology industry and associated employment uses.

Up to 11,000 jobs will be located across the precinct by 2056.

7. Thompsons Creek and the adjacent Wianamatta - South Creek become the Aerotropolis regional park.
8. Badgerys Creek coordinated into an enterprise grid, utilising existing road and lot patterns where possible.
9. Badgerys Creek precinct centres aligned with the linear creek corridors to maximise amenity benefits.
10. Coordinated development north of Elizabeth Drive to integrate with Northern Gateway west of Badgerys Creek.
11. Waste transfer station retained for circular economy site (consistent with PIC), with potential future network shown.
12. Land north of the M12 corridor becomes conservation area.
13. High risk* flood areas limited to creek and ecological functions.

WIANAMATTA-SOUTH CREEK

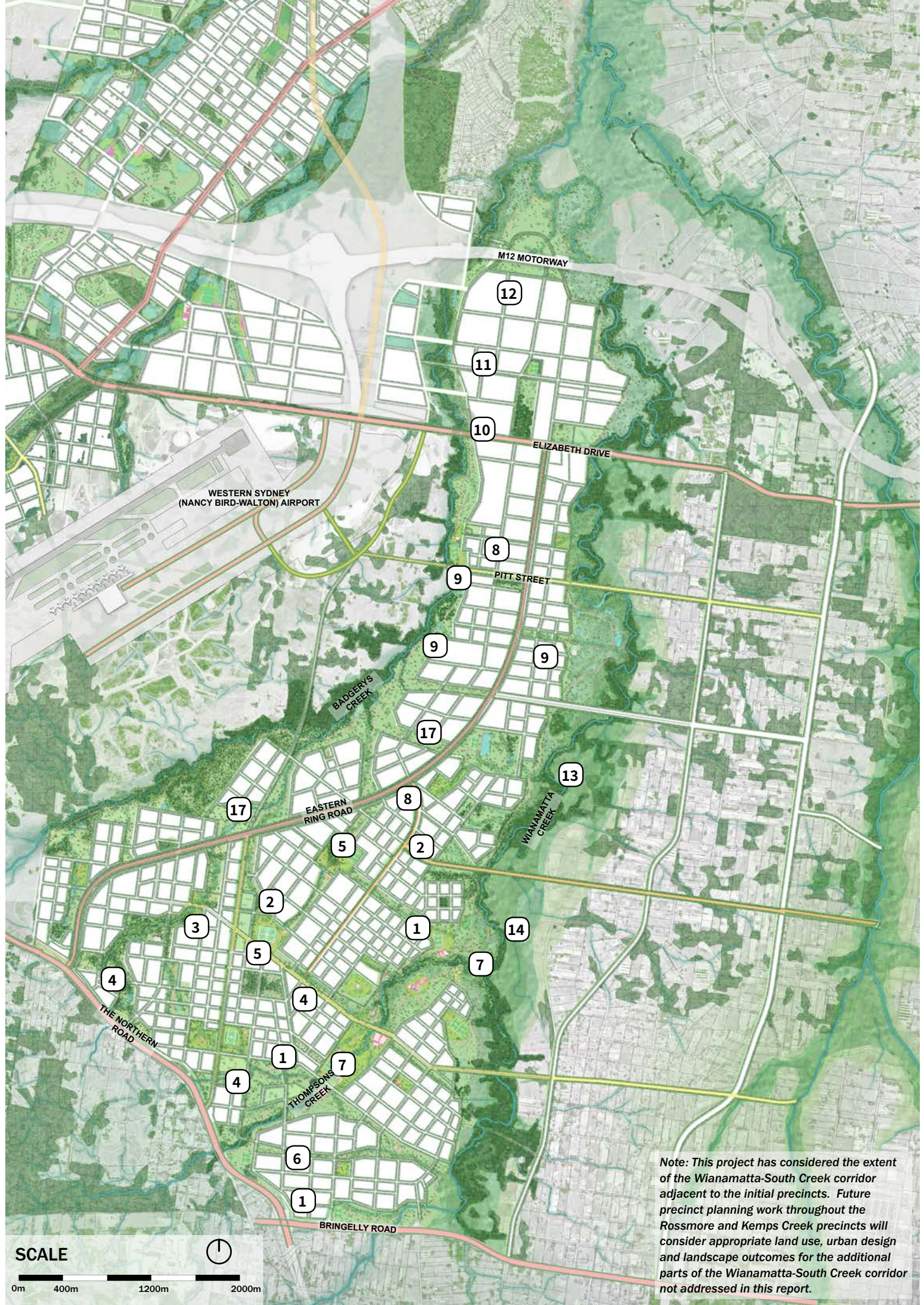
The Wianamatta-South Creek precinct is defined by the Environment and Recreation zone as established by the Western Sydney Aerotropolis Plan.

It accommodates a range of environmental and recreation functions, including water flows associated with the creek environment, ecology and biodiversity functions, recreation (walking) paths and separate active transport (bicycle) routes, as well as contained areas of active recreation, particularly focused around the Thompsons Creek regional park.

The Wianamatta - South Creek precinct is complemented by a series of east-west corridors through the Aerotropolis Core and Badgerys Creek precincts to achieve a sustainable green grid.

14. Medium risk* flood areas provide active transport and parkland uses.
15. Low risk* flood areas contain active recreation and shared passive open space areas through to development.
16. Fragmented land within the Environment and Recreation zone (Wianamatta South Creek) is publicly accessible through long term development.
17. Existing quarries transition over time to employment land uses. Vegetation is retained where it aligns with flood and biodiversity objectives.

*Risk areas as defined by Liverpool City Council.



WESTERN SYDNEY
(NANCY BIRD-WALTON) AIRPORT

M12 MOTORWAY

ELIZABETH DRIVE

PITT STREET

BADGERYS CREEK

EASTERN RING ROAD

WIANAMATTA CREEK

THOMPSONS CREEK

BRINGELLY ROAD

Note: This project has considered the extent of the Wianamatta-South Creek corridor adjacent to the initial precincts. Future precinct planning work throughout the Rossmore and Kemps Creek precincts will consider appropriate land use, urban design and landscape outcomes for the additional parts of the Wianamatta-South Creek corridor not addressed in this report.

SCALE

0m 400m 1200m 2000m

THE PLANS

The Northern Gateway is a principal area for high quality jobs and employment land framed by existing topography and Cosgroves's Creek. The Northern Gateway Strategic Centre will be a key centre, containing mixed use activity supported by Sydney Metro.

NORTHERN GATEWAY

The Urban design framework's structure draws its inspiration from the existing alignment and character of Luddenham Road, forming a complementary paired 'sister' street to Luddenham on the western slopes of the ridgeline. Between these two primary structuring streets is a robust north-east oriented grid which forms efficient rectilinear blocks that optimises use of the gentler terrain for development, and deform rationally around hilltops and creek lines to form a coherent public domain network.

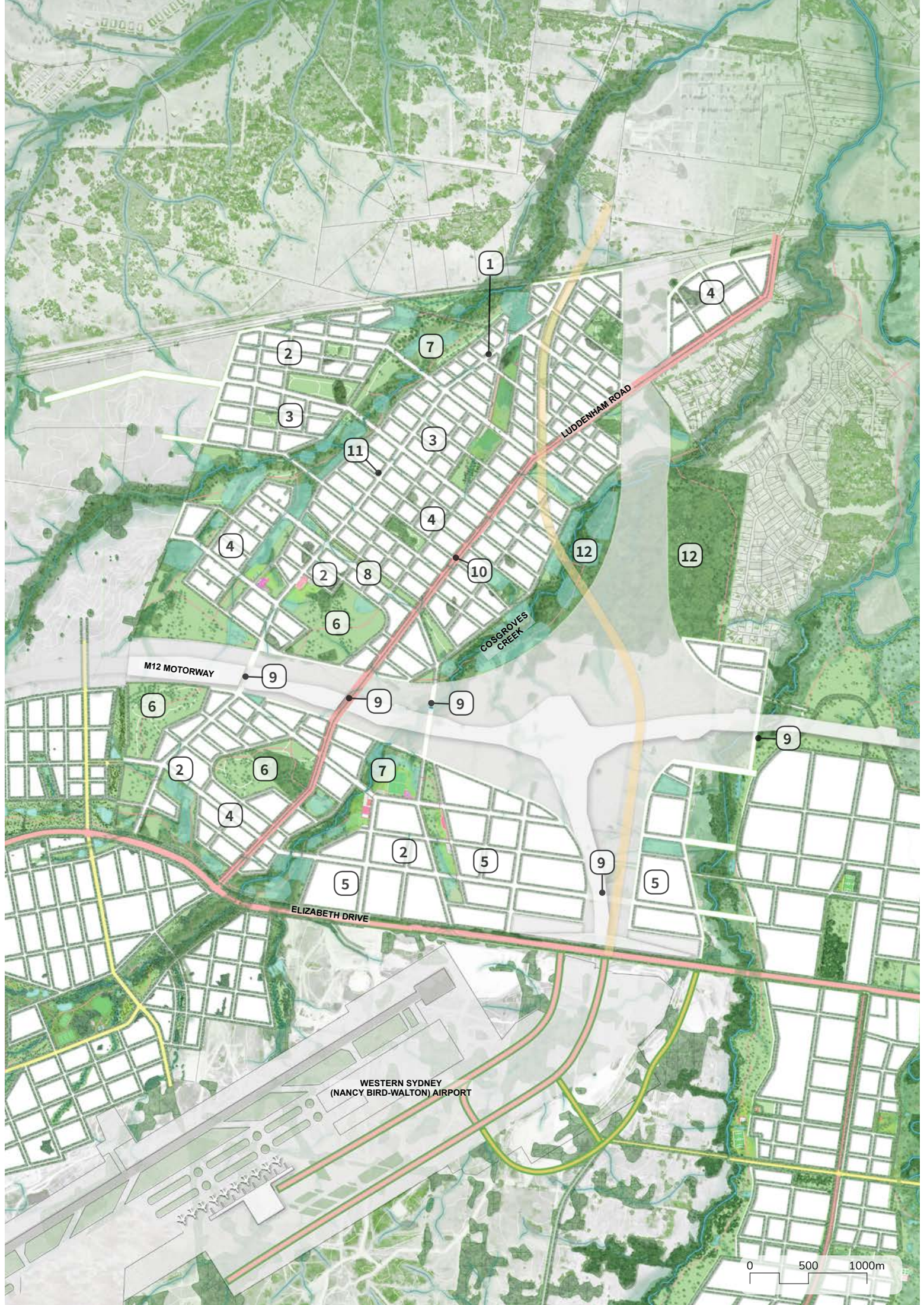
The significant riparian flood planes are framed and addressed by edge street which terminate the grids in views to open sky and landscape, embellishing and celebrating the subtle rolling of the Western Sydney landscape.

Where ground is flattest in the south the street and block structure broadens to make larger sites available for logistics and large format uses. Where terrain rolls more in the centre and north of the precinct the street and block structure reflects a greater density of smaller footprint building types tailored to the terrain.

In the north and to the west of Luddenham Road a Specialised Centre is established around the new Metro station, with the layout of the street network designed to lead residents, workers and visitors directly and rationally to significant local and regional open space in the west.

Annotations

- | | | |
|--|---|--|
| <ol style="list-style-type: none"> 1. Specialised Centre. A hub with strategic innovation and a focus on employment. Contains Metro station. Integrated with the creek parkland 2. Local centre, each with its own focus and amenity. 3. Mixed used zoning to support the strategic centre and other enterprise areas throughout the precinct. 4. Finer grain employment area with smaller building types on steeper land. Lot sizes are smaller to minimise extent of cut and fill associated with larger scale building typologies. 5. Larger scale employment area located on flatter parts of the precinct. These areas will accommodate larger block typologies. 6. Hilltop parks retained as key features. They provide connection to Country by providing creek to hilltop connections, | <ol style="list-style-type: none"> 7. Riparian Parks-Creeks, open space and existing woodland retained. In lower risk flood zones these areas contain active recreation and a range of shared passive open spaces. 8. Creek to creek connection with linear park provide active recreation and a range of shared passive open spaces up valleys and connecting development over the ridge line. 9. Critical connections across major infrastructure corridors. The M12, Outer Sydney Orbital corridors disconnect the precinct into alienated fragments of land. In order to achieve minimum walkability and connectivity throughout the precinct, active and vehicular crossings are proposed over and under these corridors. | <ol style="list-style-type: none"> 10. Luddenham Road. This is the primary urban roadway and serves as the major freight and regional rapid bus corridor. 11. Paired street to Luddenham road. This is a major structuring spine and will serve as a main frequent bus and active transport corridor. 12. Remnant woodland becomes conservation area. |
|--|---|--|



THE PLANS

The Agribusiness Precinct will be a place for high technology and intense agriculture industries, supported by its interconnectivity with the Western Sydney International (Nancy-Bird Walton) Airport. The rolling hills and chain of dams provide a high quality landscape setting for jobs and the existing Luddenham Village.

AGRIBUSINESS

The Agribusiness precinct will create a world-class food production and industry sector that will support the production and value-adding of sustainable, high quality fresh produce and prepared consumer foods.

The Agribusiness precinct draws upon the agricultural and horticultural history of the area, continuing to provide food security and supply to Sydney.

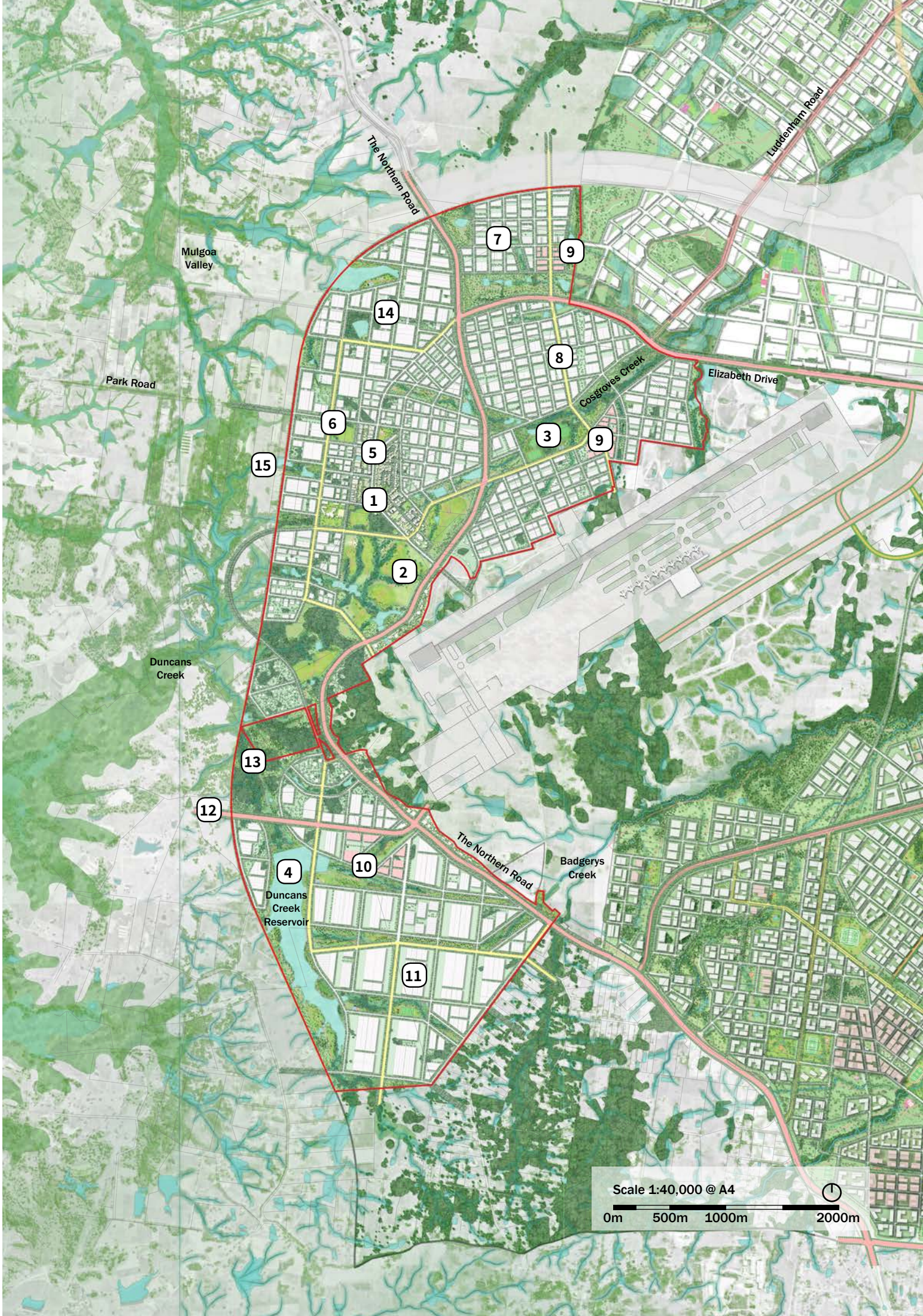
Luddenham Village sits high on the ridgeline, at the core of the Precinct, and acts as an Agri-Village that is fully connected to local, district and regional centres by the transportation and parkland networks.

The Agribusiness urban design framework is structured in response to its unique topography, with the predominant ridgeline which the Northern Road traces forming a north-south spine, from which the creeklines spring at the head of the broad valleys.

The Agribusiness precinct is anticipated to accommodate up to 3800 residents and 13,000 jobs by 2056, resourcing this from within the Aerotropolis.

Annotations

- Growth within and around Luddenham Village is structured to enhance and protect the character and history of the village.
- A new Agribusiness Park merges public access with indigenous land management practices, including indigenous regenerative land management. The park is located to preserve and enhance landscaped view corridors towards the Blue Mountains and form part of a regional tourism network.
- Cosgroves Creek Park is a parkland network framed along Cosgroves Creek with playing fields, running and cycling tracks that extends from Luddenham Village, across The Northern Road across Elizabeth Drive to the Northern Gateway Precinct.
- Duncans Creek reservoir is rehabilitated, using waterway rehabilitation techniques, providing passive recreation for workers, visitors and nearby residents incorporating details to mitigate bird and waterway functionality.
- The Old Northern Road is transformed into a green boulevard through Luddenham Village. The character of the Road will evolve into a 'main street' lined with retail, hospitality and commercial offerings.
- Historic elements within Luddenham Village will be revitalised to meet the needs of the existing and emerging community and visitors. Its sensitive renewal will ensure it can support both the existing and emerging community.
- A coordinated enterprise development, north of Elizabeth Drive with associated parkland and strong connectivity to the rest of the Agribusiness Precinct, the Northern Gateway and North Luddenham across the M12.
- A parallel Northern Road connects across the Agribusiness precinct from Anton Road north across Cosgrove Creek and Elizabeth Drive.
- Neighbourhood hubs are located along creek parkland edges and act as a centre for employment activity.
- A local employment centre develops adjacent to the airport along the Northern Road with amenity and outlook over Duncans Creek reservoir.
- A large employment precinct develops adjacent to the airport. The street layout is developed to facilitate large format land uses clearly framed by parkland.
- Potential connection to the future Outer Sydney Orbital will maximise connectivity between the precinct, the airport, greater Sydney and NSW.
- Areas of sensitive ecology form part of a conservation area.
- Intensive Food production is supported on the large and relatively flat land holdings in the northern area of the Precinct.
- The planned OSO corridor will consider critical landscape, active and vehicular crossings along its length.



Scale 1:40,000 @ A4

0m 500m 1000m 2000m



ROLE OF THE PRECINCT PLANS

Consistent with State Environmental Planning Policy (Western Sydney Aerotropolis) 2020, precinct plans for the identified initial precincts have been prepared to provide a clear picture of the intended urban outcomes through to 2056 and beyond. As part of that process, these urban design frameworks establish the key spatial recommendations to be incorporated into the Precinct Plans.

The precinct plans establish the strategic vision and general objectives, proposed land uses, performance criteria for development of land, and the approach to both infrastructure and water cycle management.

The precinct plans have been developed consistent with the objectives of the Western Sydney Aerotropolis Plan, and describe the intended outcomes to support the Aerotropolis' place within the Western Parkland City.

PURPOSE OF THIS URBAN DESIGN AND LANDSCAPE PLAN REPORT

The urban design and landscape plan report for the initial precincts provide the rationale for the intended city shape and systems of the Aerotropolis.

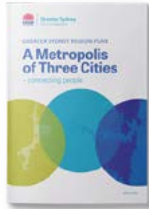
The report has been used to inform the Precinct Plan Report, which contains the required statutory mechanisms to implement the vision described by the Western Sydney Aerotropolis Plan, and the development controls against which development proposals can be considered.

STRUCTURE AND HOW TO READ THE URBAN DESIGN AND LANDSCAPE PLAN REPORT

The urban design and landscape plan report is collated according to the following:

- An executive summary applying to all initial precincts, describing the approach to design and how the Aerotropolis comes together
- Part 1: About the Project - this section describes the key contextual influences to the Aerotropolis
- Part 2: Aerotropolis Wide Framework - this section outlines the critical principles and urban systems that need to be provided throughout all precincts in order to create a 'joined up' city
- Parts 3, 4 and 5: The Urban Design Framework Plans - these sections outline the specific plans and principles for the initial precincts

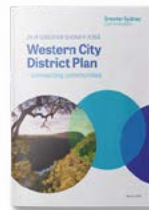
THE WESTERN SYDNEY AEROTROPOLIS STRATEGIC FRAMEWORK



Greater Sydney Region Plan: A Metropolis of Three Cities

Strategic plan created under *EP&A Act*

- Vision and planning objectives for the Greater Sydney region



Western City District Plan

Strategic plan created under *EP&A Act*

- Vision and planning objectives for the Western City District
- Aligns with the Region Plan



Western Sydney Aerotropolis Plan

Government policy framework

- Vision, Structure Plan, planning objectives and principles for the Aerotropolis
- Aligns with the Region Plan and District Plan
- Informs precinct plans and master plans in the Aerotropolis



Western Sydney Aerotropolis State Environmental Planning Policy 2020

Planning instrument created under *EP&A Act*

- Objectives and key controls for development in Aerotropolis
- Zones land broadly to permit or prohibit land uses
- Framework for precinct and master planning



Precinct Plan

Mandatory plan created under Aerotropolis SEPP

- Approved by Minister
- Aligns with the Aerotropolis Plan
- Allocates land uses within broad zones
- Development applications must be consistent with this plan



Master Plan

Optional plan created under Aerotropolis SEPP for large sites (over 100ha)

- Approved by Minister
- Aligns with precinct plans
- Unlocks complying development by setting detailed development and design criteria for permitted development



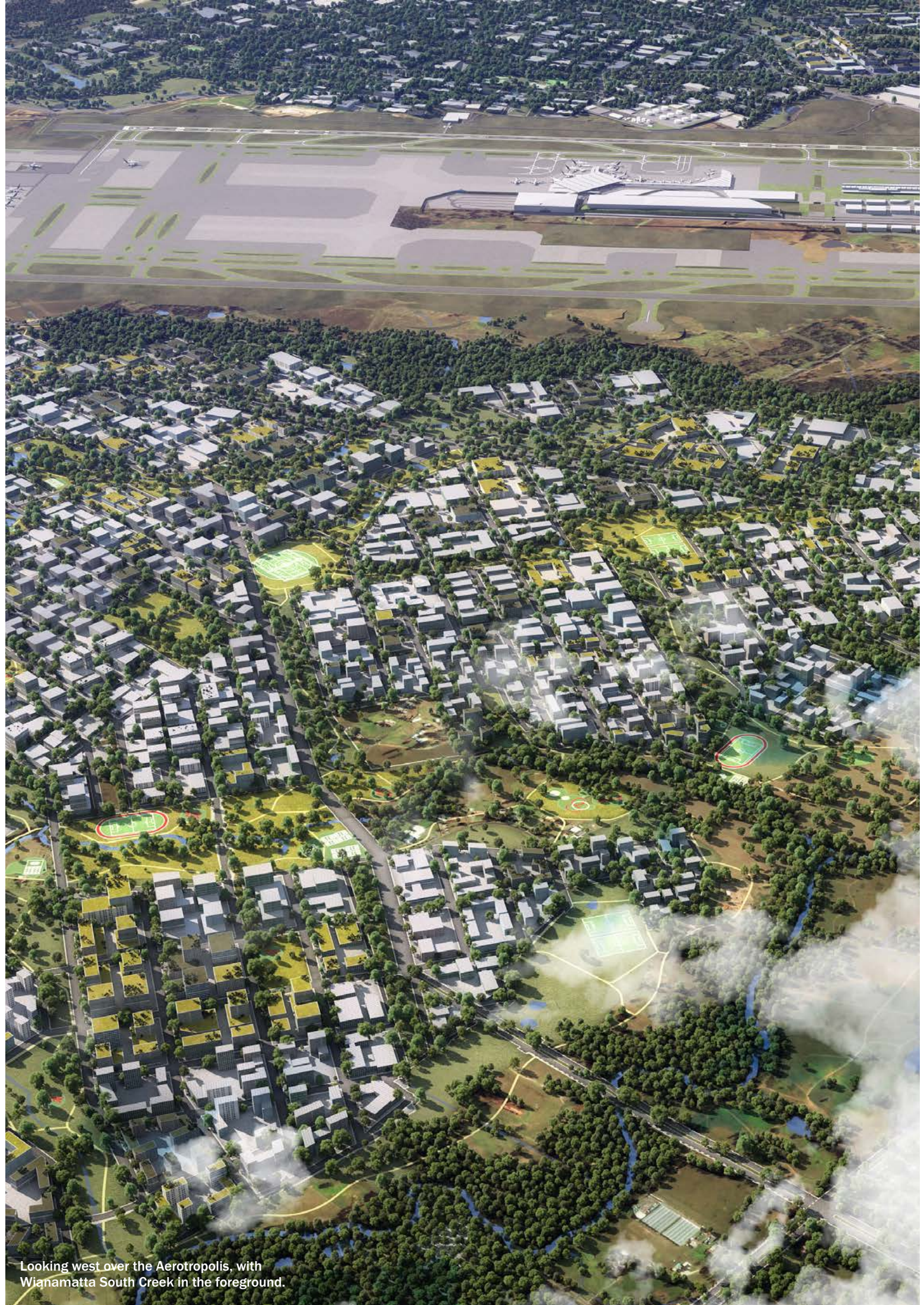
Development Control Plan - Phase 1 & Phase 2

Guideline created under *EP&A Act*

- Guidance and fine grain development considerations
- Development objectives, performance outcomes and benchmark solutions

PART 1: ABOUT THE PROJECT

**The Aerotropolis will change the face of Sydney.
A massive opportunity across time and scale,
the urban design frameworks can shape for the world how
sustainable urban form can be realised.**



Looking west over the Aerotropolis, with Wianamatta South Creek in the foreground.

PROJECT DRIVERS

To provide for sustainable urban form, new ways of designing for and enabling development need to be promoted. By starting with Country, the intent for a landscape-led outcome can be achieved. Sustainable practices across resilience, circular economy, job creation and blue-green infrastructure will provide the foundation for a city over the coming 100 years and beyond.



Green streets are important throughout the Aerotropolis to keep urban microclimates cooler.

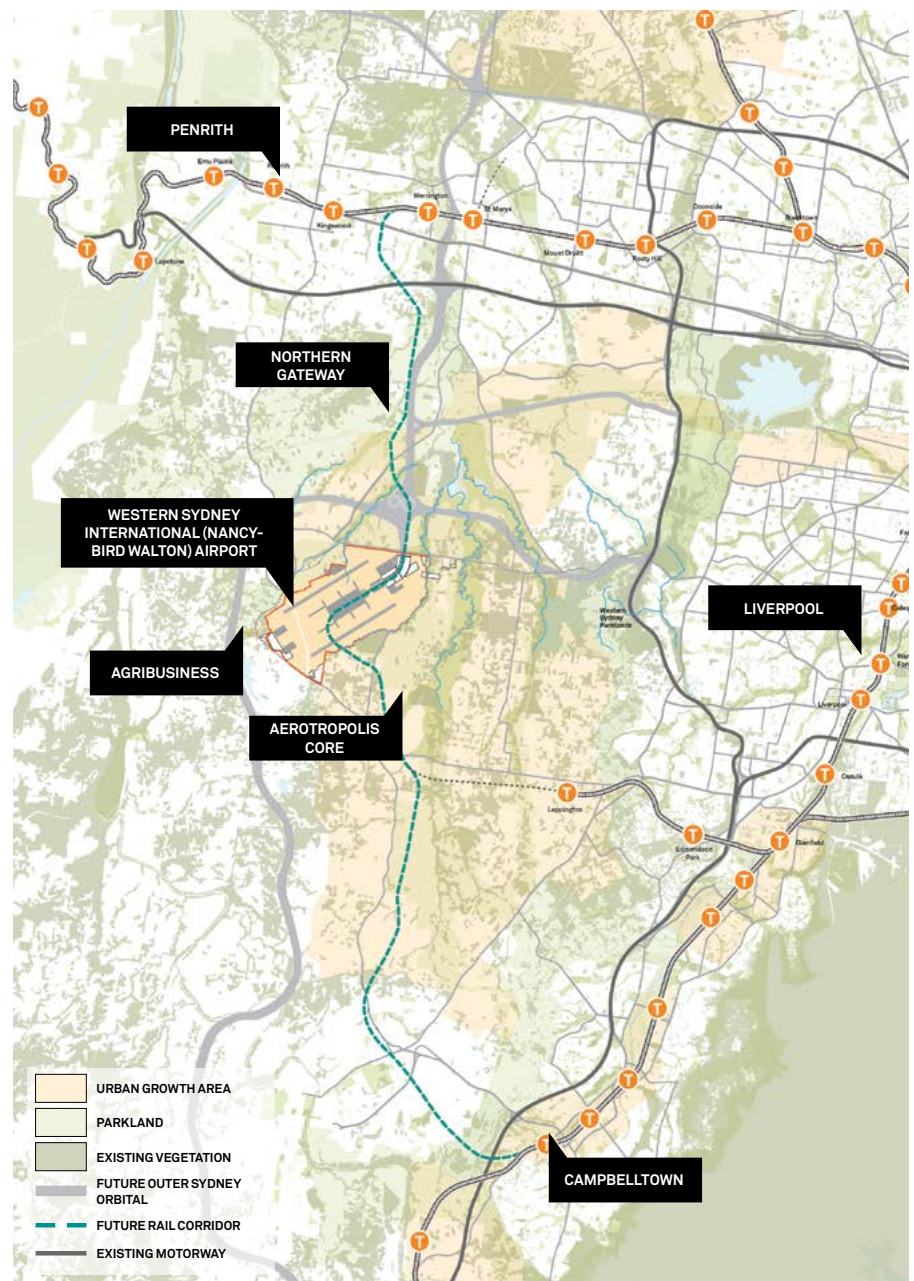
A RICHLY COMPLEX AND LAYERED PLACE

The new airport and surrounding precincts are located in a richly diverse setting of ecological, historic and cultural meaning. This is the home of Darug people - a place of settlement, sustenance and interaction for millennia. It is a place of creeks and streams, rolling hills and landscape at the edge of Sydney. It is a place of established communities, of farmland, of town centres and industry and residential neighbourhoods.

The planning of this future place is a complex process. There will be specific requirements around airport operations. Communities will want to be involved in, and benefit from, how this place changes over time.

Key to this is a demonstrated understanding of and respect for the different layers of this place. Urban design frameworks need to protect and enhance important cultural and ecological spaces, to provide for long-term infrastructure needs, to create a sense of local ownership and meaning.

In this place, blue/green systems will be particularly important, forming the basis for a more sustainable, resilient plan, one that respects and connects with country.



Five Layers of Place

BLUE-GREEN INFRASTRUCTURE FRAMEWORK

- Wianamatta (South), Badgerys and Thompson Creeks running through the precinct cluster are important floodplains for the Cumberland Plain natural water system.
- Conservation and designing with the 1% AEP flood area is vital to the hydrological resilience of this place.
- A precinct cluster with complex and diverse flora.
- Rough-barked Apple, Broad-leaved Apple trees, and a discontinuous understorey of a variety of shrubs and grasses are common on the creek corridor.
- Opportunity for generous regional green spaces and outdoor amenity, promoting the biodiversity of this place.
- Conservation balanced with access to green spaces for all to enjoy.
- Conservation of the Indigenous and native vegetation is vital to the ecological resilience of the area.

COUNTRY

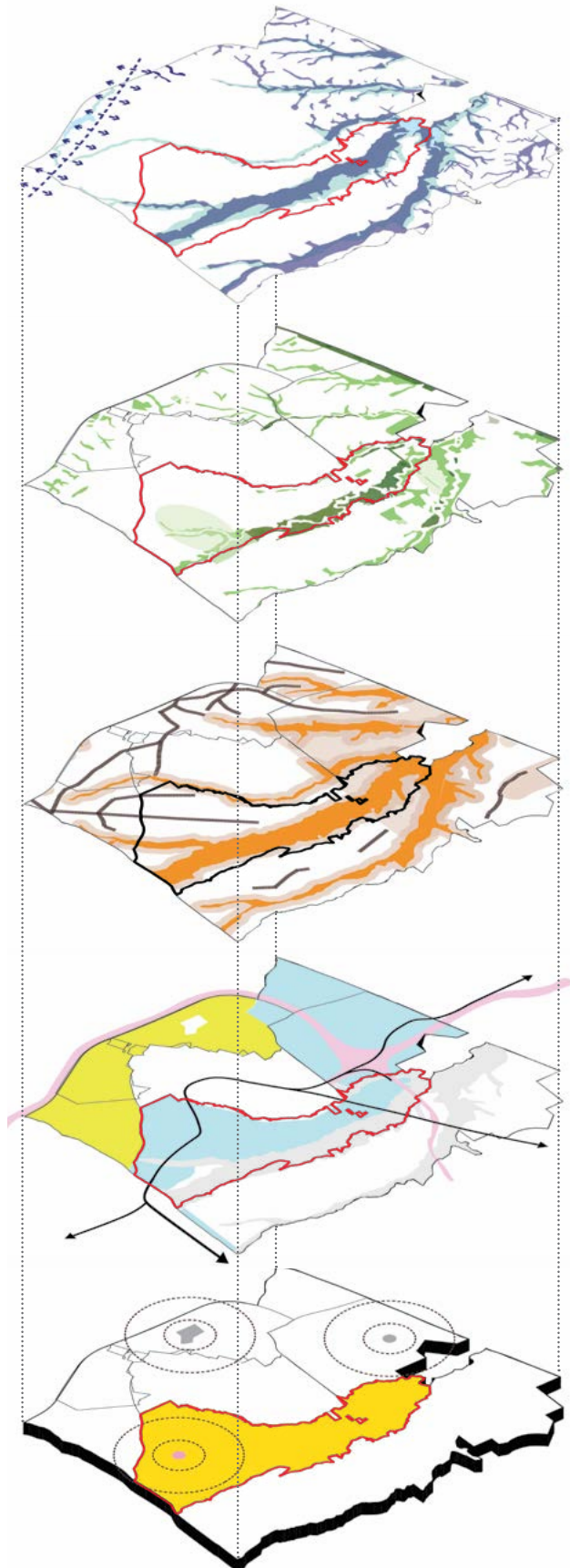
- Understanding and caring for Country through design with Indigenous planning principles - exploring the idea of "Country-led urbanism".
- Understanding the site's flora, fauna, cultural heritage, and hydrological features.
- Management and development of the site to be consistent with the principles of the Burra Charter and heritage best practice.
- Indigenous community consultation should be carried out on an ongoing basis to ensure the appropriate involvement of Indigenous stakeholders in the assessment and decision making regarding their heritage.

CONNECTIVITY

- A diverse, dynamic and sustainable global city precinct.
- Support a high order of employment-focused facilities taking advantage of its connection to the Airport.
- Implementation of emerging and future technologies.
- Sydney Metro Western Sydney Airport Line station and development and transport infrastructure will greatly contribute to the Western Sydney Economic Corridor.

COMMUNITY AND PLACE

- A precinct cluster that is thriving, inclusive with a safe day-to-night economy for workers, residents, and visitors.
- High quality public realm and adaptable infrastructure.
- Site connectivity, and access to green spaces through amenity oriented design.



DRIVER 1: DESIGN WITH COUNTRY

By Dr Daniele Hromek (Budawang | Yuin)

The Sydney Basin is one of the most diverse regions in Australia. It has maintained its distinctive character due to the variety of topographic environments, ecologies, climates and geology. Sydney was a managed landscape prior to non-Indigenous peoples' appropriation of the land.

WHAT'S IN A NAME?

The name Wianamatta tells us this is the place of the mother creek, a place of fertility and related to the cycles of life. The waters need to be understood in relation to females creating in the waters of their bodies. Female voices should be also in the decision making for this place.

The non-Indigenous naming of Emu Plains indicate what was once found in this place.



SACRED WATERS

The waters in Wianamatta are sacred from the Dreaming, they are also all interconnected. The waters must be protected 'to the most insignificant jet.'

The waters shaped the basin, from small creeklets up to larger pools and rivers, to the massive regular floods.

Women have strong enduring relationships with water, from creating watery spaces within their bodies to grow life to having reciprocal care relationships with landscapes of water. Women and their roles in the cycle of life should be honoured in this place.

GENTLE UNDULATING LAYERING

The geology is formed by a series of layers of varied materials that create gentle undulating environments. The shales weather to create clay, while the alluvium weathers to sand.

Sydney is built on layers of history with a deep Aboriginal history as its grounding.

Respect the dynamic movement of water, through the path of least resistance, if there is a block a new path is found.

Songline stories describe the garbuny [fog] time. Waters create fog, at all times of year, though in particular more frequently during the late evening to mid-morning in winter months, when it averages one in five mornings. It is estimated fog could occur 30 times more at Badgerys Creek than Sydney Kingsford Smith Airport. Fog events can last for an extended period of time.

CULTURE IS THE CURE

Both flora and fauna related to this site are now critically vulnerable due to the impacts of colonisation, and are susceptible to invasive species. This implies that a great care and sensitivity must be taken in regard to this place, especially not to perpetuate colonial ways of being, doing and thinking.

Despite experiencing the first impacts of colonisation, Aboriginal peoples in Western Sydney still care for Country and express culture through cultural practices.

Opportunities of cultural maintenance abound as the antidote to colonial practices. Spaces to share culture and knowledge about Country.

HONOUR FIRE LAW

Emus and kangaroos were attracted to these plains because the landscape was designed and managed by Aboriginal peoples.

Colonial records and visuals describe the spaces between groves of trees, clear of scrub or undergrowth. These conditions were achieved due to fire being used to culturally manage the landscape.

Cool burns managed the chance of bushfires, now prevalent in warmer parts of the year. Songs and stories tell the right time for firestick farming.

STORY TELLING

- Water and fire
- Cultural maintenance and sharing
- Recognising longer histories and layered narratives
- Caring for Country and recognising/counteracting the impacts of colonisation.

DRIVER 2: LANDSCAPE LED URBANISM

A connected natural system of blue and green infrastructure is the key structuring element of the urban fabric of Aerotropolis.

A profound understanding of the landscape of this place, its Aboriginal cultural significance, and natural systems beyond the precinct boundary is paramount to successful realisation of the Western Parkland City.

The connected natural system of blue and green infrastructure is the key structuring element of the urban fabric of the Aerotropolis. The main creeks - Wianamatta - South, Badgerys, Kemps, Cosgroves and Duncans become the spine of the Aerotropolis Parkland City. Smaller creek tributaries then define the public domain and open space framework.

This framework creates a foundation for a well connected, walkable and liveable city. It retains and re-establishes healthy, interconnected Blue-Green and Soil systems. This ensures the ongoing resilience, balance and health of the whole system that preserves landscape's capacity to retain water, provides biodiversity corridors for wildlife and reconnects remnant endemic fauna and flora communities.

'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 Arthur Phillip reporting on the countryside west of Parramatta, April 1788
Source: Taken for Granted p18



Hills and ridgelines



A Place to Connect

The Physical elements of hills, ridgelines, alluvial creeks, dams, open parkland and forested areas give rise to the intangible and the visible: a connection with Country, a Cumberland Plain character, and landscape elements that foretell of this being a place like no other. This is undeniably Western Sydney - the parkland city.

Tangible and intangible elements of landscape have been identified through substantial past work, including Tyrrell Studio's Western Parkland City Landscape Led Urban Design Guidelines (2020).

By employing landscape led urbanism principles and embedding key landscape elements as an organising structure, the core character of this place can be preserved, protected and enhanced.



Creeks and dams



Open parklands



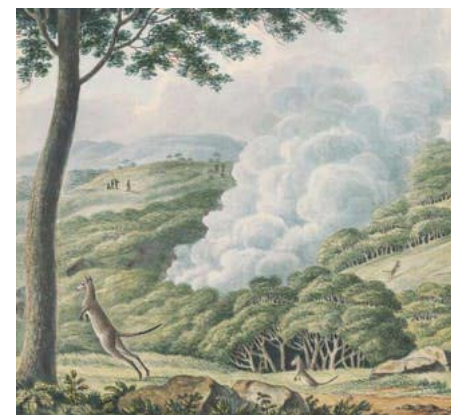
Forested areas



A Watery Place



A Managed Landscape



A Resilient Landscape

DRIVER 3: DELIVERING GREAT PLACES

LIVEABILITY MATTERS

Liveability is a critical planning objective and is fundamental to shaping the Aerotropolis. Liveability will underpin the Aerotropolis' emergence as a strong and resilient place in the emerging global economy where the quality, creativity and value of its citizenry underpins its economic advantage.

Liveability and high quality city environment help to attract and retain talent - and the business types identified by the Western Sydney Aerotropolis Plan. The concept of creative and social capital, introduced in Richard Florida's Creative Class (Florida, 2002), is proving to be more relevant than ever, where creative professionals gravitate toward cities that provide talent, tolerance and technology. These concepts are reinforced in Charles Landry's Creative City, which illustrates that people first choose a city that suits their lifestyle, before choosing a job.



20 YEARS AGO

80%

PEOPLE LOCATED BASED ON
JOB OPPORTUNITIES

TODAY

64%

PEOPLE CHOOSE A
CITY FIRST THEN A JOB

(Landry, 1995)

THE 7 DIMENSIONS OF AMENITY



NATURAL

VIEWS
TOPOGRAPHY
LANDSCAPE
WATER

Shaping future development to celebrate distinctive natural features as key ingredients underpinning the Aerotropolis' future growth.



GREEN

GREAT
STREETS

Phasing the Master Plan to unlock an integrated mesh of green streets, lush parkland and urban spaces can boost the quality and diversity of the city.



URBAN BUZZ

AUTHENTICITY
URBAN 'GRIT'

Providing a framework for the city's future population and character through concentrating active uses around a high-quality retail food and centre amenity.



ACCESS

TRANSPORT
EASE OF MOVEMENT

Improving the convenience and accessibility of the city by providing logical adjacencies, ease of movement and building in provision for high-frequency public transport.



AGGLOMERATION

ECONOMIC VITALITY
JOBS
COMPETITIVENESS
'EXCHANGE'

Strengthening the city as a strategically important place, supporting innovation, the exchange of ideas and economic activity to attract and retain high-value workers, residents and students.



COMMUNITY

SCHOOLS
FACILITIES

Delivering community-oriented functions to pair infrastructure with centre, broadening the offer of the precinct and supporting the activities of its population.



CLIMATE LIVING

BETTER HOUSING
RESPONSIVE TO
DEMOGRAPHICS

Boost the quality, sustainability and climate responsiveness of future buildings, places and spaces, unlocking greater levels of user comfort and establishing a tropical identity.

THE IMPORTANCE OF PLACE

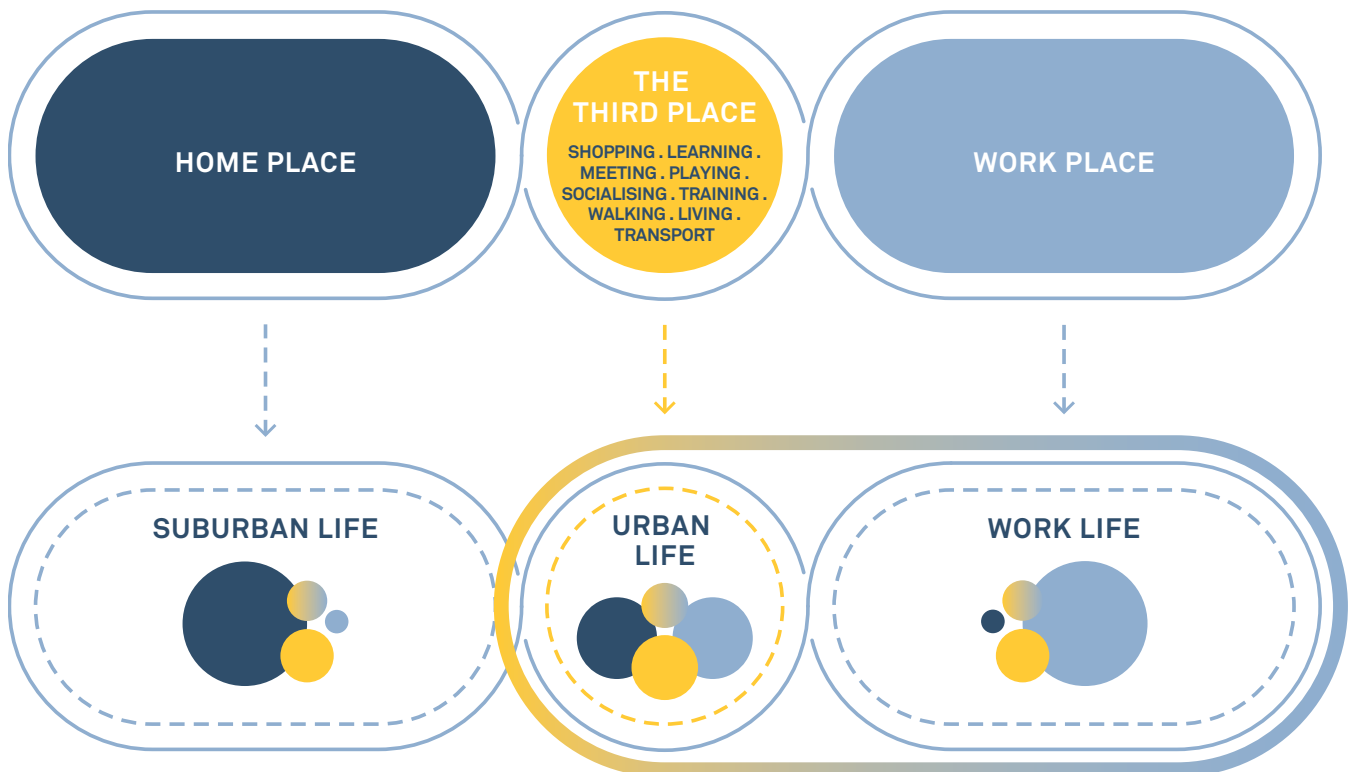
The role of 'place' is recognised as a key factor in the attraction and retention of knowledge businesses and workers. The growing emphasis on clustering, combined with spatial and cultural integration, is a critical factor. People respond well to places that are distinctive, memorable, and meaningful to create a sense of community.

Places conducive to a creative environment not only deliver good outcomes for the broader community, but also provide a high-quality domestic and public life for workers and their families.

Well designed places improve collaboration and interaction between workers, and provide urban environments that recognise and cater for their particular needs and circumstances. Creating successful knowledge-supportive places relies upon these vibrant and engaging precincts.

THE THIRD PLACE

Human life is played out in three primary realms or places: the home, work place and the 'third place' – the life between home and work. The development of genuine quality of life is linked to the quality of the third place where most of a person's day-to-day social interaction, community and civic life, recreation and relaxation takes place. It is essential the third place caters for the particular needs of knowledge workers in their work and everyday lives.



SUBURBAN LIFE

- Residential uses dominant
- Work opportunities focused in business and industry districts
- Long commute to work
- Regular shopping at local/district centre
- Limited dining and café offer
- Specialty shopping at regional shopping centre/mall or CBD
- Social/family networks orientated around home/district
- Local primary and secondary education with limited potential for tertiary education, which is typically available in the city

URBAN LIFE

- Mixture of uses can range from residential focus to work oriented focus
- Work opportunities integrated with other uses
- Regular shopping on main street
- Dining and cafés and some entertainment
- Specialty shopping at regional shopping centre/mall or CBD
- Social/family networks varied
- Local primary and secondary education with potential for integrated tertiary education

WORK LIFE

- Commercial uses dominant
- Limited if any residential uses
- Limited range of support activities unless within CBD
- Wide range of uses within major city CBDs including:
 - Civic uses
 - Education
 - Short term accommodation
 - Retail
 - Dining and cafés
 - Entertainment

DRIVER 4: AIRPORT, METRO AND JOBS

Western Sydney is set to transform over the coming decades, propelled by once in a generation government investment in infrastructure. The new Western Sydney International (Nancy-Bird Walton) Airport will anchor the Western Parkland City, supported by new rail infrastructure - the first stage being a north south rail link from St Mary's to the Aerotropolis. The Outer Sydney Orbital and M12 motorways will provide regional road access.

The Western Sydney Aerotropolis will be at the centre of a new urban area for Sydney - The Western Parkland City is projected to grow from 740,000 today to well over 1.5 million by 2056. The Aerotropolis will make a significant contribution to 200,000 jobs across Western Sydney - creating an innovation precinct and a home for technology, science and creative industries.

The Western Sydney City Deal, between Federal, State and local governments, catalyses a collaborative approach to create world class jobs and a high quality of life. The deal aligns government investment and policy actions to propel delivery of new infrastructure. Critical to the City Deal is skilling residents in the region, allowing maximum benefit from the limitless opportunity of the Western Parkland City.

The Western Sydney International (Nancy-Bird Walton) Airport is the catalyst for much of Western Sydney's future urbanisation. It and the associated Aerotropolis will accommodate a significant number of jobs and economic activity.

The Airport and associated infrastructure is due for completion and operating by December 2026. Airport rail and associated rail infrastructure is intended to be operational upon the Airport being commissioned.

SYDNEY METRO WESTERN SYDNEY AIRPORT LINE

New metro rail will become the transport spine for Greater Western Sydney, connecting communities and travellers with the new Western Sydney International (Nancy-Bird Walton) Airport and the growing region.

The city-shaping project, from St Marys through to the new airport and the Western Sydney Aerotropolis, will provide a major economic stimulus for western Sydney, creating more than 14,000 jobs during construction for the NSW and national economies.

The new metro will link residential areas with job hubs including the new Aerotropolis, and connect travellers from the new airport to the rest of Sydney's public transport system.



An artist's impression of the Luddenham Station, being delivered as part of the Sydney Metro – Western Sydney Airport project. This is Luddenham Station as viewed from the station plaza looking north. Source: Sydney Metro.

RAPID TRANSIT CORRIDORS

As a commitment of the Western Sydney City Deal, the NSW Government will establish rapid bus services from the metropolitan centres of Penrith, Liverpool and Campbelltown to Western Sydney International (Nancy-Bird Walton) Airport before it opens in 2026, and to the Aerotropolis.

The corridors will be a key gateway for visitors to Australia showcasing the unique natural environment of the Parkland City. The corridors will be inviting and vegetated with transport infrastructure forming part of the landscape. These parkways will reinforce the city's commitment to effective public transport and active transport, such as cycling and walking.

The Aerotropolis Urban design framework will provide for medium/high-density development along the corridors. Design decisions will prioritise affordability and achievability while ensuring high quality place-making and connection to existing natural assets.

(Source: Western Sydney City Deal and Liverpool City Council)



An artist's impression of the Airport Terminal Station, being delivered as part of the Sydney Metro – Western Sydney Airport project. This is the Airport Terminal Station as viewed from northern side of the station. Source: Sydney Metro.

DRIVER 5: CIRCULAR ECONOMY

With Dr Heinz Schandl, CSIRO and Alluvium | Mosaic Insights | UTS

The Aerotropolis provides an unparalleled opportunity to showcase ‘regenerative’ development principles that cities of the future will need to embody. Regenerative development is the new frontier for city and precinct design. While the conventional approach to sustainable development is focused on minimising adverse outcomes, regenerative development targets ‘net positive’ outcomes and supports cyclical resource flows.

Regenerative goals may seem ambitious and challenging in today’s context, but they are a necessary path towards resilient, thriving cities and suburbs. As a significant new land release, the Aerotropolis provides an effective opportunity to lock in the principles and foundations of regenerative development. While some outcomes may not be achievable upfront, the transition can be modelled and planned for.

A circular economy city is one that keeps resources in use for as long as possible, extracts the maximum value from them whilst in use, then recovers and regenerates products and materials at the end their life. It is a more efficient and environmentally sound alternative to the traditional linear economy in which we make, use and dispose of resources.

Source: (Climate-KIC, 2018)

CIRCULAR ECONOMY CITIES

- Things are made smarter, cheaper and more resource efficient
- Recovery of the resources and synergies between companies
- Incubators for circular economy start-ups, markets and innovation
- Carbon neutral
- Transition from waste landfills to waste mining.
- City that is fairer, more inclusive and more sustainable.
- Sharing economy
- Enabled through procurement



**THE AEROTROPOLIS
COULD BE A CARBON
POSITIVE PRECINCT
BY 2050**



Global Change Institute, University of Queensland

WASTE MANAGEMENT



Waste management plays a central role in transition to the circular economy operation that Western Sydney Aerotropolis aspires to achieve.

It requires a transition from a linear approach of **TAKE – MAKE – THROW**, the disposal of waste to a recognition of waste as resource with circularity, where discarded materials are resources in another process in a **TAKE-MAKE – RECOVER – REMAKE** model.

It requires the establishment of resource separation, collection and processing for the residential, commercial and institutional sectors. While historically energy and water have been attentively considered in sustainability planning, waste is often not, despite its significant contributions to greenhouse gasses emission and the innovation opportunities for urban resource mining and job creation.

CASE STUDY: GLOBAL CHANGE INSTITUTE, UNIVERSITY OF QUEENSLAND

“The Global Change Institute was founded on the promise of dealing with change ... GCI stimulates thinking and generates new ideas to answer community puzzles and global problems.”

Penelope Wensley AC, Former Queensland Governor

Designed to encourage new thinking about how we can live and work in a low-carbon world, the GCI Living Building is a flagship sustainability project of The University of Queensland.

As a pilot for sustainable designs of the future, the GCI building is a living example of what measures can be taken to minimise the amount of energy buildings consume and still enjoy a vibrant, healthy, working environment.

Throughout the year, the building generates more energy than it consumes through abundant use of natural light, low-energy lighting, and capturing its own energy via solar panels on the roof.

DRIVER 6: RESILIENCE

With Dr Frank Thomalla, Climate and Disaster Risk Research and Consulting

Urbanisation and the complex characteristics of cities can present opportunities for inclusive, equitable, resilient and ecologically sustainable development. At the same time, they have the potential to increase or to create new vulnerabilities and risks, if these are not adequately considered in the planning process. Building a resilient city means creating a city that is well prepared for and ready to respond to a range of potential shocks and surprises.

WHAT IS A RESILIENT CITY?

The United Nations Office for Disaster Risk Reduction (UNISDR, 2017) defines a resilient city as one, where:

- There is strong leadership and coordination and responsibilities in disaster risk management are clearly delineated. This includes effective stakeholder engagement, well defined policies and strategies and distribution of tasks, effective lines of communication and mechanisms that facilitate effective risk management.
- The city is up-to-date on knowledge about hazards. Risk assessments are routinely prepared as a basis for urban planning and long-term development, including current and future investment decisions that contribute to improved resilience.

- There is an adequate financial plan that complements and promotes mechanisms to support resilience activities.
- Urban planning is carried out based on up-to-date risk information with a focus on the most vulnerable groups. Realistic and risk compliant building regulations are applied and enforced to effectively reduce physical risk.
- Natural ecosystems within and around the city's territory are identified, protected and monitored to sustain and safeguard their protective functions as natural buffers.
- All institutions relevant to a city's resilience are strengthened to have the capabilities they need to execute their roles.
- The social connectedness and culture of mutual help are strengthened through community, education, and multi-media channels of communication.

- There is a strategy to protect, update and maintain critical infrastructure to ensure that services continue and to increase resilience against hazards and the impacts of climate change.
- Effective disaster response is ensured by creating and regularly updating preparedness plans, connecting to early warning systems and increasing emergency and management capacities through public preparedness drills.
- Post-disaster recovery, rehabilitation, and reconstruction strategies are aligned with long term planning and provide an improved city environment after disaster events.

Source: UNISDR. 2017, p. 14. How To Make Cities More Resilient - A Handbook For Local Government Leaders.

ESSENTIALS FOR MAKING CITIES RESILIENT

1. Identify, Understand and use Current and Future Risk Scenarios

- Identify hazards, exposures and vulnerabilities
- How might hazards change over time?
- How might multiple hazards combine in their impact over time?
- Which geographic areas are exposed and what is the impact?
- Which communities and housing are exposed?
- Which economic assets and activities are exposed?
- Which critical infrastructure assets are exposed, what are the consequent risk of cascading failures from one asset system to another?
- What are the timescales over which impacts occur and what responses are required?

2. Pursue Resilient Urban Development

- Land zoning and management of urban growth to avoid exacerbating resilience issues – identification of suitable land for future development taking into consideration of how low-income groups can access suitable land

- Risk-aware planning, design and implementation of new buildings, neighbourhoods and infrastructure, using innovative or existing/traditional techniques as applicable
- Development and implementation of appropriate building codes
- Maximizing use of urban design solutions such as permeable surfaces, green areas, shadowing, water retention areas, ventilation corridors etc) that can cope with risks and also reduce the dependency on technical infrastructure
- Engaging affected stakeholders in appropriate and proportional participatory decision-making
- Incorporating exemplary sustainable design principles into new development. Link to other existing standards where appropriate (BREEAM, LEED, Greenstar, etc)

3. Safeguard Natural Buffers to Enhance the Protective Functions Offered by Natural Ecosystems

- Identify, protect and monitor critical ecosystem services that confer a disaster resilient benefit.
- Anticipate changes from climate trends and urbanization, and plan to enable ecosystem services to withstand these, enhanced as required by green and blue infrastructure.

4. Strengthen Societal Capacity for Resilience

- Cultivate an environment for social connectedness which promotes a culture of mutual help through recognition of the role of cultural heritage and education in disaster risk reduction.
- Social connectedness and a culture of mutual help have a major impact on the actual outcomes of disasters of any given magnitude.

5. Increase Infrastructure Resilience

- Address how critical infrastructure systems will cope with disasters and develop contingencies to manage risks caused by these outcomes.

DRIVER 7: URBAN COMFORT AND GREEN STREETS

Designing streets that respond to their environment will have numerous benefits that improve the liveability, urban cooling and sustainability outcomes of cities, while also emphasising Western Sydney's character.



NOISE & AIR POLLUTION

Cars and trucks account for approximately 40% of carbon emissions globally, while public transportation produces 95% less monoxide than cars (Robert J. Shapiro, Kevin A. Hassett, and Frank S. Arnold, *Conserving Energy and Preserving the Environment: The Role of Public Transportation*, 2002). A balanced street network that accommodates rapid transit and recognises cyclists and pedestrians can help reduce private vehicle use, reducing emissions and improving air quality. Street trees, planting and vegetation have also been shown to reduce urban noise by up to 3-5 decibels

(David Nowalk et al., *Understanding the Benefits and Costs of Urban Forest Ecosystems: Handbook of Urban and Community Forestry in the Northeast New York*, 2007).



WATER SENSITIVE URBAN DESIGN

Water Sensitive Urban Design can ensure streets play an active role in sustainability and water quality. Tree planting is estimated to be 3-6 times more effective in managing stormwater and reduce hard infrastructure cost. Incorporating green street infrastructure can improve the efficiency of stormwater management and reduce the need for irrigation.

(Foster, *The Value of Green Infrastructure for Urban Climate Adaptation*)



ENERGY EFFICIENCY

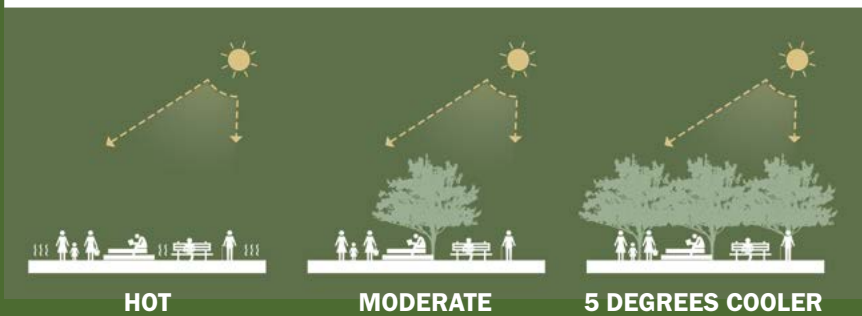
Utilising sustainable, low impact materials and encouraging renewable energy technologies can reduce energy costs. Replacing street lights with LED bulbs can create significant energy savings over time. New York City replaced all of its street lights with LEDs across a period of 10 years, reporting annual energy savings of about 81%

(Global Street Design Guide from Global Designing Cities Initiative, 2016).



Benefits of Street Trees

With the transformative potential to define how the Aerotropolis appears and is perceived, as well as unlocking economic, environmental, social and health benefits - introducing street trees is perhaps the most important and impactful investment in streetscape design.



Street Comfort & Climate

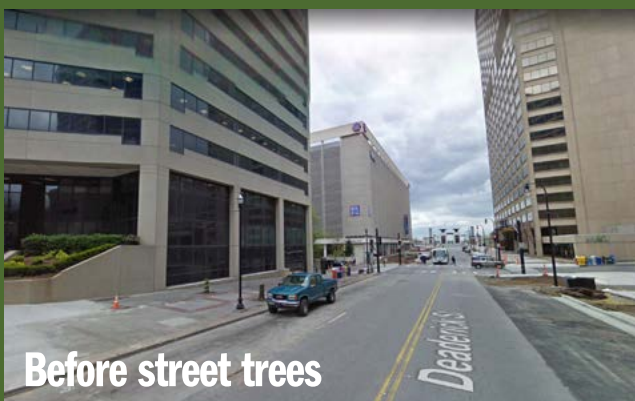
Street trees are an important ingredient in a quality public realm, and in a seasonal climate with hot summers, they are critical to achieving appropriate levels of shade and shelter. In Western Sydney, shade is a critical factor in pedestrian comfort and a key influence on journey choice. Research indicates

that dense tree cover can reduce temperatures by up to 5° Celsius making shade trees an essential outcome for major active transport connections (Trees are Crucial to the Future of our Cities from University of Wisconsin-Madison, 2019). This approach is desirable for addressing the Urban Heat Island effect.

Health and wellbeing benefits

A multitude of studies have shown that natural environments can enhance public health and general wellbeing. These studies indicate that people who live in neighbourhoods with a higher density of trees on their streets report significantly less cardio-metabolic conditions (Kardan, O., Gozdyra, P., Misic, B. et al. Neighbourhood Greenspace and Health in a Large Urban Centre, 2015).

Case Study: Deaderick Street, Nashville



Before street trees



After street trees

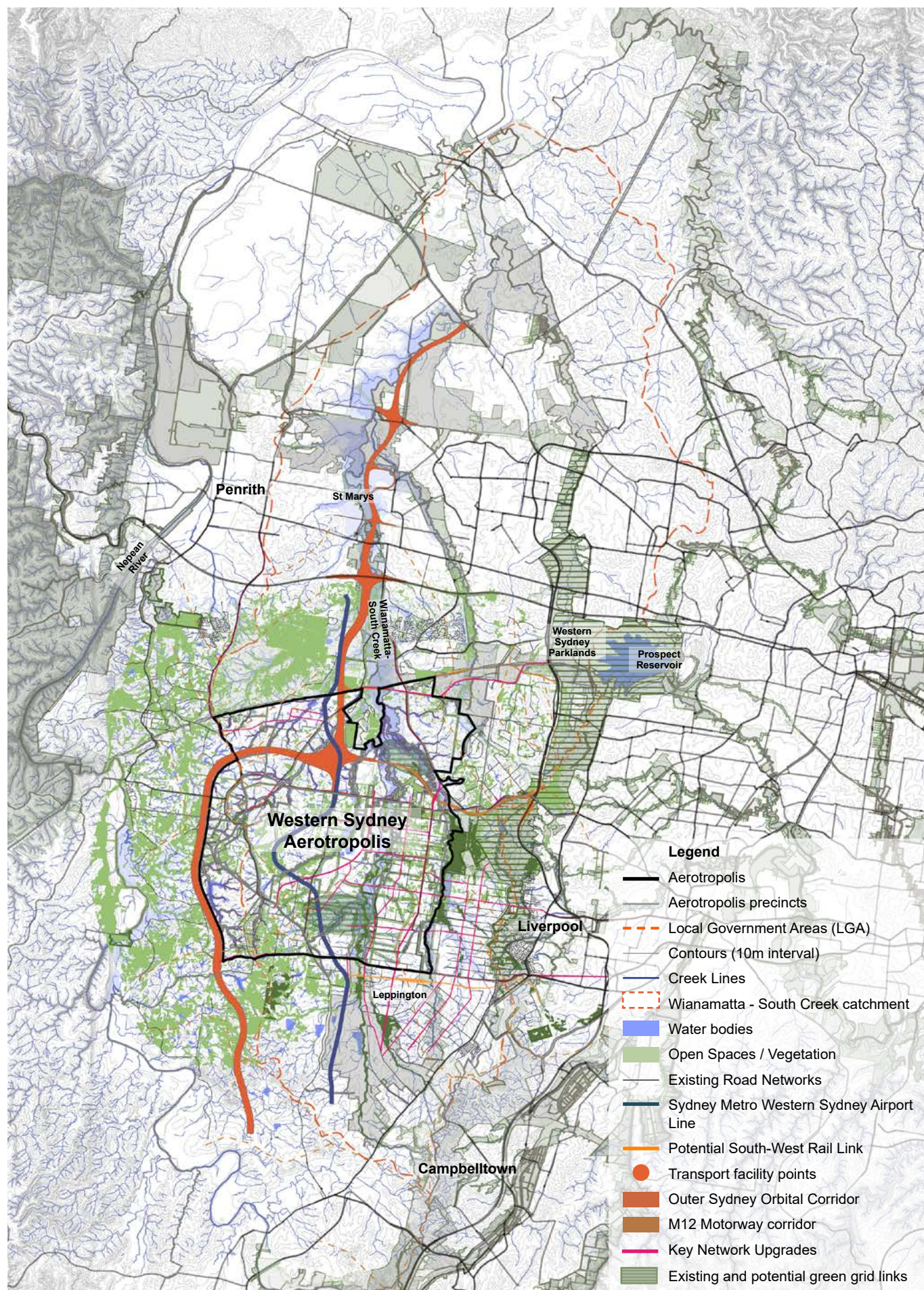
Street trees can redefine how a city appears and is perceived. Deaderick Street in Nashville was a central transfer point for the metro bus system, filled with empty bus shelters, had no trees, and had a storm water and sewage overflow problem. The introduction of 102

trees and 4,249 shrubs reduced average daily traffic volume, and created a more pedestrian-friendly environment. Additionally, there was an increase in tourists and patronage of concert venues on the street. Rain gardens and bio-swales were designed to allow infiltration

and planted with native plants, adaptable to the local context. It is estimated that over 4.5 million litres were removed from the system on an annual basis (Burns, J., Deaderick Hailed as State's First 'Green Street', Nashville Business Journal, 2009).

REGIONAL CONTEXT

The context informing the Aerotropolis is across many scales. The airport is a nation-building project, it being a critical piece of infrastructure driving Sydney's 24 hour economy. It is significant at the state and metropolitan scales as a centre for activity. And it will be a main arrival point to the Western Parkland City for visitors from around the globe.



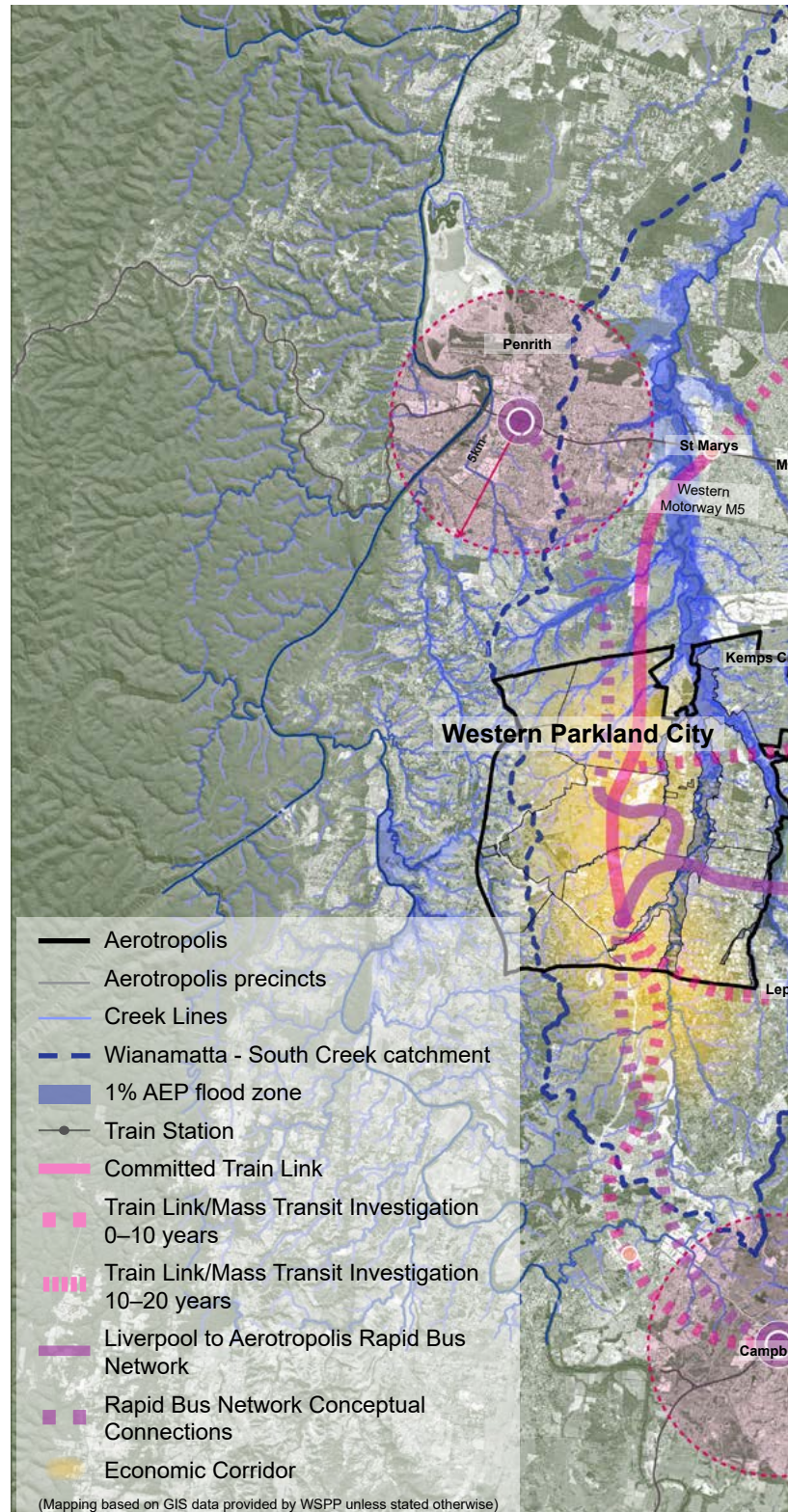
THE WESTERN PARKLAND CITY

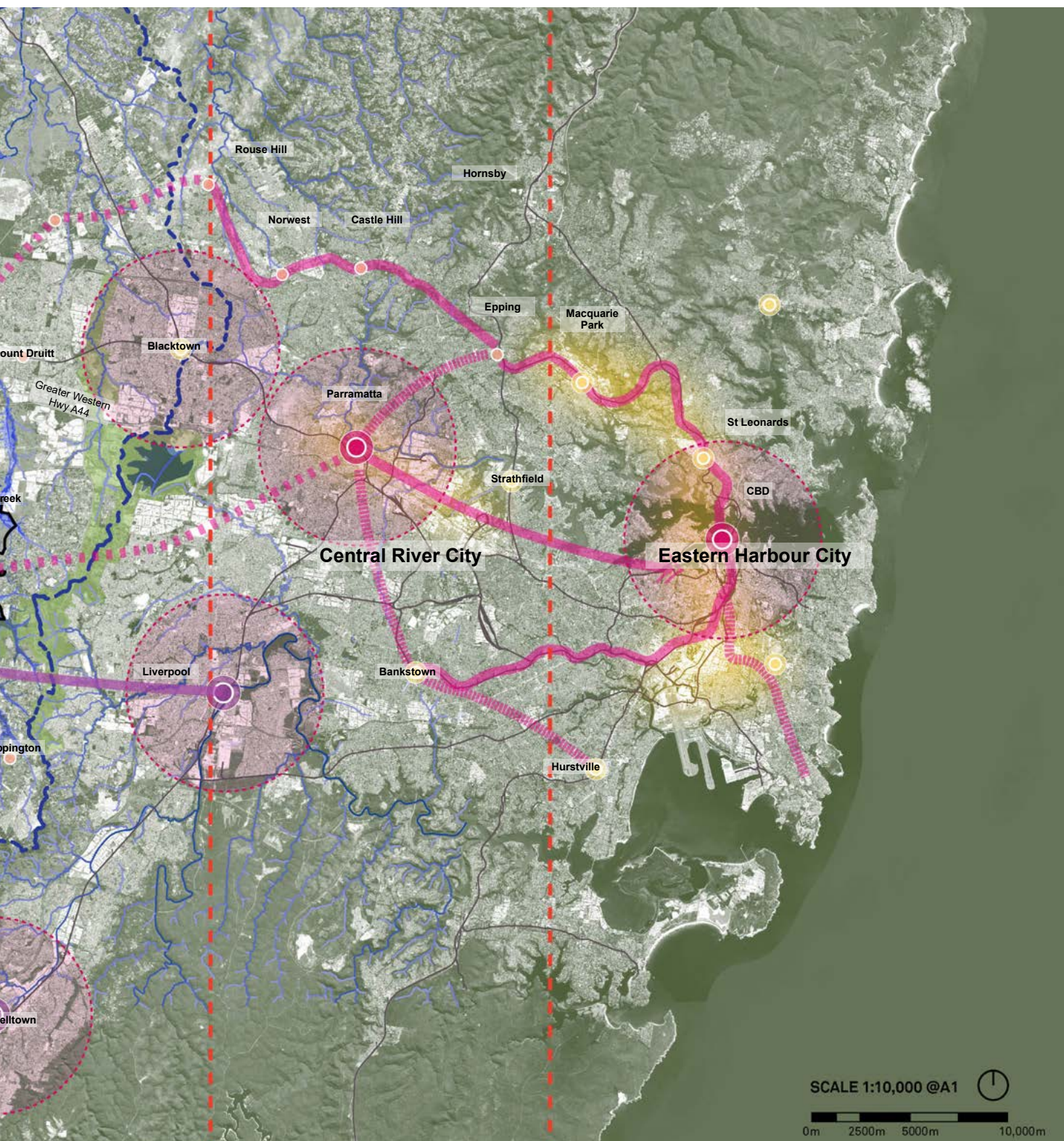
IMPLEMENTING THE REGION PLAN

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. Founded on the principle of the 30 minute city, each metropolis has a central employment and amenity focus. For the Western Parkland City, this is the metropolitan cluster of centres comprising the Aerotropolis, Penrith, Liverpool and Campbelltown; and the amenity focus of its myriad waterways, all linked to the Wianamatta South Creek - the Mother Place.

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. For the Eastern Harbour City it is Sydney Harbour; for the Central River City it is the Parramatta River. 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.





STATE POLICY



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

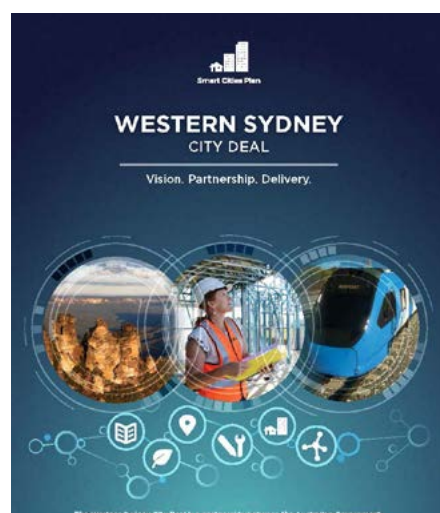
PREMIER'S PRIORITIES

In June 2019, NSW Premier Gladys Berejiklian unveiled 14 Premier's Priorities which represent the NSW Government's commitment to making a significant difference to enhance the quality of life of the people of NSW.

- Bumping up education result for children
- Increasing the number of Aboriginal young people reaching their learning potential
- Protecting our most vulnerable children
- Increasing permanency for children in out-of-home care
- Reducing domestic violence re-offending
- Reducing recidivism in the prison population
- Reducing homelessness
- Improving service levels in hospitals
- Improving outpatient and community care
- Towards zero suicides
- Greener public spaces
- Greening our city
- Government made easy
- World class public service

The relevant priorities to the Aerotropolis include:

- Greener public spaces: Increase the proportion of homes in urban areas within 10 minutes' walk of quality green, open and public space by 10 per cent by 2023
- Greening our city: Increase the tree canopy and green cover across Greater Sydney by planting one million trees by 2022.



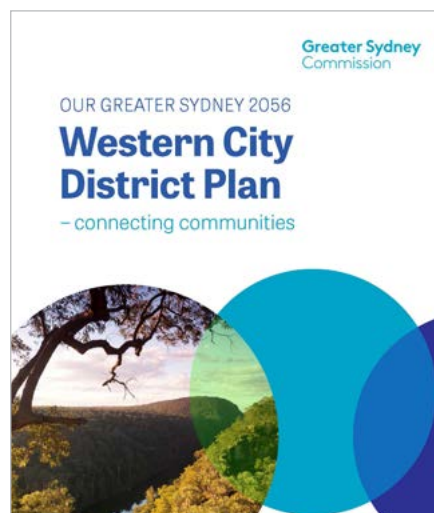
WESTERN SYDNEY CITY DEAL

The Western Sydney City Deal is the catalyst for a collaborative approach across three tiers of government to create world-class jobs and a great quality of life through the vision of the Western Parkland City.

The City Deal is a partnership with the core goals of:

- Realising the 30-minute city by delivering the Sydney Metro Greater West (formerly the North South Rail Link).
- Creating 200,000 jobs by supercharging the Aerotropolis and agribusiness precinct as catalysts.
- Skilling residents in the region and initiating an Aerospace Institute.
- Respecting and building on local character through a \$170 million Liveability Program.
- Coordination and innovation through a Planning Partnership.
- Getting on with delivering for the Western Parkland City with enduring tri-level governance.

<https://www.infrastructure.gov.au/cities/city-deals/western-sydney/>



WESTERN CITY DISTRICT PLAN

The Western Parkland City vision draws on the strength of the new Western Sydney International (Nancy-Bird Walton) Airport, Aerotropolis and the Sydney Metro Western Sydney Airport Line to plan for a Western Economic Corridor. The vision is to establish a metropolitan cluster capitalising on established centres of Liverpool, Greater Penrith and Campbelltown-Macarthur.

The WCDP identifies planning priorities (these reflect the GSRP planning objectives) within framework of infrastructure & collaboration, liveability, productivity and sustainability.

- Creating a once-in-a-generation economic boom with the Western Sydney Aerotropolis bringing together infrastructure, businesses and knowledge-intensive jobs
- Delivering the first stage of the North South Rail Link
- Collaborating and building strong relationships between Liverpool, Greater Penrith and Campbelltown-Macarthur reinforced by the emerging Badgerys Creek Aerotropolis forming a unique metropolitan cluster

- Providing major transport links for people and freight by unprecedented transport investments
- Developing a range of housing, providing access to public transport and infrastructure including schools, hospitals and community facilities
- Linking walking and cycling paths, bushland and a green
- Greater Blue Mountains World Heritage Area, the Scenic Hills and Western Sydney Parklands
- Enhancing and protecting South Creek, Georges River and Hawkesbury-Nepean river systems
- Mitigating the heat island effect and providing cooler places by extending urban tree canopy and retaining water in the landscape
- The target for the Greater Sydney Region is to achieve 40% urban tree canopy cover by 2056. The current state of tree canopy in Greater Sydney is 21%
- Protecting the District's natural landscapes, heritage and tourism assets, unique rural areas and villages
- Protecting the environmental, social and economic values of the Metropolitan Rural Area.



WESTERN SYDNEY AEROTROPOLIS PLAN

The planning for and around the Western Sydney Aerotropolis is complex, involving a number of different federal, state and local level statutory plans and strategic policies.

However, since the release of A Metropolis of Three Cities (Department of Planning, Industry and Environment, March 2018), the state level policies that will guide the development of the Aerotropolis provide consistent messages, themes and principles.

The key documents for planning these three Precincts are:

- Western Sydney Aerotropolis Plan
- State Environmental Planning Policy (Western Sydney Aerotropolis) 2020
- Western Sydney Aerotropolis Development Control Plan 2019 Phase 1.

The Western Sydney Aerotropolis Plan provides the vision and high-level planning framework for the Aerotropolis including objectives, strategic outcomes and implementation strategies for all precincts

Planning Framework



Source: Western Sydney Aerotropolis – Summary of Key Planning Documents (p. 7, December 2019)

A single, overarching objective underpins this Plan and will be integrated into all planning.

The vision for the Western Sydney Aerotropolis is a landscape-led approach to urban design and planning. Ways to achieve this vision are:

- Start with Country
- Retain water in the landscape
- Preserve, extend and restore the green
- Located transit corridors within walking distance to landscape amenity
- Orientate urban development towards landscape amenity, connected to transit corridors
- Adopt urban typologies.

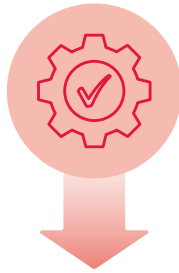
The key themes that need to be addressed:

- Productivity – accessible and well connected Aerotropolis, enhance existing employment, enable job growth and safeguard airport operations
- Sustainability – landscape-led approach to urban design and planning, environmental sustainability (low carbon) and resilient and adaptable
- Infrastructure and collaboration – infrastructure that connects and services Western Parkland City and collaborative approach to planning and delivery
- Liveability – diverse, affordable and well located housing (30-minute city) and provision of social and cultural infrastructure (including affordable rental housing)

Recognise Country

Acknowledge Traditional Custodians and provide opportunities to Connect with Country, Design for Country and Care for Country when planning for the Aerotropolis.

Productivity



Objective 1

An accessible and well-connected Aerotropolis

Objective 2

High-value jobs growth is enabled, and existing employment enhanced

Objective 3

Safeguard airport operations

Sustainability



Objective 4

A landscape-led approach to urban design and planning

Objective 5

A sustainable, low carbon Aerotropolis that embeds the circular economy

Objective 6

A resilient and adaptable Aerotropolis

Infrastructure and collaboration



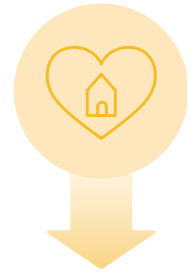
Objective 7

Infrastructure that connects and services the Western Parkland City as it grows

Objective 8

A collaborative approach to planning and delivery

Liveability



Objective 9

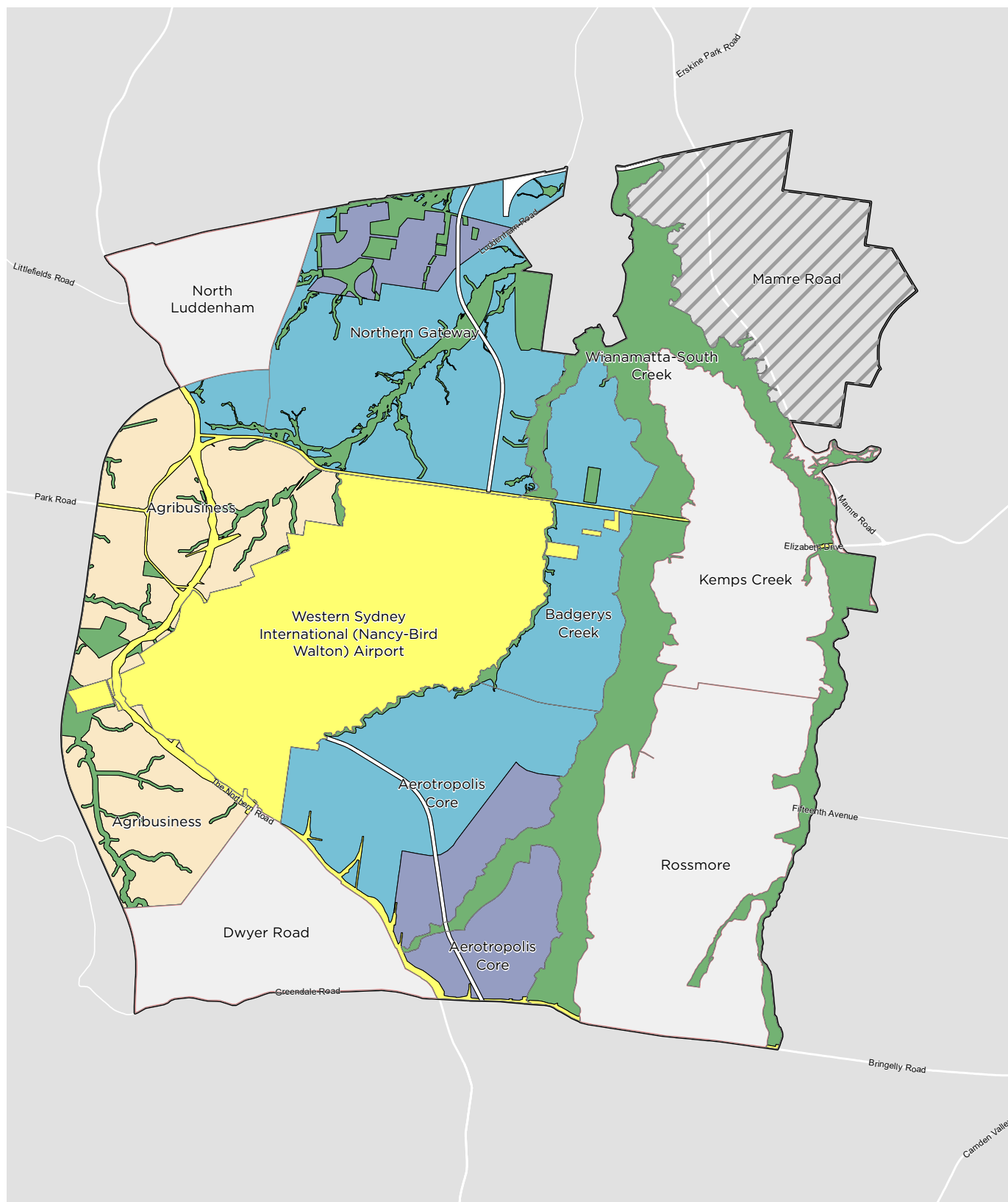
Diverse, affordable, healthy, resilient and well-located housing

Objective 10

Social and cultural infrastructure that strengthens communities

Objective 11

Great places that celebrate local character and bring people together



Land Zone

Western Sydney Aerotropolis

Western Sydney Aerotropolis

Precinct Boundary

Land Zone (Aerotropolis SEPP)

AGB Agribusiness

ENT Enterprise

ENZ Environment and Recreation

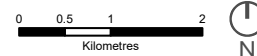
MU Mixed Use

SP2 Infrastructure

Major Infrastructure Corridor

Deferred Matter (LEP Zone)

Mamre Road (WSEA SEPP)



The subject land is affected by the following zones:

Environment and Recreation Zone

- Applied to Wianamatta-South Creek Precinct for conservation and blue-green corridors. This includes those areas located within the 1% AEP. By preserving areas for recreation and relaxation, this zone will be vital to the Western Parkland City's liveability.
- Land that is of high biodiversity value is to be protected and will therefore benefit from additional planning controls in the proposed SEPP that prohibit the clearing of vegetation.

Enterprise Zone

- Permits land uses that supplement or complement the functions of the city and the Airport as a 24-hour transport hub. The zone will enable uses typically associated with employment and supporting a range of commercial and industrial sectors that will benefit from proximity to the airport such as distribution centres, landscape material supplies and vehicle repair workshops.
- Residential development and other noise sensitive uses such as schools and hospitals will not be permitted in this zone.

Mixed Use Zone

- Permits mixed use developments that integrate residential and commercial uses. This zone will ensure higher density residential and employment areas are located in places with high amenity. This includes having access to high frequency public transport, good connections to the State road network, open spaces including parks and waterways, pedestrian and cycle linkages and public squares, and will ensure residential uses are well outside of aircraft noise contours.

Agribusiness Zone

- Supports high-tech agribusiness uses, including freight, logistics and horticulture in the Agribusiness Precinct

SP2 Infrastructure Zone

- New and existing road and rail corridors, transport facilities, land required for utilities, the Airport and associated land in Commonwealth ownership to support airport operations. The SEPP will need to be amended to accommodate infrastructure as it is planned and as corridor and site boundaries are further refined.



Better Placed - Government Architect New South Wales

Better Placed is an integrated design policy for the built environment of NSW. It promotes good design to create a healthy, responsive, integrated, equitable and resilient built environment.

The policy establishes key design objectives and provides a framework for examining and reviewing design proposals.

The policy's seven objectives are:

1. Better fit - contextual, local and of its place
2. Better performance - sustainable, adaptable and durable
3. Better for community - inclusive, connected and diverse
4. Better for people - safe, comfortable and liveable
5. Better working - functional, efficient and fit for purpose
6. Better value - creating and adding value
7. Better look and feel - engaging, inviting and attractive



Better Placed; Aligning Movement and Place - Government Architect New South Wales

Aligning Movement and Place is a state design guide which sets out an approach, methods and processes to aligning movement infrastructure and places and promotes place-based approach to planning and delivery of transport network.

The guide further outlines seven objectives established in Better Placed with regard to relationship between movement and place.

This document is supported the Practitioners Guide to Movement and Place and will be further supported by a Toolkit which will provide:

- Tools for delivering better places on movement links,
- Indicators to recognise the degree of balance required in a given context,
- Mechanism for shaping project briefs to reduce severance and improve mobility,
- Mechanism for ensuring place benefits are included in briefs and realised.



Greener Places - Government Architect New South Wales

Greener Places promotes connection and integration of green assets.

_Overarching document outlining NSW Government position on green infrastructure.

Four principles help deliver green infrastructure in NSW:

1. Integration - combine green infrastructure with urban development and grey infrastructure
2. Connectivity - create and interconnected network of open space
3. Multifunctionality - deliver multiple ecosystem services simultaneously
4. Participation - involve stakeholders in development and implementation

_Greener Places is supported by Greener Places Design Guide, which includes information relating to:

- Open Space for Recreation - Green infrastructure for people
- Urban Tree Canopy - Green infrastructure for climate adaptation and resilience
- Bushland and Waterways - Green infrastructure for habitat and ecological health.



Draft Greener Places Design Guide - Government Architect New South Wales

The Draft Greener Places Design Guide framework provides information and methodology on how to design, plan, and implement green infrastructure in urban areas throughout NSW.

The major components that make up the green infrastructure network fall into three categories:

1. Open space for recreation - provides a framework for improved public open space planning.
2. Urban tree canopy - provides recommendations for planning and improvement in urban tree canopy.
3. Connecting bushland and waterways - provides a framework for improving connectivity between bushland and waterways supporting habitat and biodiversity in urban areas. It promotes the connection of people to nature within a sustainable environment.

The Greener Places Design Guide framework supports two of the NSW Government Premier's Priorities:

- Greening Our City, and
- Greener Public Spaces

Open space for recreation

_Strategies:

- Improve the provision and diversity of open space for recreation
- Understand the demands on existing open space, and plan for open space in new and growing communities
- Improve the quality of open space for better parks and facilities
- Use open space to connect to nature
- Link to the network of green infrastructure
- Encourage physical activity by providing better parks and amenity
- Provide open space that is multifunctional and fit for purpose
- Design versatile, flexible spaces
- Consider life-cycle costs, management, and maintenance

Six criteria guide performance outcomes for the planning of open space for recreation:

- accessibility and connectivity
- distribution
- size and shape
- quantity
- quality
- diversity

Urban tree canopy

_Strategies:

- Protect, maintain, and enhance the existing urban tree canopy
- Create an interconnected urban tree canopy across NSW
- Build knowledge and awareness of urban tree canopy across State and local government, and the community

Bushland and waterways

_Strategies:

- Protect and conserve ecological values
- Restore disturbed ecosystems to enhance ecological value and function
- Create new ecosystems
- Connect people to nature
- Connect urban habitats

THE BLUE-GREEN INFRASTRUCTURE FRAMEWORK

- The Blue-Green Infrastructure Framework is the combined network of blue and green systems including waterways, riparian areas, bushland, parks and open spaces, tree canopy (including street trees) and private gardens.
- Wianamatta-South Creek is a natural core spine of the blue and green systems.

- Wianamatta-South Creek and Kemps Creek are identified as north-south Green Grid priority corridors in the Western City District Plan with the aim to create continuous, regionally significant open space corridors providing ecological protection & enhancement, stormwater treatment and regional recreational opportunities.

- The Western City District Plan further identifies a Green grid corridors running along Cosgroves Creek and south of the Aerotropolis.
- These natural north-south blue-green spines are proposed to be complemented with east-west linear parks, providing east-west connection and materialising the strengthened connection to Western Sydney Parklands.

Legend

- Aerotropolis
- Aerotropolis precincts
- Local Government Areas
- Contours (10m interval)
- Hydrology network & water bodies
- 1% AEP flood zone
- Wianamatta - South Creek catchment
- Ridgelines
- Protected Areas 2006
- CPCP Avoided Lands:
- Reserve Site for biodiversity purpose
- Reserve Site for other purposes
- Reserves and National Parks
- Western Sydney Parklands
- Vegetation
- Potential Parks: (source NSW Western Sydney Aerotropolis Plan)
- Regional Parks (potential)
- Linear Parks (potential)
- Green Grid:
- (Source NSW Government Architects Office)
- Unknown or Deferred
- Public Land (Open Space)
- Public Land (Not Accessible)
- Private Land (Planned Precinct)
- Private Land (Development Restrictions)
- Private Land

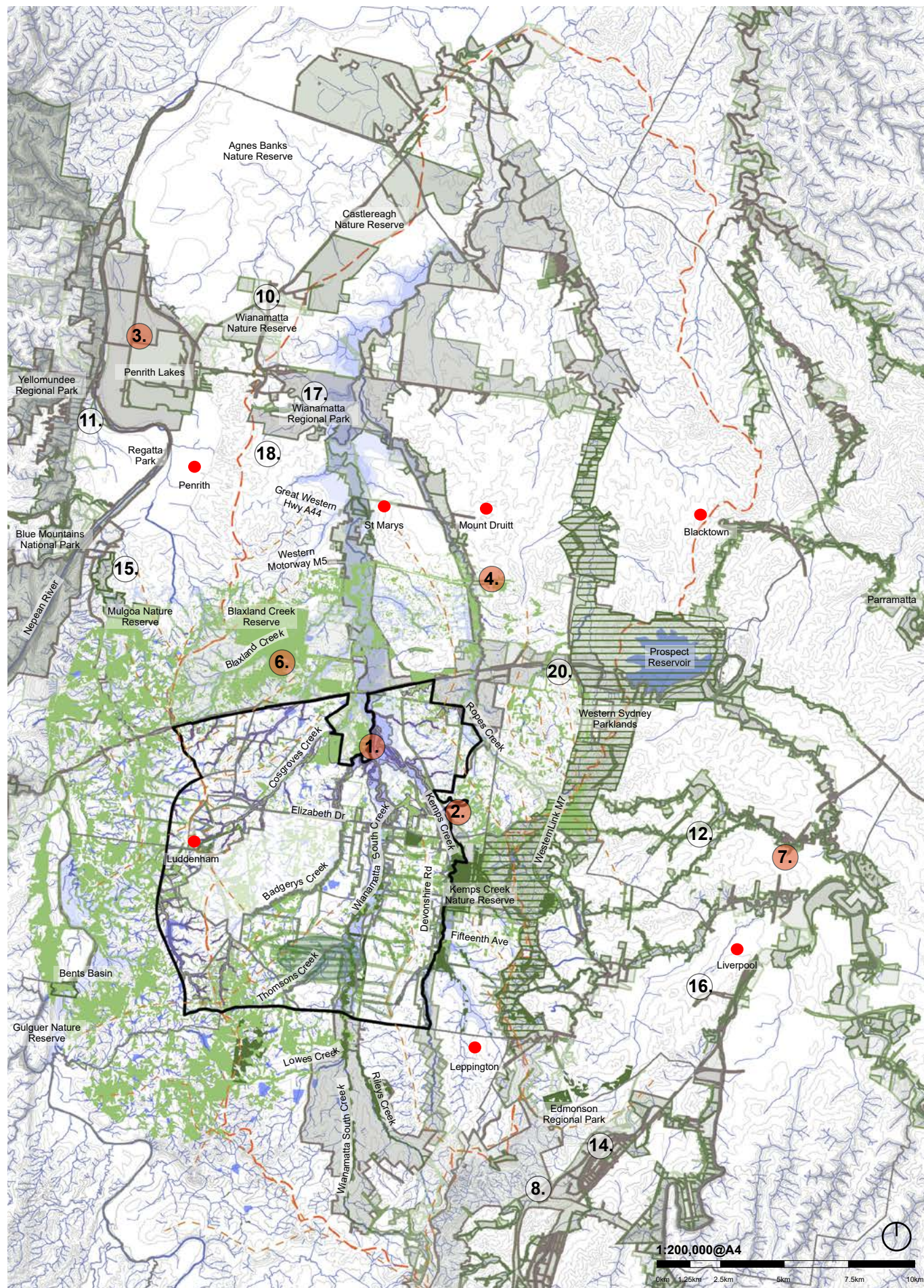
Priority Corridors (source Western City District Plan)

1. South Creek
2. Kemps Creek and Kemps Creek Nature Reserve
3. Penrith Lakes Parklands
4. Ropes Creek
6. Blaxland Creek and Bushland Reserve
7. Georges River Parklands and Chipping Norton Lakes

Projects Important to the District (source: Western City District Plan)

8. Bunbury Curran Creek and Bow Bowling Creek
10. Cranebrook to Windsor Nature Reserve Corridor
11. Eastern Escarpment open space and trails
12. Five Fairfield Creeks
14. Kayess Park Open Space Corridor
15. Nepean Creeks - Peach Tree, Mulgoa and Surveyors Creeks
16. Prospect Creek and Prospect Reservoir Parklands
17. Shanes Park and Wianamatta - South Creek Regional Park
18. South Western Creeks, Badgerys and Cosgroves Creeks
20. Western Sydney Parklands and Eastern Creek

(Mapping based on GIS data provided by WSPP unless stated otherwise)



BIODIVERSITY

Conservation and enhancement of biodiversity values is a key objective of the Greater Sydney Region Plan.

Objective 27: Biodiversity is protected, urban bushland and remnant vegetation is enhanced.

This provides a very clear mandate to ensure vegetation across the Aerotropolis is retained and enhanced as part of the Western Parkland City. In addition to recreation, water and other environmental functions, biodiversity therefore needs to form an important part of both the arrangement of the public realm, as well as site design within the private realm.

The Western Sydney Aerotropolis Plan also recognises the Draft Cumberland Plain Conservation Plan, which aims to protect threatened plants and animals in Western Sydney while supporting the delivery of housing, infrastructure, open and green spaces.

In addition, areas to the east of the Airport site and south of Elizabeth Drive sit within the South West Growth Centre under State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (Growth Centres SEPP).

Legend

- Aerotropolis
- Aerotropolis precincts
- Precincts subject to this report
- Local Government Areas
- Contours (10m interval)
- Road Network
- Hydrology network & water bodies
- 1% AEP flood zone
- Wianamatta - South Creek catchment
- Ridgelines
- Vegetation types:
- Castlereagh Scribbly Gum Woodland
- Cooks River / Castlereagh Ironbark Forest
- Cumberland Plain Woodland
- Freshwater Wetlands in floodplains
- Moist Shale Woodland
- River-flat Eucalypt Forest
- Shale Gravel Transition Forest
- Shale Sandstone Transition Forest
- Swamp Oak Floodplain Forest
- Western Sydney Dry Rainforest

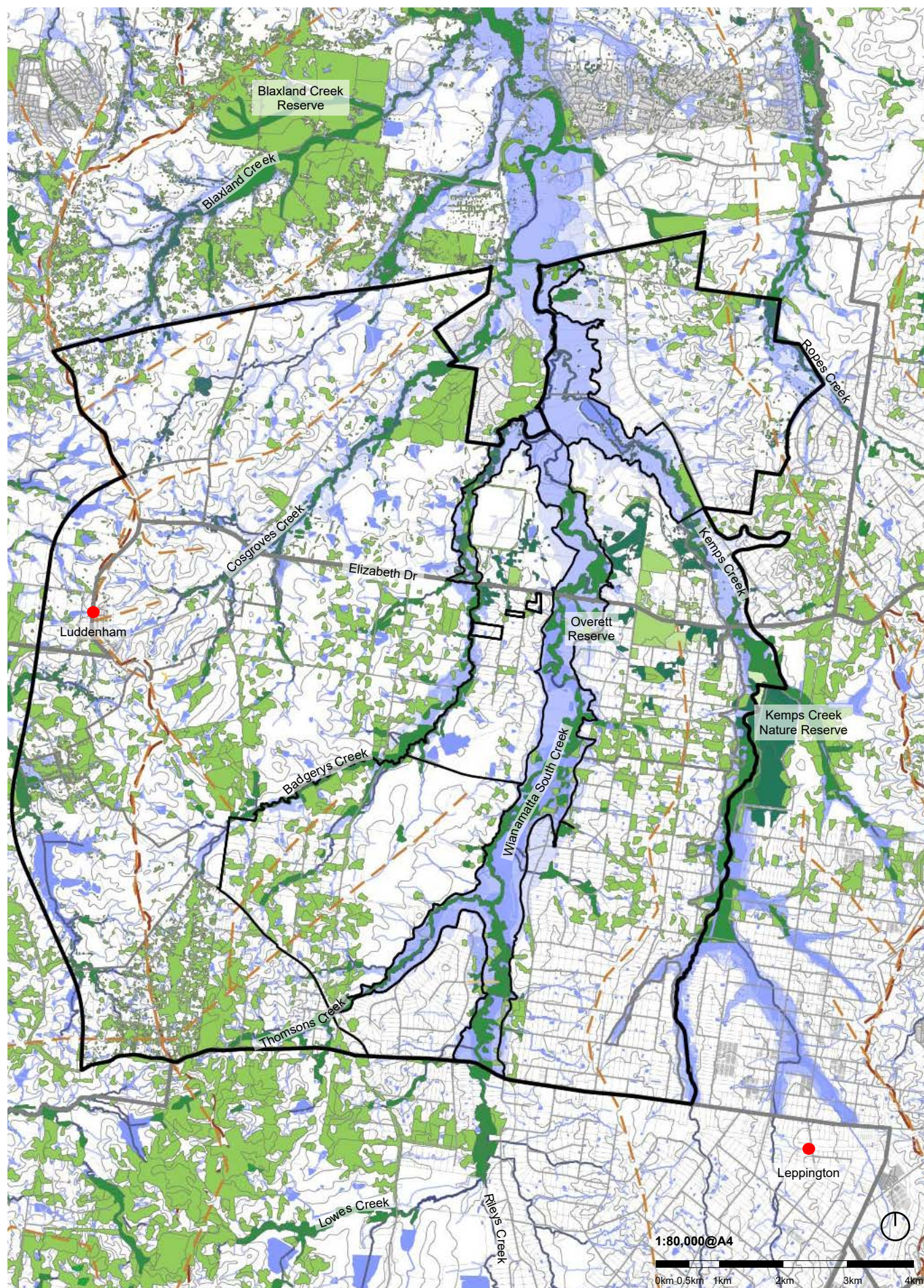
(Mapping based on GIS data provided by WSPP unless stated otherwise)

- The Biocertification Order under the Growth Centres SEPP 2006 needs to be complied with, and with native protected lands of 2,000ha to be protected across the Growth Centre. The requirements of the Order will have an implication on the preferred scenario for the Precincts. Part of the Aerotropolis Precincts where the Order applies, are mostly under 'certified' lands; thus providing a complex environmental assessment and controls.
- The draft Growth Centres Conservation Plan (2007) identified areas of high biodiversity value within the Growth Centres to be considered for protection and/or rehabilitation during the precinct planning for each precinct.
- Cultural landscape shaped by human activities - region cleared for grazing and farming, hence little of the original Cumberland Plain vegetation remains.
- Wianamatta - South Creek supports a number of rare species.
- 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.
- Combination of exotic and native vegetation is present within privately own land, generally around perimeter of the property.

Existing vegetation throughout the project area is a remnant of a broader Cumberland Plain vegetation community that occupied the plains pre-European settlement.

Current remnant vegetation throughout the project area:

- River-flat Eucalypt Forest,
- pockets of Swamp Oak Floodplain Forest,
- Cumberland Plain Eucalypt Woodland + grassland ground cover,
- pockets of Shale Gravel Transition Forest
- And Castlereagh Ironbark Forest.



URBAN CONTEXT

Planning and urban design of the Aerotropolis needs to have careful consideration of the urban context.

The Aerotropolis sits central to an urban economic corridor stretching from Lowes Creek and Leppington in the south to Penrith and Eastern Creek in the north. This includes:

WESTERN SYDNEY EMPLOYMENT AREA

The Western Sydney Employment Area is located east of the Aerotropolis, generally along the Warragamba pipeline, and integrates with the Mamre Road precinct within the Aerotropolis. The focus for employment business in the Western Sydney Employment Area is to leverage the accessibility benefits of the motorway network for transport, logistics, warehousing and offices.

GREATER PENRITH TO EASTERN CREEK CORRIDOR

This is an investigation area for future urban development, linking existing communities and jobs to major infrastructure. Committed as part of the Western Sydney City Deal, new housing will be planned, delivered and integrated with new infrastructure such as schools, health care and transport.

SOUTH WEST GROWTH AREA

East and south of the Aerotropolis, new neighbourhoods and employment areas will be focused around amenity and transit, such as the Leppington train station and Fifteenth Avenue Transit corridor. The Wianamatta - South Creek extends south through the Growth Area, providing amenity and active transport connection opportunities to the Aerotropolis.











METROPOLITAN CLUSTER OF CENTRES

The metropolitan cluster model of centres will be enhanced through rapid bus connections between the existing centres of Penrith, Liverpool and Campbelltown to the Aerotropolis and airport. Over the long term, the South West Rail Link between Leppington and the airport will strengthen these connections.

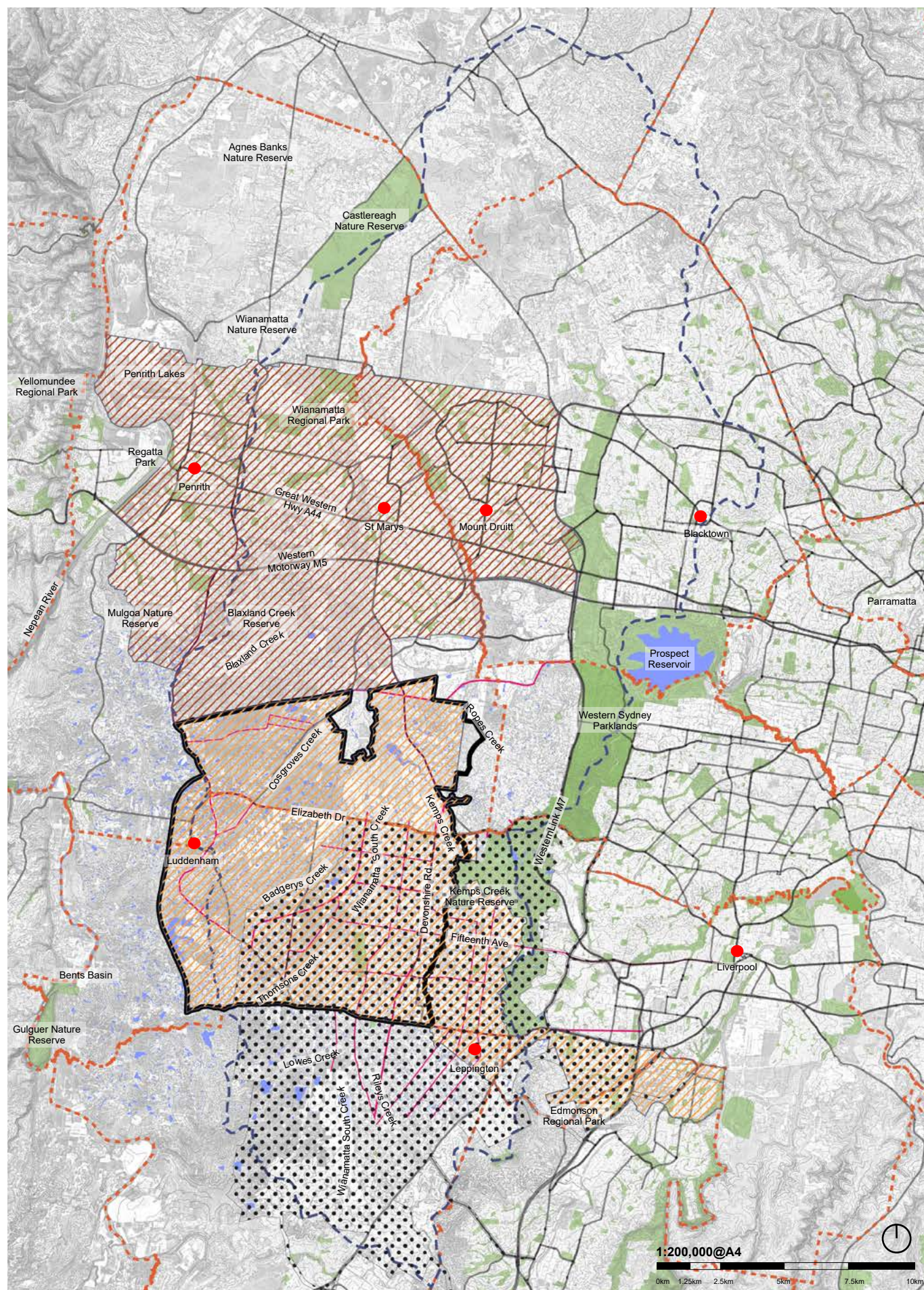
RURAL HINTERLAND

To the west of the Aerotropolis lies the Metropolitan Rural Area. Here, the economic viability of agriculture and peri-urban activities will be supported as the Aerotropolis develops. In addition to its economic functions, the rural area provides an important social value through its landscape qualities, enabling long views from the Aerotropolis to the Blue Mountains.

Legend

-  Aerotropolis
-  Aerotropolis precincts
-  Local Government Areas (LGA)
-  Greater Penrith to East Creek Corridor
-  Western Sydney Aerotropolis Growth Area
-  South West Growth Centre
-  Road Networks
-  Creek Lines
-  Wianamatta - South Creek catchment
-  Water bodies
-  1% AEP flood zone
-  Open Spaces
-  Strategic Centres

(Mapping based on GIS data provided by WSPP unless stated otherwise)



TRANSPORT CONTEXT

Substantial investment in transport infrastructure is driving the Aerotropolis forward. The proposed infrastructure identifies the planned roads, corridors and Sydney Metro Western Sydney Airport Line alignments. It enables the alignment of future planned infrastructure to be considered as well as the transport hierarchy for the future Aerotropolis site. In addition to the Western Sydney International (Nancy-Bird Walton) Airport, key transport infrastructure informing and shaping the urban design frameworks are:

WESTERN SYDNEY AIRPORT METRO LINE

Six new stations will anchor destinations along the metro line connecting St Marys to the Aerotropolis Core. The stations within the Aerotropolis are:

- Luddenham, to service a future education, innovation and commercial precinct
- Two stations within the airport site, at the airport terminal and at the airport business park
- Aerotropolis Core, the commercial heart of the Western Sydney Aerotropolis

FREIGHT RAIL

Long term planning is being undertaken for future freight rail. As part of significant rail freight capacity upgrades for Sydney, the Western Sydney Freight Line project is identifying corridor protection for future rail connections to serve Western Sydney International (Nancy-Bird Walton) Airport, Western NSW and Port Botany. Additionally, a corridor within the Outer Sydney Orbital is being planned as part of freight connections between the Central Coast and southern NSW.

ROAD INFRASTRUCTURE INVESTMENT AND PLANNING

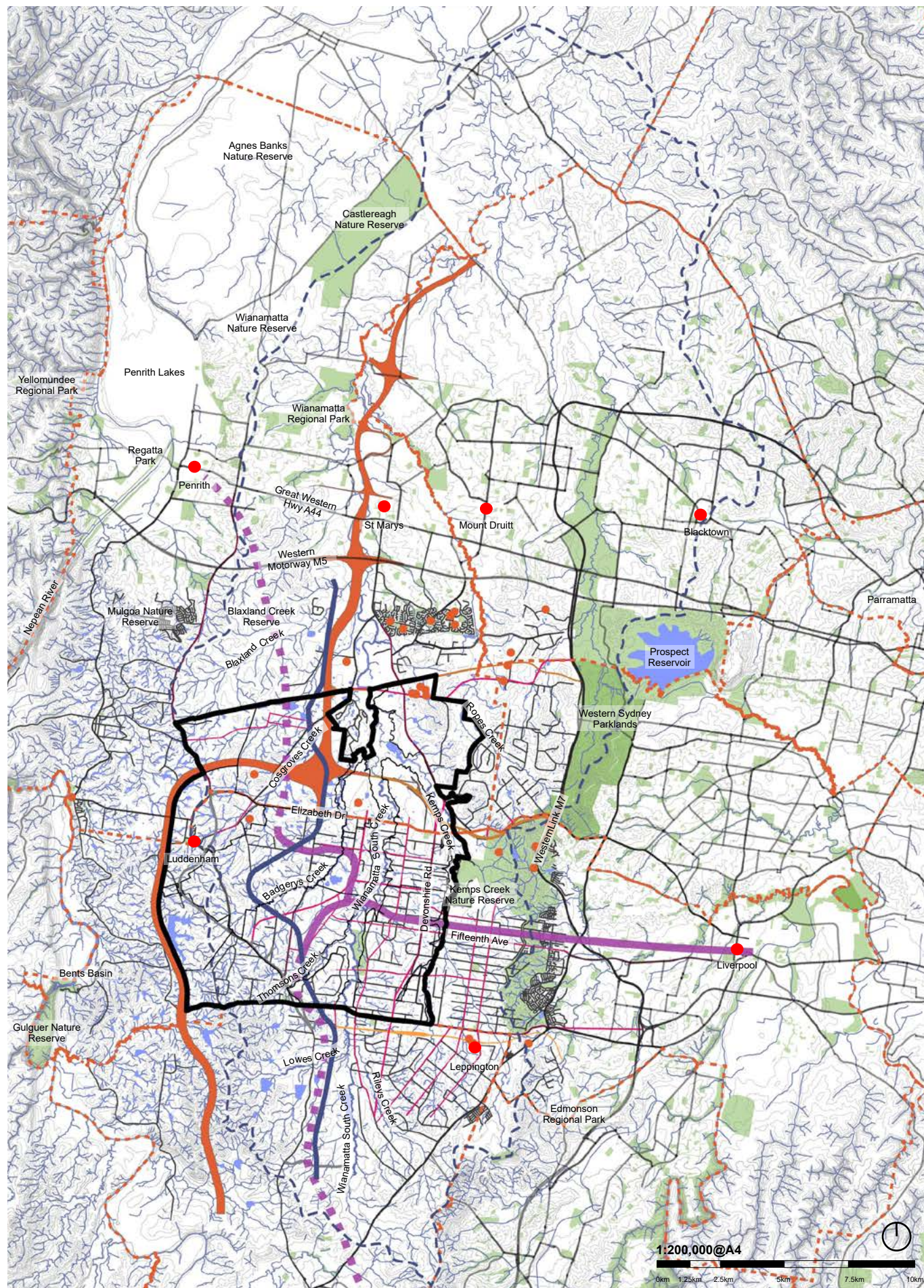
Substantial planning and investment is being undertaken by the Western Sydney Planning Partnership, Transport for NSW and local governments to service the Aerotropolis, across major new motorways, upgrades to existing roads, extension of district corridors from the east. This includes:

- The M12 motorway
- Upgrades to Elizabeth Drive
- The Northern Road upgrade
- Corridor planning for Luddenham Road, the Eastern Ring Road and other connections to the surrounding urban context
- Rapid bus connections from Liverpool, Penrith, Blacktown, Parramatta and Campbelltown to the Aerotropolis Core and Western Sydney International (Nancy-Bird Walton) Airport
- Long term planning for the Outer Sydney Orbital

Legend

- Aerotropolis
- Aerotropolis precincts
- Local Government Areas (LGA)
- Contours (10m interval)
- Creek Lines
- Wianamatta - South Creek catchment
- Water bodies
- Open Spaces / Vegetation
- Existing Road Networks
- Sydney Metro Western Sydney Airport Line
- Potential South-West Rail Link
- Transport facility points
- Outer Sydney Orbital Corridor
- M12 Motorway corridor
- Key Network Upgrades

(Mapping based on GIS data provided by WSPP unless stated otherwise)



LOCAL CONTEXT

The local context of the Aerotropolis shapes the urban design frameworks. Country, landscapes, environmental systems, creeks, ownership patterns and the immediate urban surrounds inform city shape.



























Photograph of Western Sydney Aerotropolis landscape. Image source: WSPP

LOCAL CHARACTER

- Aerotropolis precincts have character of a managed, productive landscape, that has been cleared for grazing and farming in the past. It is characterised by a patchwork of grazing land, greenhouses, 'rural-residential' lots, tree nurseries, landscape supplies and extraction sites.
- Aerotropolis Core and Badgerys Creek precincts are bound by Wianamatta-South Creek along the east edge and Badgerys Creek to the west.

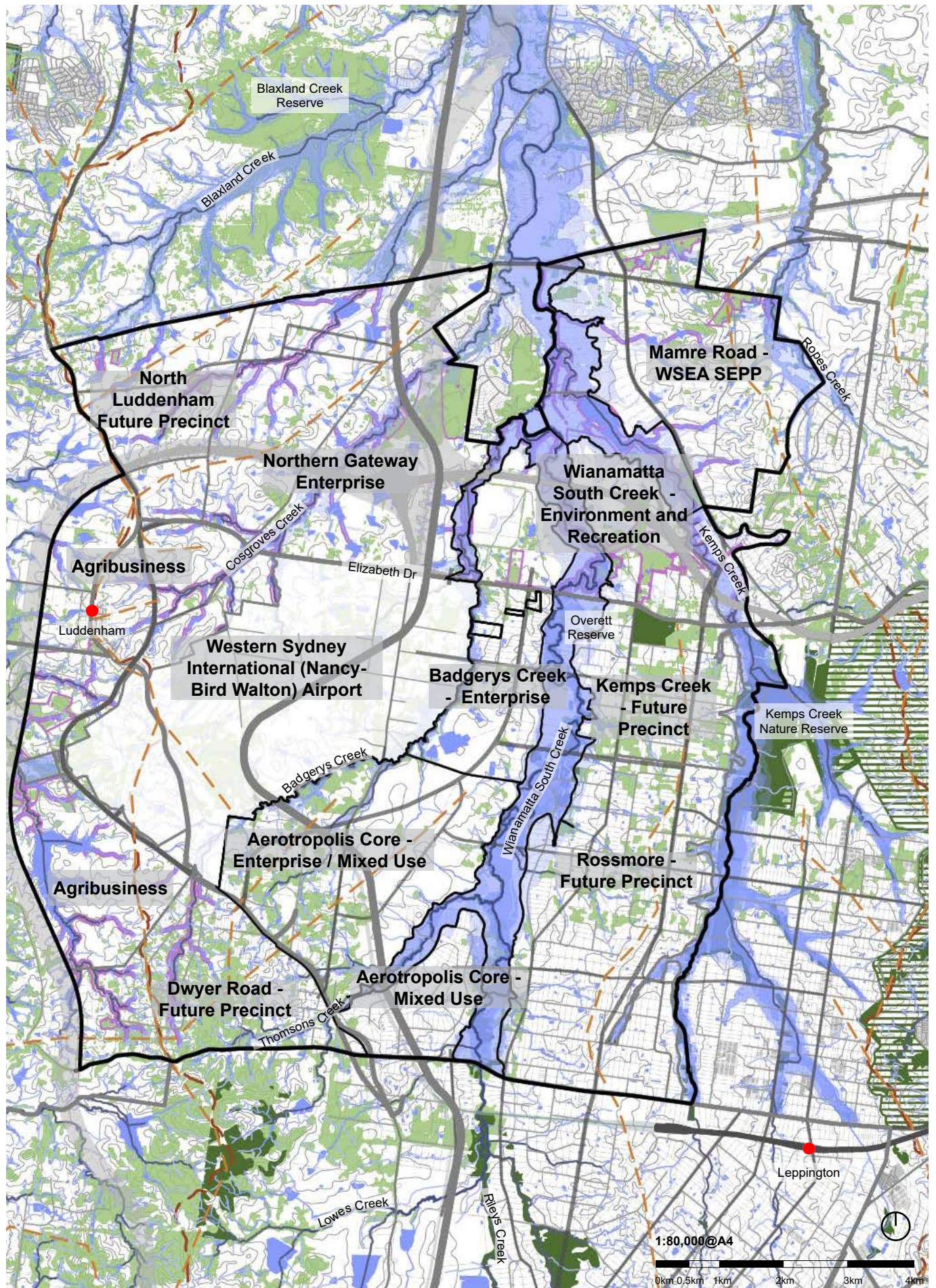
Legend

-  Aerotropolis
-  Aerotropolis precincts
-  Precincts subject to this report
-  Local Government Areas
-  Contours (10m interval)
-  Road Network
-  Protected Areas 2006
-  Reserves
-  Western Sydney Parklands
-  Vegetation (Tree Canopy)
-  CPCP Avoided Lands
- Potential Parks: (source NSW Western Sydney Aerotropolis Plan)
-  Regional Parks (potential)
-  Water bodies
-  1% AEP Flood Zone
-  Creek Lines
-  Wianamatta - South Creek catchment
-  Ridgelines
-  Sydney Metro Greater West
-  Potential South-West Rail Link
-  Outer Sydney Orbital Corridor
-  M12 Motorway Corridor
-  Potential East-west Link, Stabling and Critical infrastructure
-  Key Network Upgrades
-  Road Alignment Upgrade

(Mapping based on GIS data provided by WSPP unless stated otherwise)

- The landscape is relatively flat and open, only gently undulating, with numerous small farm dams and ephemeral creeks feeding into Wianamatta-South Creek.
- Views are dominated by the presence of the sky and confined / framed by clusters of vegetation mainly around main creek lines and lines of trees along property boundaries and access roads. Ridgelines are rather subtle.
- 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.
- A combination of exotic and native vegetation is present within privately own land, generally around perimeter of the properties.
- The precincts are accessible via the Northern Road (currently being upgraded) and Bringelly Road at the southern end. Within the precincts, the roads are of rural character - the main roads are Elizabeth Drive traversing east-west across the precincts, Badgerys Creek Road connecting north-south and then a series of disconnected local roads throughout.





A view across existing pasture to Wianamatta-South Creek,
near to Luddenham Road.
Photography by Daniele Hromek.



AEROTROPOLIS CORE EXISTING CHARACTER

The Aerotropolis Core has a markedly different character from its intended future. Peri-urban and rural in character, the existing landscape conditions are rapidly changing with the construction of the Western Sydney International (Nancy-Bird Walton) Airport, The Northern Road and the committed upgrades to Elizabeth Drive and the future M12 Motorway.

The existing landscape comprises a gentle land, with a filigree of ephemeral creeks tracing the ground towards both Badgerys and Wianamatta - South Creeks. A ridge line bisects the precinct, roughly mid-way between both creek corridors. This emphasises views to distant tree lines and the generally open landscape. Due to the presence of woodlands along Badgerys and Wianamatta - South Creeks, views to the Blue Mountains at ground level are not evident.

The fragmented land ownership throughout the Aerotropolis Core has led to a disrupted landscape. Distinctions between ownership boundaries are evident through fences, differing planting and site organisation patterns. Buildings are generally low in scale, being one to two storeys, and ordinarily comprise single houses, workshops, sheds and outbuildings.

Kelvin Park Homestead is a State Heritage listed item and lies to the west of Thompsons Creek. The homestead is a direct connection to the pastoral history of the district, and it is situated atop a small rise, looking over the broader landscape. The former function of much of the Aerotropolis Core as pasture land is reflected in this ongoing activity to the north of the homestead, between Wianamatta - South Creek and Badgerys Creek Road.

An existing quarry lies to the west of Badgerys Creek Road, between it and the creek - reflective of the alluvial sands in this part of the precinct. Its position is flanked by wooded vegetation, tracing the ephemeral creek system southward towards the Northern Road.



Right: Aerial photography of Thompsons Creek and part of the Aerotropolis Core. Existing agricultural practices and use of the land can be clearly seen.



Images:

1. Looking from Kelvin Park Drive towards distant tree canopy.
2. Existing access drive to the former Defence Lands within the Aerotropolis Core.
3. Existing creek vegetation character.
4. The Aerotropolis Core contains existing single houses on large lots, many of which comprise open grassland and former pasture.
5. The relatively flat landscape of the Core is bisected by a fragmented land ownership pattern.
6. Existing verge vegetation along Badgerys Creek Road.



BADGERYS CREEK EXISTING CHARACTER

The Badgery's Creek precinct lies in the narrow area of land between the Badgery's and Wianamatta - South Creek systems. Largely flat, the land falls away from a gentle ridge that lies largely central between the creeks.

Elizabeth Drive bisects the precinct, and its east-west orientation provides drivers with a good sense of the undulating topography - being aligned perpendicular to the contours of the land. In this way, a sense of ridgetop, creek and Cumberland Plain landscapes is experienced.

South of Elizabeth Drive, a patchwork of lots are arranged along Martin and Lawson Roads. An eclectic mix of rural-residential housing, productive orchards, plant nurseries and peri-urban agriculture occurs throughout. Views across the open grassland of lots terminate in the woodlands of the creek systems, and so there is a strong sense of open grassland, distant vegetated creeks and sky. Much like Aerotropolis Core, existing buildings relate to the functionality of the land, with simple residential structures, outbuildings and workshops. These buildings sit within the landscape, such that the broader views and water systems are the dominant feature.

North of Elizabeth Drive, larger lots provide a setting for open pasture, farm dams and the meandering creeks. A small cluster of Cumberland Plain woodland is located central to this area. A waste transfer station is located adjacent Badgerys Creek, demonstrating the circular economy potential of the Aerotropolis.

A defining feature at the southern edge of the precinct is the existing quarries. These continue the circular economy credentials, and will continue to operate for some time.

WIANAMATTA - SOUTH CREEK EXISTING CHARACTER

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, peri-urban activities about the edge of the vegetated corridor.

Right: Aerial photography of the Badgerys Creek Precinct, showing Wianamatta-South Creek and Martin Road.





Images:
Photographs showing scenes throughout Badgerys
Creek and Wianamatta - South Creek.

AGRIBUSINESS EXISTING CHARACTER

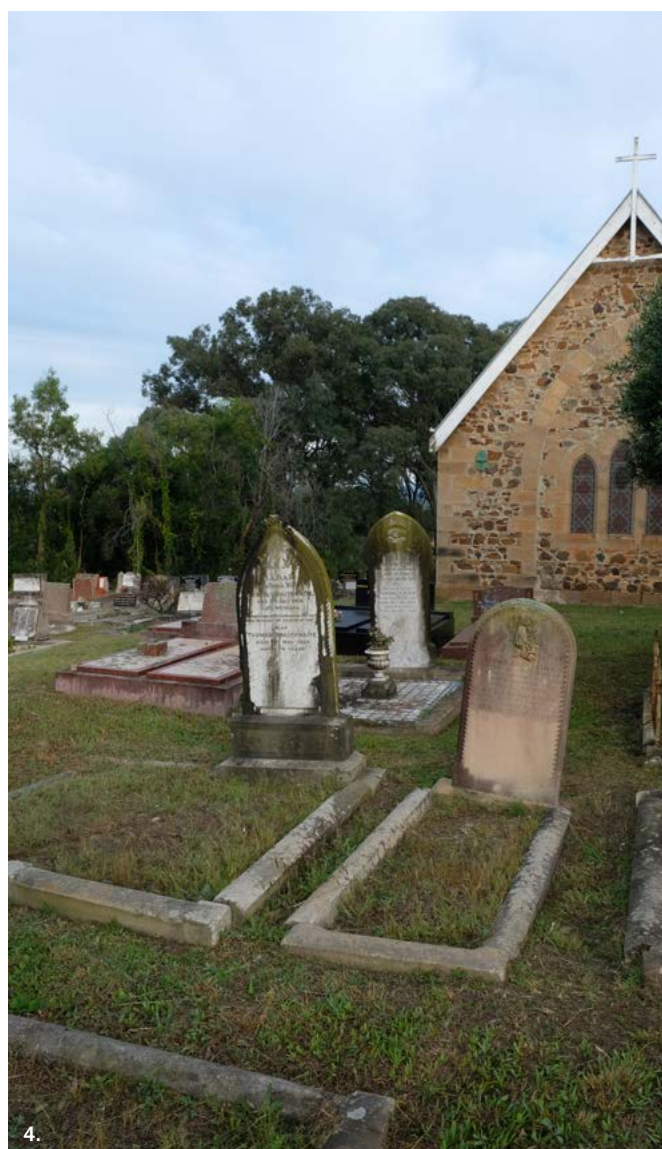
Located between the watershed of the Nepean River to the west and the Wianamatta Creek and proposed airport to the east, the Agribusiness Precinct spans the ridgeline on which the Northern Road is situated, this road historically linking Penrith and Campbelltown. Luddenham, positioned on the Northern Road is a village that provides service facilities to the surrounding agricultural lands.

Luddenham Village is distinguished by its low built form and scale and features a selection of heritage listed buildings including St James Anglican Church and the Luddenham showground. The village is set within an agricultural setting of open pasture and groups of native trees with significant views to the Blue Mountains to the west and wooded ridgelines and surrounding landscape including Cosgroves Creek to the east. These views, from the highest ridgeline within the Aerotropolis, significantly inform your impression of place and its relationship to context.

The fluvial nature of the landscape is highlighted by the drainage and creek lines that are identified by a series of dams and water bodies. These water bodies serve as reservoirs for the small scale agricultural and horticultural activities of the area. Duncan's Creek reservoir to the south is the largest and has been known to be used for recreational activities. To the east, the landscape character is open grassland with minor groups of trees located in irregular patterns across the landscape. To the west of the ridgeline, the valleys are characterised by remnant woodlands and are more incised than those valleys to the east. Overall, the undulating topography, open pasture and groupings of remnant woodlands provide traditional aesthetic pastoral values associated with the Cumberland Plain.



Right: Aerial photograph of the Agribusiness Precinct, showing Luddenham Village, The Northern Road and existing pasture land.



Images courtesy of Studio Hollenstein:

1. View to south west from Northern Road, Luddenham, over Lawsons Inn Site
2. Cumberland Plain Woodland
3. Dam and field crops, Willowdene Rd. Luddenham
4. St James Anglican Church and Graveyard, Luddenham

NORTHERN GATEWAY EXISTING CHARACTER

The Northern Gateway is characterised by undulating terrain with significant hill tops and ridgelines affording views across the Cumberland plain to the Blue Mountains in the west and the Georges River Valley.

It is bounded by Elizabeth Drive in the south, the Warragamba pipeline in the north and Badgery's Creek in the east, and covers an area of approximately 1616ha.

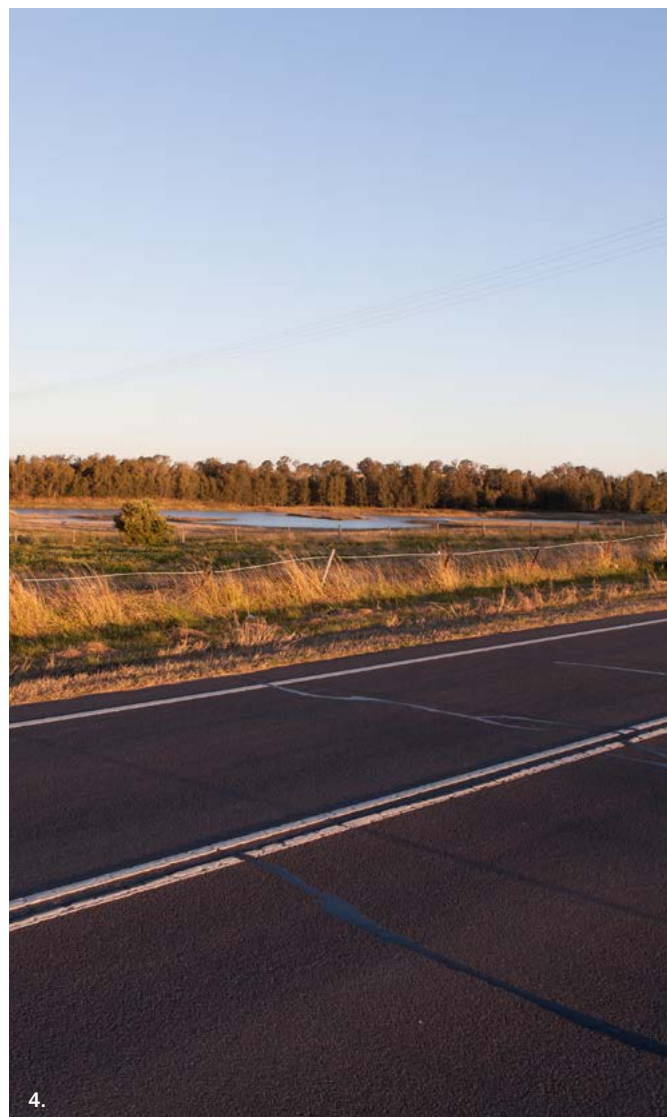
Luddenham Road bisects the precinct, running north-east from Elizabeth Drive almost parallel to Cosgroves Creek and along the eastern slopes of the ridgeline, avoiding the steepest hilltops which dot the southern half of the precinct.

It has a pleasant rural character and is lined with stands of mature native trees along its southern boundary.

Significant creek lines cut through the gentler terrain forming a tube of subtle fingers and valleys which are dotted with farm dams and remnant Cumberland Plain Woodland.



Right: Aerial photography of the Northern Gateway Precinct, showing Cosgroves Creek and existing farm dams.



Images courtesy of Hill Thalys.

1. Luddenham Road and the important roadside tree line.
2. Hilltops are prominent landscape features within the precinct.
3. Farm dams and ridgelines signify the existing landscape character.
4. Open views from the roadside to dams and creek vegetation.



Images of the Aerotropolis project area.
Photography by Daniele Hromek.



Images of the Aerotropolis project area.
Photography by Daniele Hromek.

SOIL AND GEOMORPHOLOGY

Soils make up a network of interconnected undisturbed site soils. It occurs in riparian corridors, parks and specially designed Brown Corridors. Soils are key to achieving healthy ecosystems and good water retention in clay landscape of the Cumberland Plain.

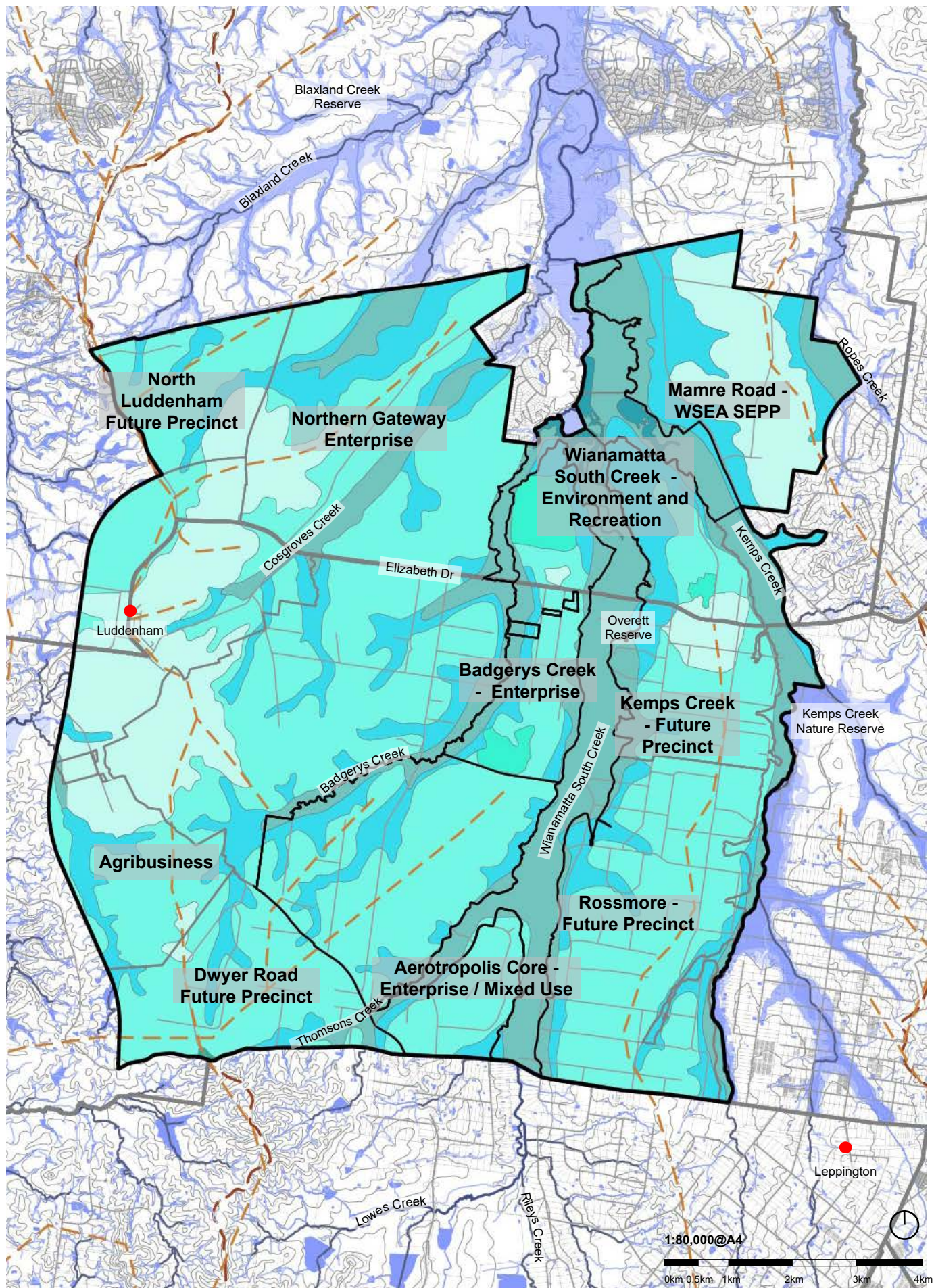
The soils of western Sydney Cumberland Plain when in their undisturbed state are integral to the proper functioning of the Green and Blue infrastructure framework. A healthy soil ecology plays a complex, dynamic role via living biota in the overall ecology of place as the major driver of all energy systems; increasing the water absorption of soils by providing increased in ground carbon storage, increased nutrient and mineral availability and by suppressing soil pathogens and salinity. A network of undisturbed soils is the foundation for the health of the Blue and Green Infrastructure Framework.

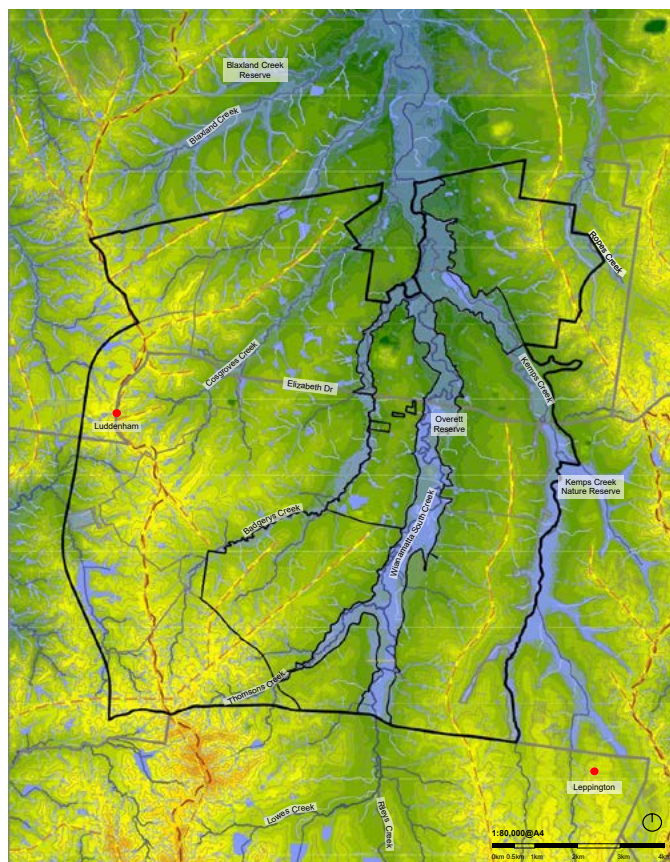
Soils in areas identified by the urban design frameworks are to remain undisturbed and be continuous, allowing for connectivity of soil ecology. Engineered cut and fill and topographic alteration should be limited due to the damage this causes to soil profiles and the ecologies therein. Localised excavation for footings, shallow sub-bases to paths, tree planting holes and the like are permitted, however the A and B soil horizons are to be removed separately stored separately and replaced in their correct order.

Legend

- Aerotropolis
- Aerotropolis precincts
- Precincts subject to this report
- Local Government Areas
- Contours (10m interval)
- Hydrology network & water bodies
- 1% AEP flood zone
- Great Soil Groups:
- Gleyed Podzolic Soils
- Red Podzolic Soils - less fertile (granites and meta-sediments)
- Red Podzolic Soils - more fertile (volcanics and granodiorites)
- Soloths
- Yellow Podzolic Soils - less fertile (granites and meta-sediments)
- Water
- Not assessed
- Wianamatta - South Creek catchment
- Ridgelines

(Mapping based on GIS data provided by WSPP unless stated otherwise)



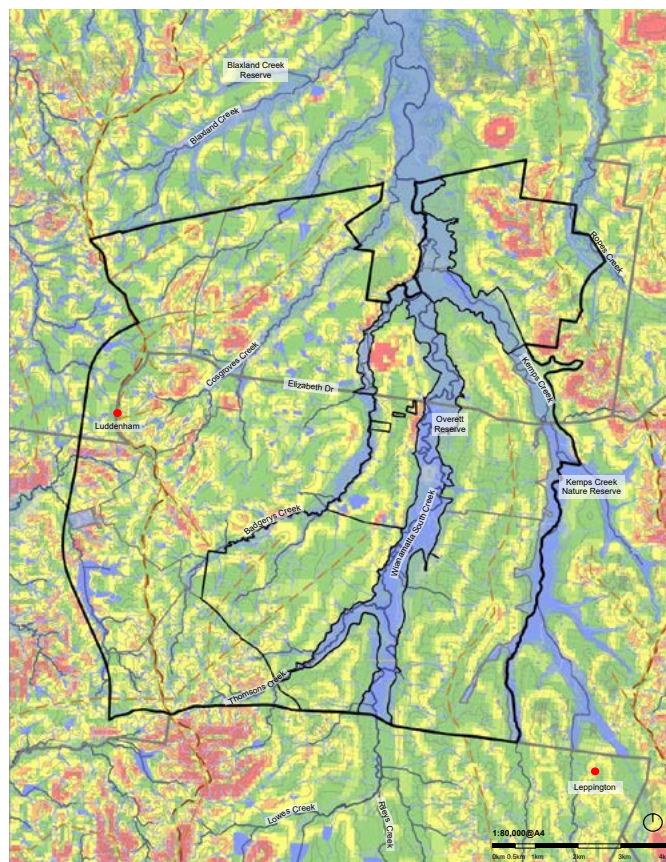


Topography and landform

Legend

- Aerotropolis
- Aerotropolis precincts
- Precincts subject to this report
- Local Government Areas
- Contours (10m interval)
- Road Network
- Hydrology network & water bodies
- 1% AEP flood zone
- Terrain:
- -5 - 20m elevation
- 20 - 45m elevation
- 45 - 70m elevation
- 70 - 95m elevation
- 95 - 120m elevation
- 120 - 145m elevation
- 145 - 170m elevation
- Wianamatta - South Creek catchment
- Ridgelines
- Key views / view corridors
- Visual Precincts

(Mapping based on GIS data provided by WSPP unless stated otherwise)

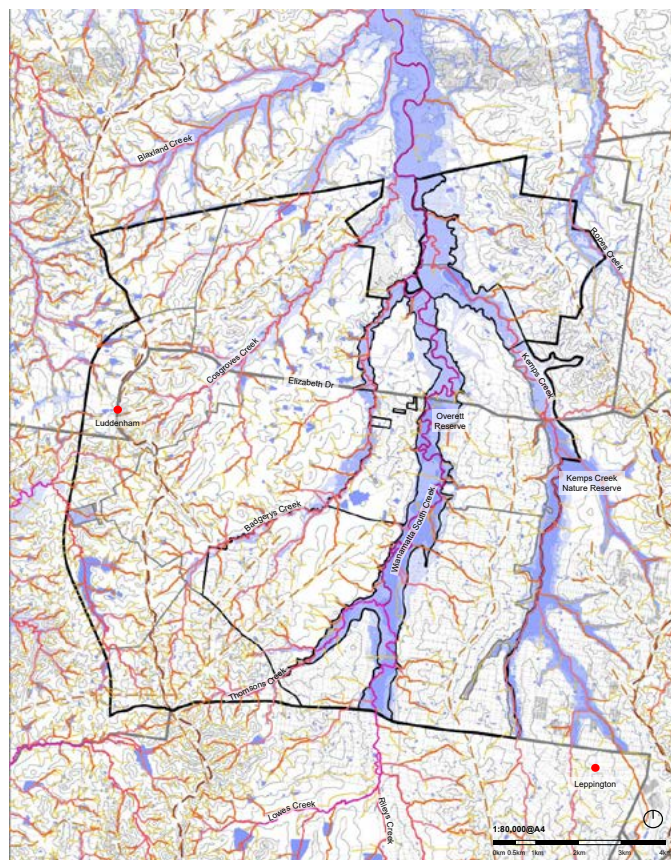


Slope

Legend

- Aerotropolis
- Aerotropolis precincts
- Precincts subject to this report
- Local Government Areas
- Contours (10m interval)
- Hydrology network & water bodies
- 1% AEP flood zone
- Terrain:
- 1:100-1:50
- 1:50-1:35
- 1:35-1:20
- 1:20-1:14
- 1:14- 1:8
- Wianamatta - South Creek catchment
- Ridgelines

(Mapping based on GIS data provided by WSPP unless stated otherwise)

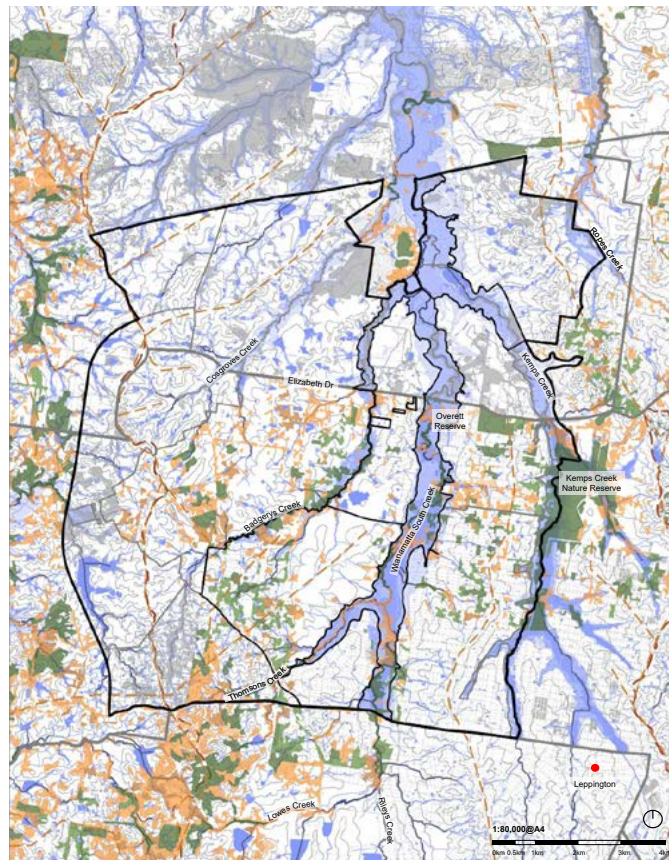


Creeks and 1% AEP flood extents

Legend (Strahler System stream order)

- Aerotropolis
- Aerotropolis precincts
- Precincts subject to this report
- Local Government Areas
- Contours (10m interval)
- Road Network
- Hydrology network & water bodies
- Stream Classification**
- 7th Class
- 6th Class
- 5th Class
- 4th Class
- 3rd Class
- 2nd Class
- 1st Class
- 1% AEP flood zone
- Probable Maximum Flood zone
- Wianamatta - South Creek catchment
- Ridgelines

(Mapping based on GIS data provided by WSPP unless stated otherwise)



Vegetation, canopy and disturbance levels

Legend

- Aerotropolis
- Aerotropolis precincts
- Precincts subject to this report
- Local Government Areas
- Contours (10m interval)
- Hydrology network & water bodies
- 1% AEP flood zone
- Wianamatta - South Creek catchment
- Ridgelines
- Retention Value:**
- Low
- Medium
- High
- Very High
- Lowest Disturbance Levels
- Medium Level of Disturbance
- High Disturbance Levels
- Scattered trees grazing understorey
- Scattered trees above rural residential
- Scattered trees above urban development
- Unlabelled

(Mapping based on GIS data provided by WSPP unless stated otherwise)

HERITAGE

We acknowledge that while there are important sites in this area, all of Country is important as part of the wider cultural landscape.

COUNTRY AND ABORIGINAL HERITAGE

The Aboriginal Cultural Heritage assessment identified 138 known Aboriginal heritage sites within the initial precincts which includes objects, places, and declared Aboriginal Places.

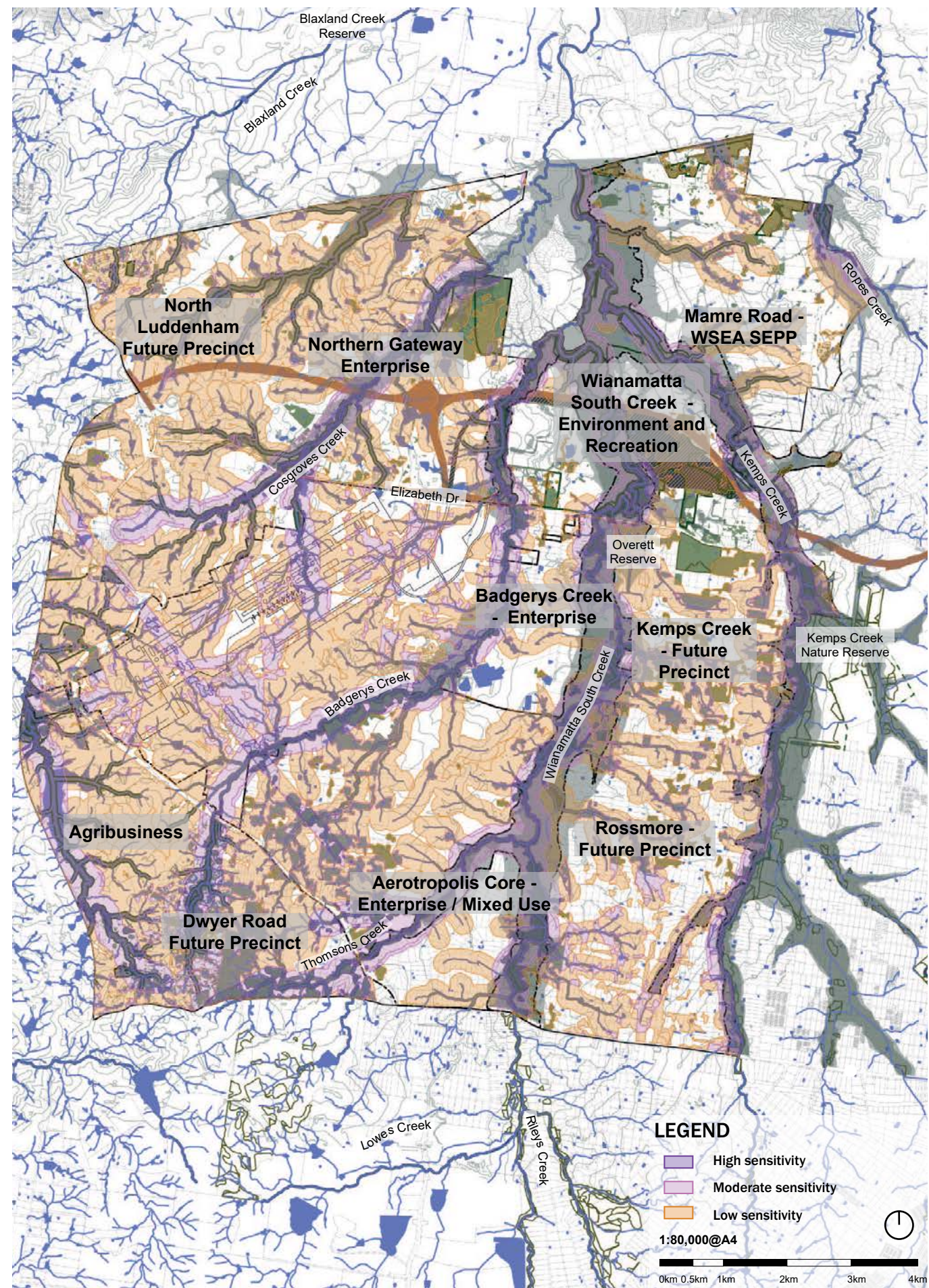
Among the 138 identified sites the majority (115) are identified as 'artefact' sites comprising artefact scatters and isolated finds. The remaining sites largely comprise potential archaeological deposits (PADs) (19), most of which (15) were found in association with artefacts.

Other site types that have been identified within the five precincts include three culturally-modified trees (carved or scarred) and one grinding groove site.

The identified sites have been identified across the landscape and concentrated within areas where relatively low amount of land disturbances have occurred. Culturally modified trees are located in areas where remnant vegetation remains extant (e.g. along creek lines and away from urban areas), whereas grinding groove sites are located close to creek lines due to the need for water in the grinding process.

The known PADs occur most often on lower elevations and along or between creek lines, and few are known in areas of high elevations such as hills or ridgelines. In addition to the identification of known sites, the assessment mapped the Aboriginal heritage sensitivity across the initial precincts and identified several potential conservation corridors which contain Aboriginal heritage values (see adjacent figure).

Note: Whilst the specific locations of known Aboriginal heritage sites and AHIMS data have been identified and considered in the urban design work, a map showing these sites has not been included within this report due to sensitivity reasons.



POST COLONIAL HERITAGE

The precincts encompass sites that have the potential to contain historical archaeological remains associated with the early nineteenth century and twentieth century development of the district. Broadly, the level of survival of these items will vary across the sites, and is dependent on the type of site, the methods of demolition, later phases of construction and the impact of service installation in the twentieth and twenty-first centuries.

Four properties have the potential to contain State significant archaeological remains. Any impacts in these areas will require specific management due to specific legislative controls. A detailed assessment would also be required before any proposed development can be considered.

Five properties (mainly large rural or former government sites) have the potential to contain multiple archaeological sites. These potential sites are likely to be dispersed across the large land units and will require further investigation to prepare appropriate curtilages for management for each discrete area.

The existing road grids associated with the mid to late nineteenth century subdivisions (Luddenham village, Exeter Farms subdivision, Devonshire subdivision and the Hutchinson Subdivision) should be maintained as much as possible, as this will reduce impacts on potential archaeological sites.

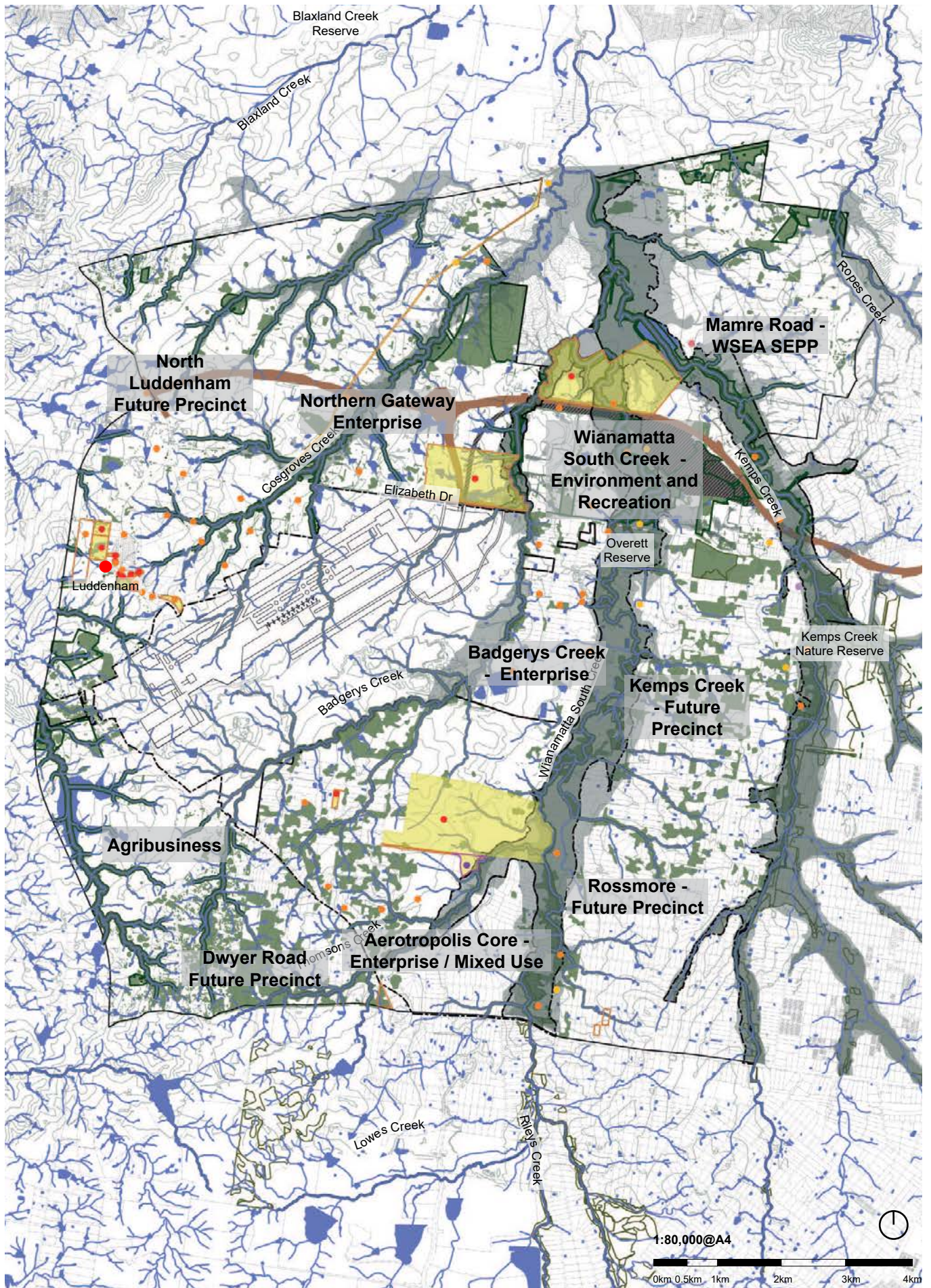
Kelvin Homestead is a colonial homestead group of structures with historical, associative, and representative values as an early Georgian farmstead. The existing landscaping around the house, and its setting on a knoll above a creek, is a significant part of its character. The site is also noted to have a high archaeological potential.

This item is protected under the provisions of the Heritage Act 1977 (NSW), which requires any change that affects the item's significance to be subject to assessment and approval by the NSW Heritage Council.

The collection of local heritage items is quite varied in the types of items and their value as locally significant items. What does become apparent are that the items listed relate to particular themes that are prevalent throughout the area, particularly relating to agriculture, pastoralism and the way of life during the early 19th century.

Several special sites warrant specific consideration:

















- The Fleurs Radiotelescope Site
- McGarvie-Smith Farm (Item 857)
- McMaster Field Station/McMaster Farm (unlisted)
- Luddenham Road Alignment (item 843)
- Luddenham Village
- Lawson's Inn Site
- Exeter Farm
- Kelvin Park
- Bringelly Radio Receiving Station Complex (Former OTC Site)
- 'Bayly Park' Complex



AIRPORT CONSIDERATIONS

The Western Sydney Aerotropolis Plan safeguards continued and 24 hour operations of the airport.

Legend

-  Public safety areas
-  Aerotropolis
-  Light Intensity Radius
-  3km Wildlife Buffer
-  8km Wildlife Buffer
-  Windshear
-  Wianamatta - South Creek catchment
-  Ridgelines
- Lighting Intensity:
-  Light Control Zone A
-  Light Control Zone B
-  Light Control Zone C
-  Light Control Zone D
- Australian Noise Exposure Concept (ANEC):
-  ANEC between 20 and 25
-  ANEC between 25 and 30
-  ANEC between 30 and 35
-  ANEC exceeding 35

(Mapping based on GIS data provided by WSPP unless stated otherwise)

NOISE

Development that will impact upon the aviation operations of the Airport will not be supported. New residential and other noise sensitive development will not be located within the ANEC/ANEF 20 and above contours.

Development within the ANEC/ANEF 20 and above contour will adopt appropriate design and construction standards to reduce aircraft noise impacts.

OPERATIONAL AIRSPACE

The Western Sydney Aerotropolis Plan identified an OLS for the Airport. Encroachments into operational airspace for the Airport may require approval under Part 12 of the Airports Act 1996 and Airports (Protection of Airspace) Regulations 1996.

The OLS has been used as one mechanism to limit heights within the urban design frameworks.

WILDLIFE STRIKE

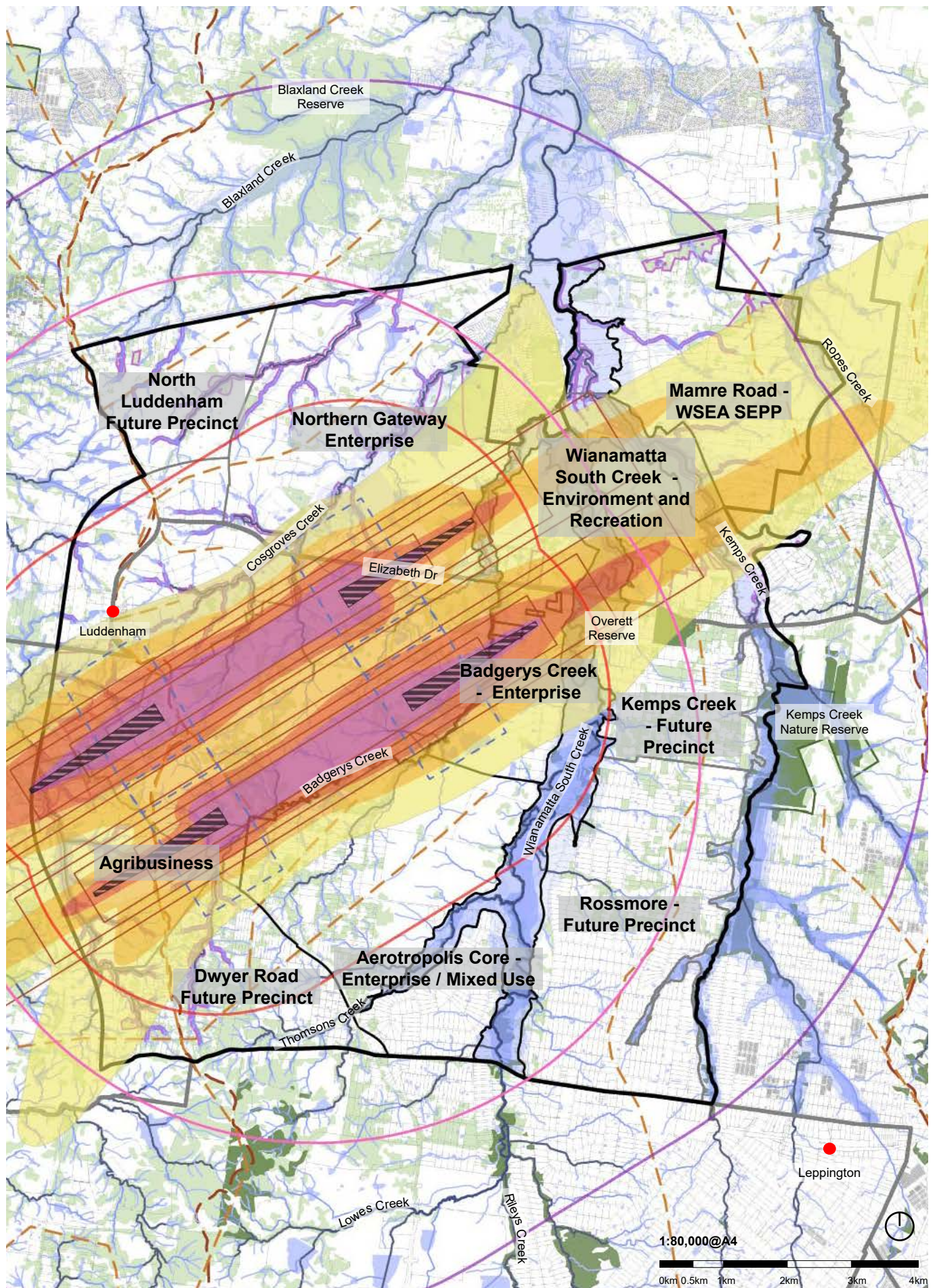
To limit the potential of bird strike to aircraft, controls on landscape and land uses are part of the Western Sydney Aerotropolis Plan.

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. Monitoring and management on private lands is critical.

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.

PUBLIC SAFETY AREAS

Defined areas at the end of runways nominate the locations of highest risk, and so land uses within these areas need to ensure low population densities, and not contain any storage, use or manufacture of dangerous goods.



SURROUNDING PRECINCTS

RELATIONSHIPS AND CONNECTIONS

The initial precincts of Aerotropolis Core, Badgerys Creek, adjacent parts of Wlanamatta-South Creek, the Northern Gateway and Agribusiness precincts are not being planned in isolation. Connections and relationships between these are important for the overall success of the Aerotropolis system.

In addition, planning needs to be cognisant of the future precincts:

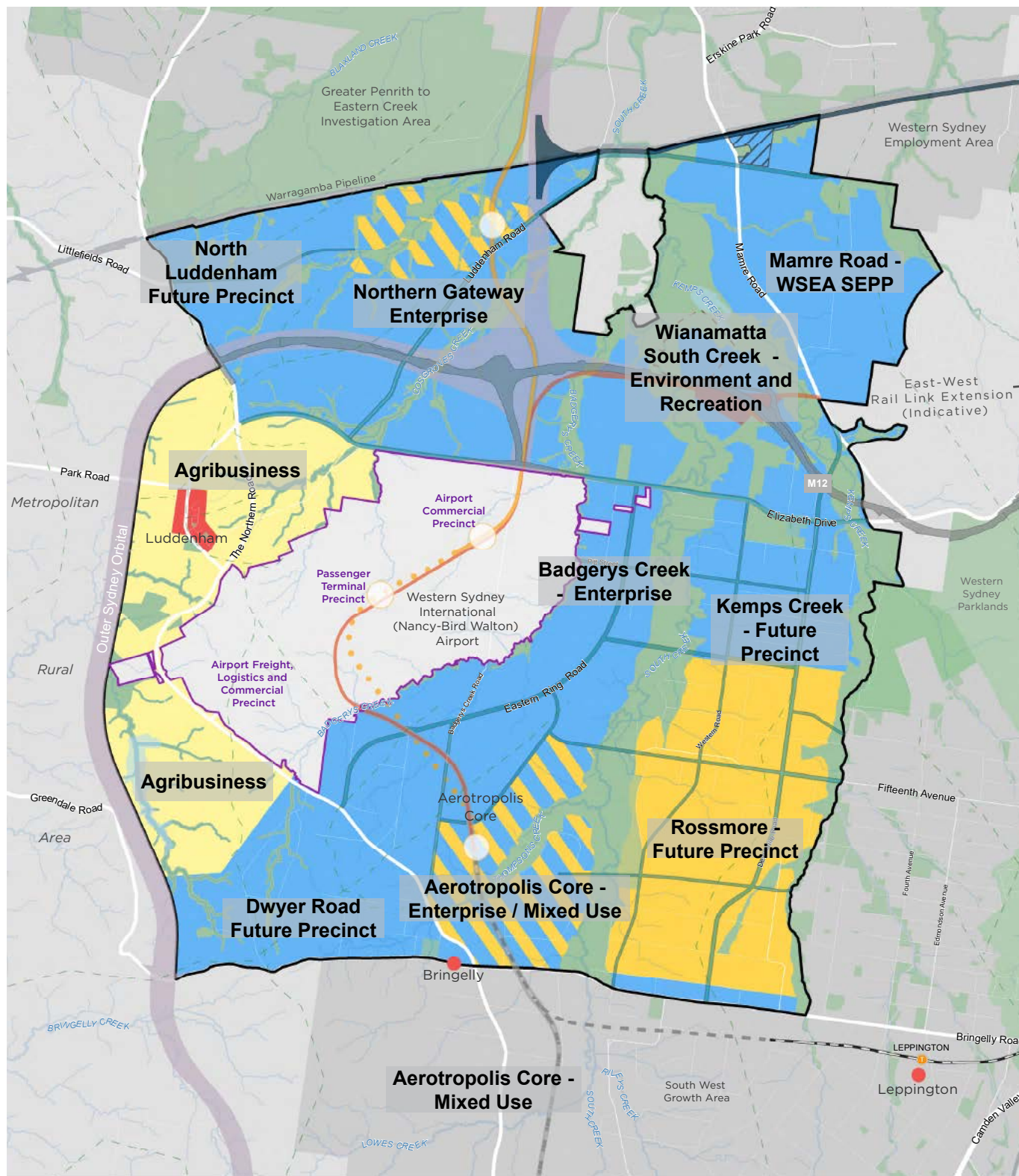
- Urban land within the Rossmore precinct
- Flexible employment within the North Luddenham, Kemps Creek and Dwyer Road precincts.

The urban design frameworks therefore need to address:

- Connections across all travel mode types;
- Regular crossings of the creek corridors to enable walkable neighbourhoods and catchments to centres and amenity;
- Careful location of centres such that catchments are considered beyond precinct boundaries;
- Land use interfaces that complement the adjacent precinct functions.

EXISTING LOCAL ENVIRONMENT PLANS

The local planning context of the Aerotropolis is one of change. The existing LEP zonings will change according to the Western Sydney Aerotropolis Plan and its associated State Environment Planning Policy.

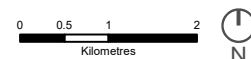


Structure Plan Western Sydney Aerotropolis

- 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



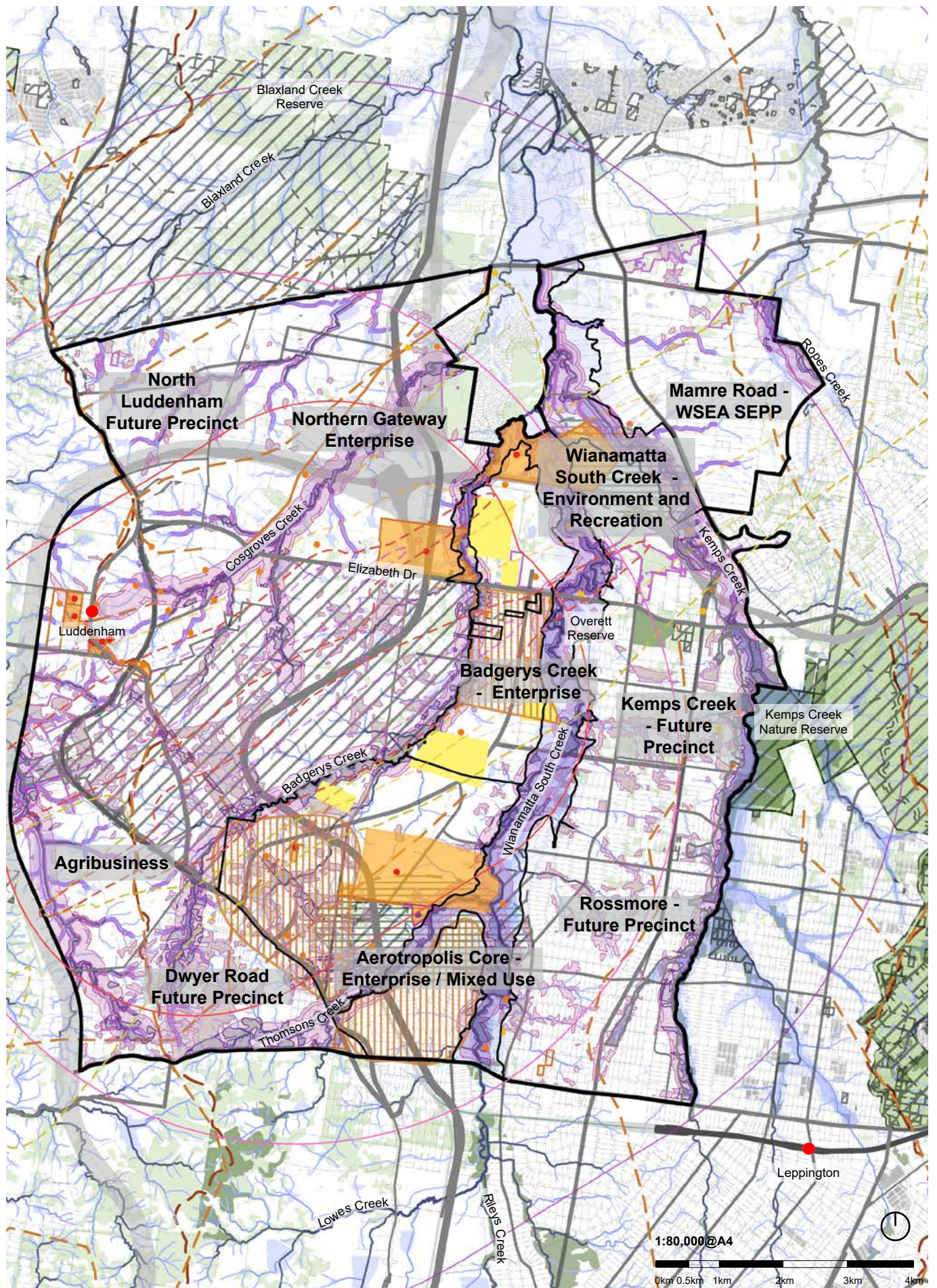
OPPORTUNITIES AND CHALLENGES



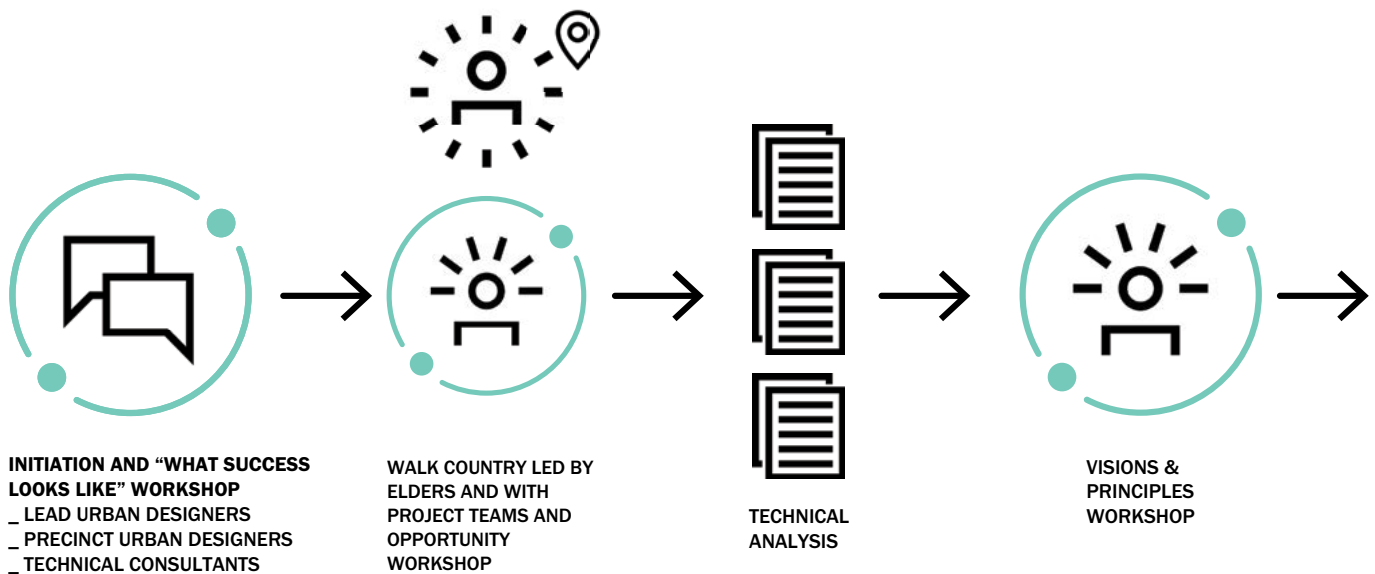
(Mapping based on GIS data provided by WSPP unless stated otherwise)

COMMON OPPORTUNITIES ACROSS THE AEROTROPOLIS

- Ensure development areas are contained outside the recent flood modelling 1% Annual Exceedance Probability
- Retain creeks within the landscape, especially those nominated Strahler 2 and above
- Retain and enhance existing vegetation for biodiversity purposes
- Respect topography through urban form and city shape, and in particular, ensure clear links between ridgetops and creek lines
- Provide public (street) edges to creek corridors, open space and key infrastructure items
- Focus density towards areas of amenity: the creek corridors, open space, and employment density around Metro Stations
- Align streets to provide views and access to the creek corridors
- Enable amalgamation of lots to coordinate development across land use, transport, open space, water, environmental and infrastructure outcomes - this is particularly important across the mixed use zone between Thompsons and Wianamatta - South Creeks, and to the Enterprise zone west of Badgerys Creek Road and south of Elizabeth Drive
- Ensure sensitive land uses are located outside of airport ANEF 20 contours, and public safety areas contain low density, low risk businesses
- Coordinate development densities to balance urban structure outcomes with the height limitations of the OLS
- Retain Indigenous heritage items in open space where possible
- Respect and enable conservation of non-Indigenous heritage items
- Provide a connected urban grid that responds to topography, climate risks (such as flood and bushfire), allows a walkable environment and facilitates both rapid and frequent bus services
- Leverage the local distinctiveness of Luddenham Village and a continued place of residence and sustainable community
- Allow existing quarries and extractive industries to operate, facilitating circular economy outcomes



PROJECT PROCESS



A CO-DESIGN PROCESS

The Aerotropolis project has, at its outset, aimed to go beyond business as usual. The design process has continued that theme, promoting co-design as a mechanism to engage across technical disciplines, client groups and external stakeholders.

Initial workshops allowed the design teams and technical consultants to ascertain the key areas of opportunity and define spatial principles.

Two enquiry-by-design workshops were held with representatives across the Western Sydney Planning Partnership, and with identified stakeholders. These allowed design scenarios to be tested, for design objectives to be clarified, and for a preferred approach to precinct design to be identified.

Complementing the enquiry-by-design workshops, two community sessions were held to work through particular landowner aspirations and align those with the Aerotropolis strategic outcomes.

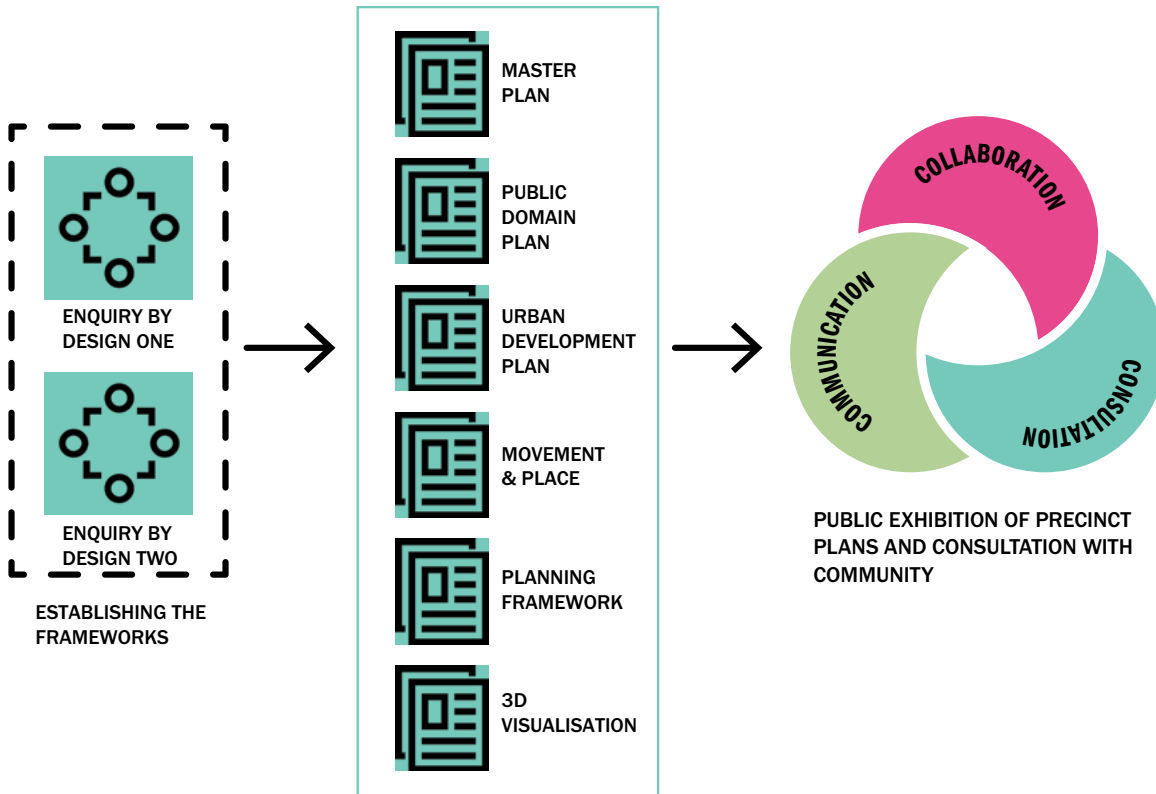
TECHNICAL WORKING GROUPS

Several technical working groups helped to shape the urban design frameworks. These groups addressed:

- Urban design
- Transport
- Environment and sustainability
- Water
- Urban economics and feasibility
- Servicing and land capability

The technical working groups comprised personnel from Councils, State Agencies and technical consultants.

The working groups met regularly throughout the design period to input to, review and refine urban design frameworks.



GANSW DESIGN REVIEWS

The urban design frameworks and associated content was presented to and reviewed by the Government Architect NSW throughout the project.

The four reviews focused on:

- Context, analysis and drivers
- Scenario development
- Integration across precinct boundaries
- Ensuring Design with Country and Landscape Led design outcomes

THREE URBAN DESIGN SCENARIOS

Each precinct group explored differing scenarios based on their particular contexts and precinct specific issues.

The three urban design scenarios prepared across the precincts focused on three themes in order to test ideas, objectives and outcomes:

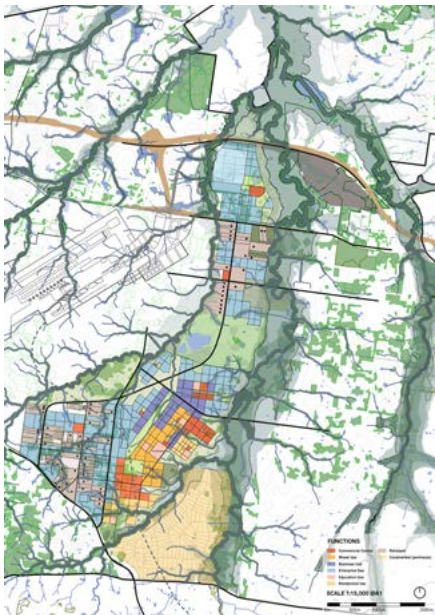
1. Aerotropolis Core, Badgerys Creek and Wianamatta - South: Ownership; Creeks and Water; Coordination.
2. Northern Gateway: Existing Lot Structure; Western Sydney Grid; Two Grids.
3. Agribusiness: Connected Landscape; Landscape Buffer; Fragmented Landscape.

AEROTROPOLIS CORE, BADGERYS CREEK AND WIANAMATTA SCENARIOS

By Hassell

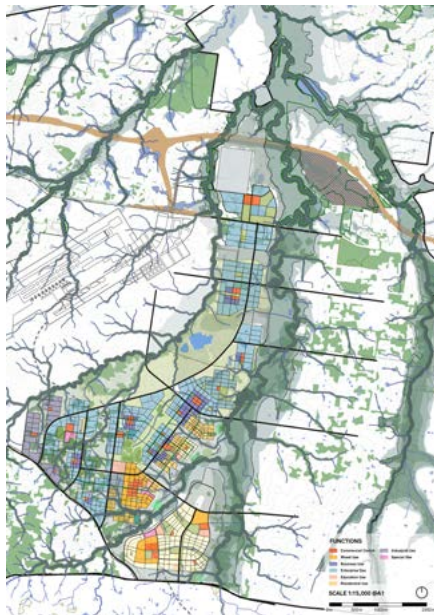
SCENARIO 1 - OWNERSHIP

- Development limited by fragmented land ownership
- Focused intensity to large land holdings
- No intensification south of Thompson Creek in Kelvin Park neighbourhood
- A centralised regional park



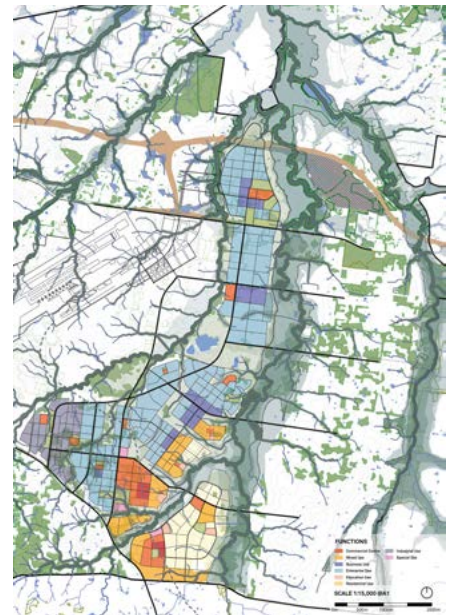
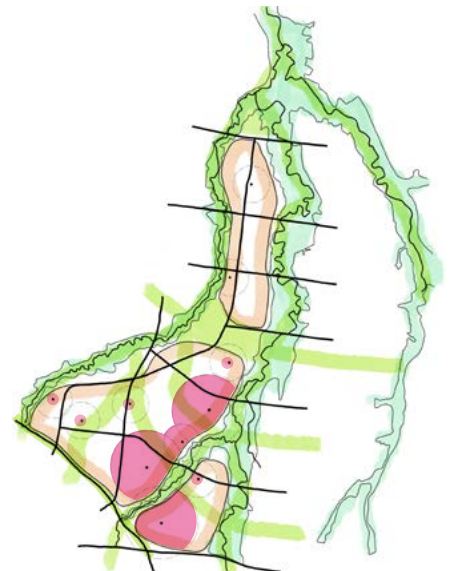
SCENARIO 2 - CREEKS & WATER

- Neighbourhood clusters enveloped by green corridors aligned to ephemeral creeks
- Intensity spread across each cluster, with greatest intensity around the Sydney Metro Western Sydney Airport Line station
- Additional station at Kelvin Park to enable development impetus
- A networked regional park system



SCENARIO 3 - COORDINATION

- Three development clusters each surrounded by a 'park' edge
- Intensity focused to Thompsons Creek and Metro Stations
- Green corridors along creek alignments are 'integrators' rather than 'separators'
- A centralised regional park

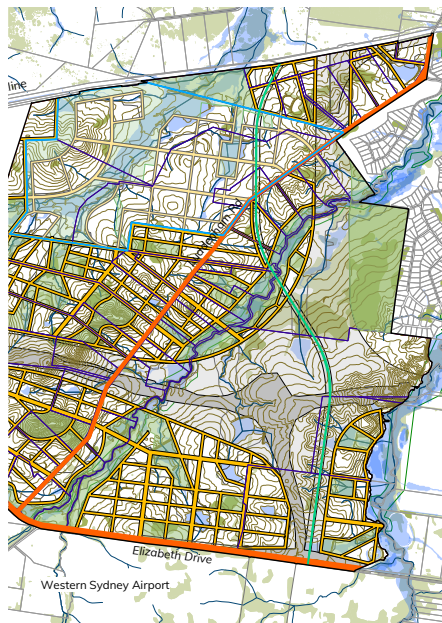


NORTHERN GATEWAY SCENARIOS

By Hill Thalís

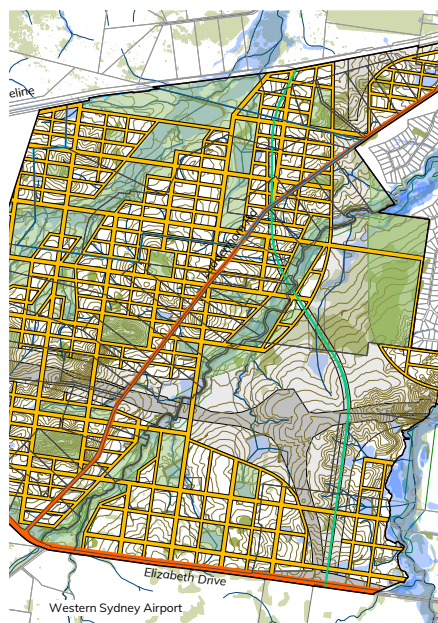
SCENARIO 1 - EXISTING LOT STRUCTURE

- Development and urban structure limited by fragmented land ownership
- Limited connectivity
- limited opportunity for creek to creek connections



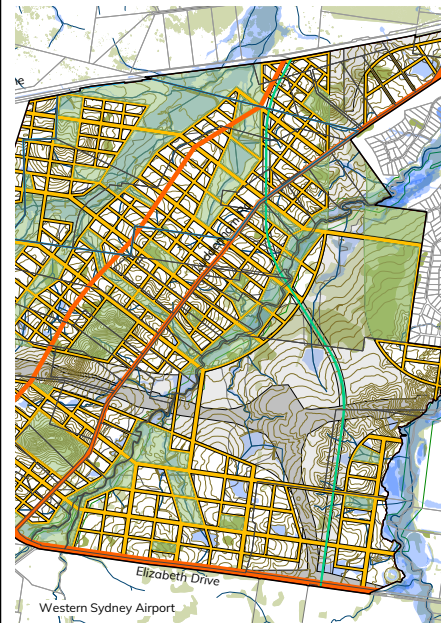
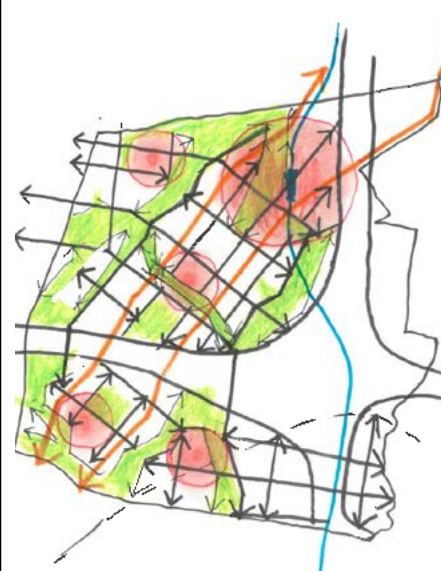
SCENARIO 2 - WESTERN SYDNEY GRID

- A more connected grid
- More reworking of creeks
- Optimal Orientation
- Difficult lot geometry becomes difficult along Luddenham road limiting development



SCENARIO 3 - TWO GRIDS

- A more connected grid
- less reworking of creeks and more opportunity to connect with Country
- Twin road allows alternate transport route and connectivity
- Optimal orientation along Western Sydney Grid. Orientation manageable along Luddenham grid

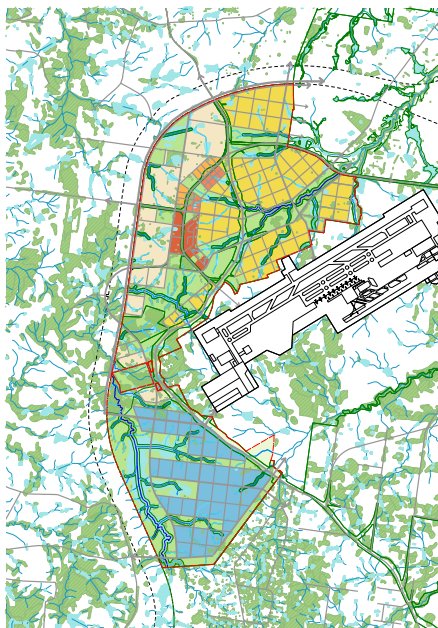


AGRIBUSINESS SCENARIOS

By Studio Hollenstein

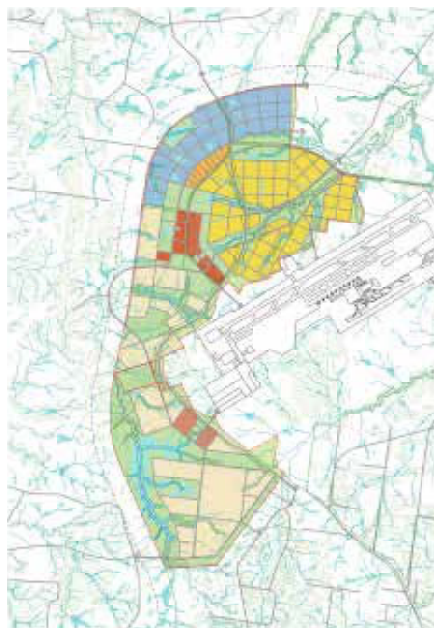
SCENARIO 1 - CONNECTED LANDSCAPE

- Land uses distributed to maximise connectivity with the airport freight entry
- Luddenham Village expands north with employment uses along the Northern Road
- Smaller centres are distributed throughout
- A connected landscape links Duncans Creek, Luddenham Village and Cosgroves Creek



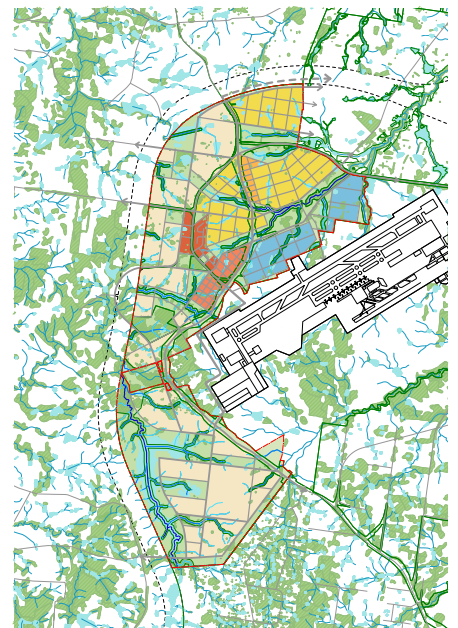
SCENARIO 2 - LANDSCAPE BUFFER

- Land uses distributed to maximise connectivity to the M12
- Two distinct centres at Luddenham village and another associated with the airport freight entry.
- A landscape buffer wraps Luddenham Village separating it from agribusiness land uses.



SCENARIO 3 - FRAGMENTED LANDSCAPE

- Land uses distributed to provide bonded connection to the airport
- Luddenham Village expands south with employment uses adjacent to the airport.
- Street pattern aligned more closely with land ownership
- Green corridors located along significant creek alignments.



ENQUIRY BY DESIGN SUMMARY

The co-design process for the Aerotropolis allowed the design teams, technical specialists and stakeholders to understand objectives and orders of priorities in order to balance often competing requirements.

To ensure an outcome beyond business as usual, and to reinforce the Parkland City outcomes, key urban design principles were used to pass a high level value judgement against each scenario. To be clear, the scenarios were not intended to represent an intended outcome, but were mechanisms to test issues. In this regard, using the principles as a filter, each urban design team was able to establish a core foundation from which to prepare the urban design frameworks.

In summary, the enquiry-by-design process confirmed:

- Creeks to be retained within open space systems
- Ridgetop parks offer good opportunities to connect topography, creeks and landscape with Country
- A gridded street network with a hierarchy of movement corridors is required
- A distribution of centres, open space and amenity in order to allow liveable and 'workable' (jobs) neighbourhoods
- Enable employment density around the Sydney Metro Western Sydney Airport Line stations
- Enable density adjacent to amenity (open space)
- Retain and enhance vegetation with biodiversity values
- Enable amalgamation of smaller land holdings that facilitate a coordinated development outcome



Design with Country

- challenges of time, knowledge, ongoing engagement



A Holistic Approach to Water

- metropolitan scale strategy, cross-agency engagement, ownership and management



Integrated Infrastructure

- social, ecological, movement systems; impacts of planned infrastructure



Delivering the Parkland City vision

- within airport operational requirements



Net Zero Neighbourhoods

- delivery mechanisms



Temporal and Spatial Questions

- phasing of development, considering land ownership, what's fixed and flexible



Potential Use and Place Conflicts

- urban typologies and relationship to site conditions

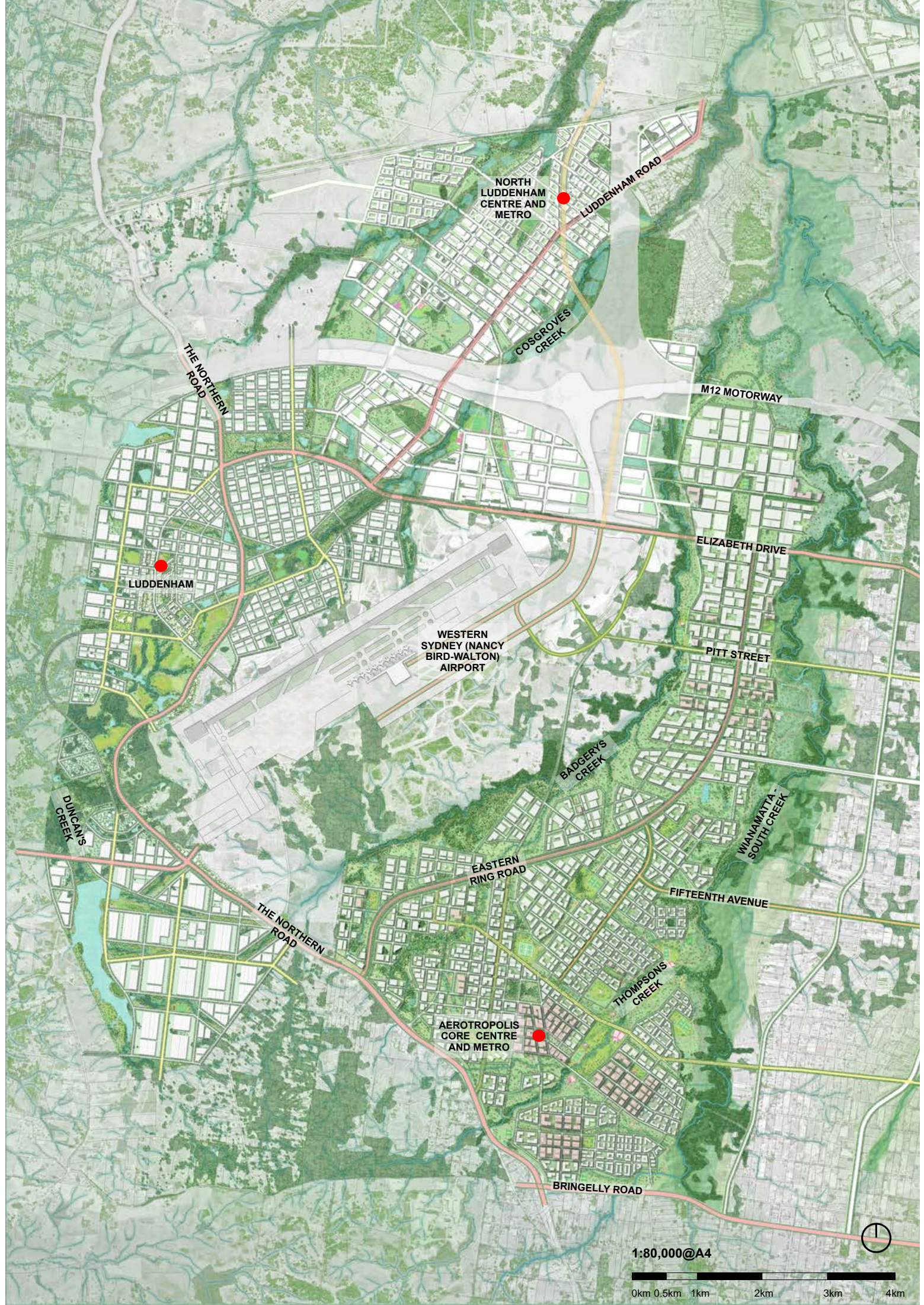


Quality Assurance at All Scales

- from strategy to delivery

PART 2: THE AERO- TROPOLIS FRAMEWORK

The Aerotropolis will be a coordinated urban system complementing the role and function of Western Sydney International (Nancy-Bird Walton) Airport. Connectivity across transport, open space, the undisturbed soil network and centre types is critical to ensuring it evolves into a dense, jobs focused economic hub.



1:80,000@A4

0km 0.5km 1km 2km 3km 4km

AEROTROPOLIS VISION



The Aerotropolis Core and Badgerys Creek Precincts, looking towards the Western Sydney (Nancy Bird Walton) Airport.

The Aerotropolis is Australia's newest global gateway, built around the world class Western Sydney International (Nancy-Bird Walton) Airport. Its evolution has driven transformational change in the Western Parkland City. Development is framed around the Wianamatta–South Creek corridor and an expansive network of parklands and waterways to realise the cool and connected Western Parkland City. Above all, it respects and connects Country. It creates opportunity, amenity and sustainability for workers and residents in Western Sydney.



PRINCIPLES

The urban design frameworks establish the intended vision and an approach to realise urban targets and development outcomes articulated within the Western Sydney Aerotropolis Plan. The urban design principles for the Aerotropolis offer a flexible framework from which future development proposals can be considered.



BUILDING ON THE WSAP VISION

WESTERN SYDNEY AEROTROPOLIS PLAN OBJECTIVES

The Western Sydney Aerotropolis Plan provides the direction for precinct planning and has informed the spatial principles applying to the urban design frameworks across each initial precinct.

The WSAP balances this with an ambitious 'landscape-led' planning approach, where the structure and places of the Aerotropolis are defined by the Blue-Green Infrastructure Framework – a network of blue and green spaces and assets such as waterways, open spaces and tree canopy.

The WSAP begins by establishing a vision, objectives and principles to give effect to these objectives. It identifies the intended land use planning outcomes for each of the 10 precincts and a sequenced approach to precinct planning that optimises investment in major infrastructure and creates the impetus to activate the Aerotropolis early.

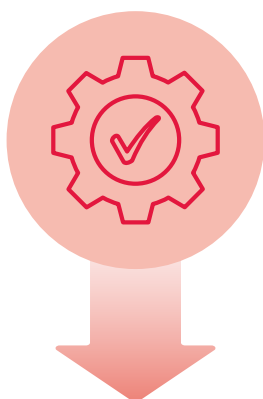
The WSAP gives effect to 4 themes, 11 objectives and 50 principles. These have been carried forward spatially to derive the urban design and landscape plans for the initial precincts.

AEROTROPOLIS SHAPING OBJECTIVES AND PRINCIPLES IN THE WSAP

Recognise Country

Acknowledge Traditional Custodians and provide opportunities to Connect with Country, Design for Country and Care for Country when planning for the Aerotropolis.

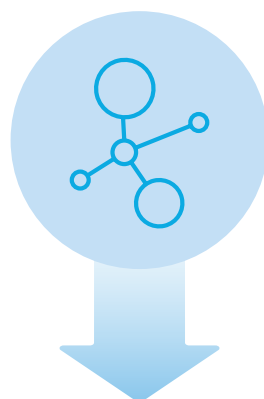
Productivity



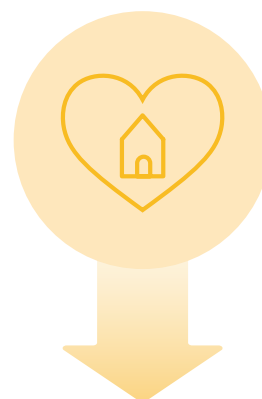
Sustainability



Infrastructure and collaboration

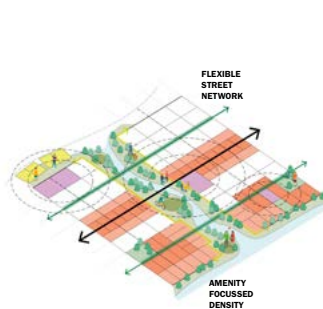


Liveability



AEROTROPOLIS INITIAL PRECINCT SPATIAL PRINCIPLES

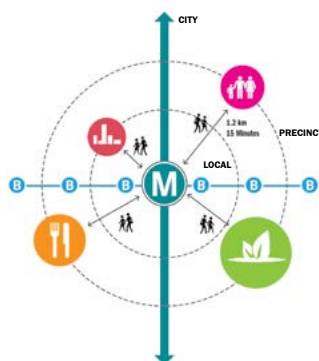
Productivity and Liveability



Sustainability



Connectivity



Place and Built Form



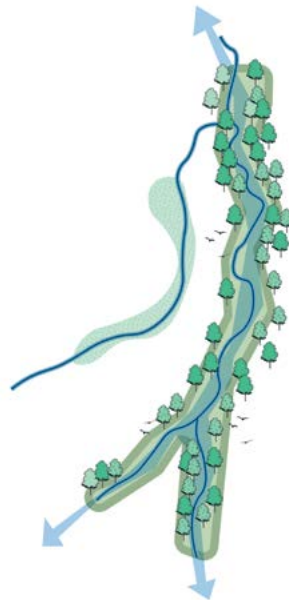
URBAN DESIGN PRINCIPLES

SUSTAINABILITY



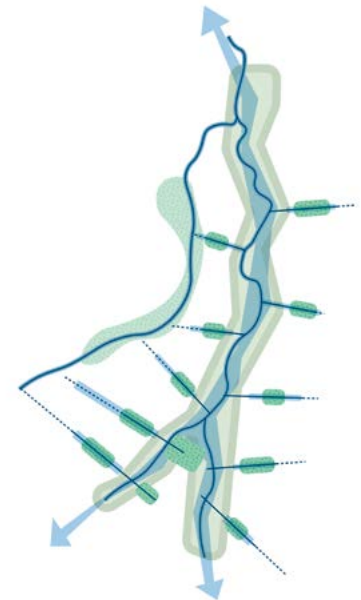
Join landscape with water

- 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

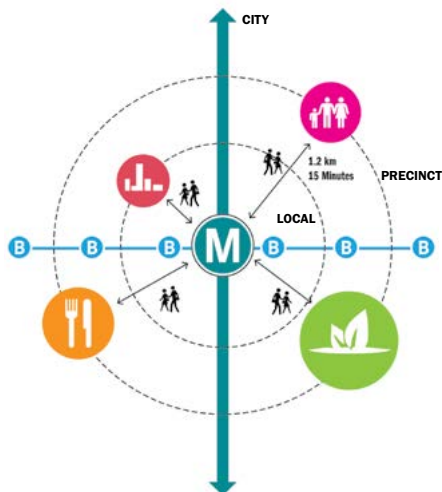
- The Wianamatta - South Creek, Badgerys, Thompsons and Cosgroves Creek system will be enhanced as a critical ecological corridor through the Aerotropolis
- High risk flood areas will be retained for existing ecology and water functions
- Medium risk flood areas will contain active transport, ecology 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

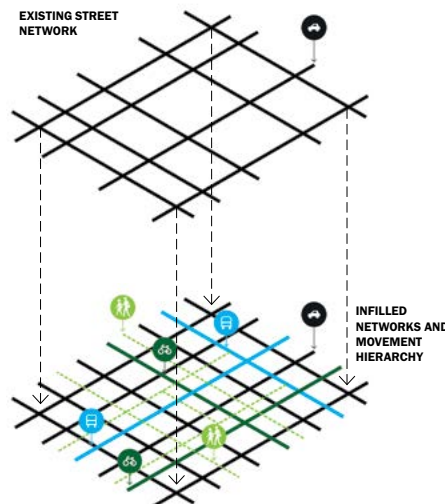
- Creeks, including ephemeral waterways, are retained to their natural flow path and contours, in open space, from Strahler category 2 and higher
- The ecology of the ephemeral creek systems will be improved through local endemic species planting
- Planting and landscape design will ensure stormwater 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

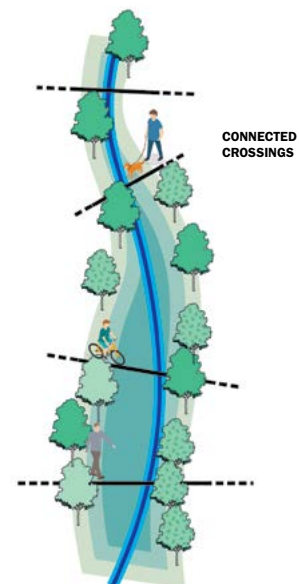
- Sydney Metro Western Sydney Airport Line stations will be supported by high quality public realm, dense mixed use neighbourhoods, an intensity of jobs and good connectivity with other forms of public and active transport
- Neighbourhoods are designed to offer walkable catchments to Sydney Metro Western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



A connected and permeable urban structure

- Streets across the mixed use and employment zones are designed to provide a connected, legible and permeable network
- Street networks are designed to continue into future stages, including across arterial roads where appropriate
- A hierarchy of street types is provided that enables highly walkable, comfortable and amenable streets in centres, the mixed use zone and throughout the employment zone
- 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 capable streets is no greater than a 400 metre walk from job or living locations
- Development blocks and buildings are designed to interface positively with all street types

Hassell ©



Provide regular creek crossings

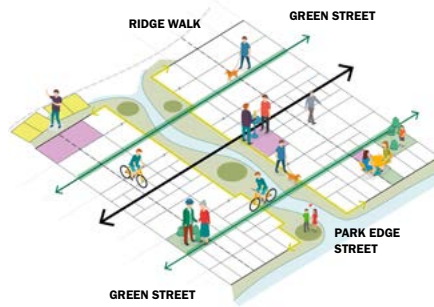
- The public realm and street network will be designed to enable convenient, comfortable and safe walking and bicycle access to the Wianamatta - South Creek, Thompsons, Badgerys and Cosgroves Creek systems
- Regular creek crossings will be provided to support walkable catchments, ideally every 400 metres
- 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



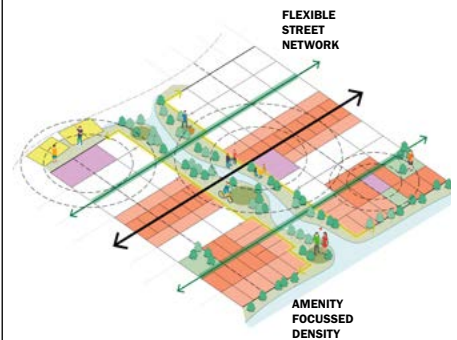
Centres provide a focus to all neighbourhoods

- 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 hierarchy
- 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

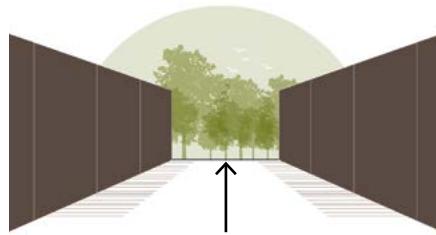
- Neighbourhoods are designed to align areas of density with areas of high amenity, such as open space, creek corridors and public transport
- Neighbourhoods are designed to facilitate convenient accessibility from public transport spines to dense areas around open space amenity

PLACE AND BUILT FORM



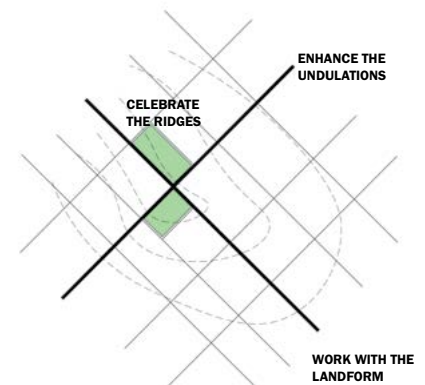
Urban structure responds to Country (land, water, sky)

- 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 space



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

The Aerotropolis applies a new model of city making - founded on Country, landscape and sustainability principles. It will be a place of boundless opportunity, where the Western Sydney International (Nancy-Bird Walton) Airport offers connections to the globe for a thousands of future focused businesses.

It is a place of inclusion, where everyone has access to the best of Western Sydney's amenity. Rapid transit and world class parkland provide a launchpad for thousands of new jobs, establishing the Core as the place to be in Western Sydney.

This is a place for future generations. The city framework for the Aerotropolis focuses on custodianship. What we do now sets in motion a path towards a sustainable city that will nurture people, landscape, culture and Country.

A CITY OF THE LANDSCAPE

The landscape-led design approach to the Aerotropolis means Country and its landscape are at the heart of the city. Creeks, parkland, ecology and water envelop dense urban neighbourhoods and employment areas. This serves to create a distinct place like no other, because it is, and is of its place. Where ridgetops roll into ephemeral creek systems. Where structured green parks frame city neighbourhoods. And where the ecology of place can thrive.

WIANAMATTA CUSTODIANSHIP

The Wianamatta system is fundamental to the Aerotropolis. A sacred place for First Peoples, it will be retained as open space and enhanced for its water, ecology and recreation functions.

The Wianamatta holds the Aerotropolis. As a place of water, it is the life source for the city, and its conservation is fundamental to Western Sydney's future.

REALISING THE 30 MINUTE CITY

The Aerotropolis and its initial precincts provide a framework for the 30 minute city to be exemplified. With rapid transit provided by Metro connections, the thousands of jobs throughout the Aerotropolis are within easy reach for Western Sydney residents. Rapid bus connections to Campbelltown, Penrith and Liverpool further bolster jobs accessibility. At a local scale, walkable neighbourhoods offer excellent accessibility to centres, social infrastructure and parkland. Everything is within 30 minutes.

KNOWLEDGE RICH AND SOCIALLY INCLUSIVE

The accessibility, export, amenity and landscape qualities of the Aerotropolis provide the right conditions for a host of new business to be established. With a focus on the knowledge economy, high quality, export oriented jobs will form a key tranche of the local economy.

The Aerotropolis is for everyone. Easily accessible, its urban and parkland landscapes offer huge opportunity for Western Sydney residents to benefit from the boundless future.

A GATEWAY TO THE GLOBE

Thousands of hectares of employment land will provide places for businesses to thrive. Taking advantage of the immediate global access the airport provides, future focused businesses will be able to leverage the export opportunities available to them. From agribusiness, to advanced manufacturing and smart logistics, boundless opportunities are available for new economies to emerge.

The arrangement of the city will provide a new front door to Sydney and Australia. The unique landscape setting provides a fundamentally Western Sydney arrival experience, encouraging visitor attraction and thriving local businesses.

Note: This project has considered the extent of the Wianamatta-South Creek corridor adjacent to the initial precincts. Future precinct planning work throughout the Rossmore and Kemps Creek precincts will consider appropriate land use, urban design and landscape outcomes for the additional parts of the Wianamatta-South Creek corridor not addressed in this report.



BLUE AND GREEN INFRASTRUCTURE FRAMEWORK

Enabling an interconnected system

The Aerotropolis will have compact urban form – a place where centres and local communities are connected by walking, cycling, interaction and collaboration. A compact urban form minimises the urban footprint and leaves more land for open spaces, waterways and recreation areas. It allows people to access a diversity of uses within walking distance of centres, open space or transport.

- Western Sydney Aerotropolis Plan, pp 23.

The urban design frameworks are informed by the *Western Parkland City Landscape-Led Urban Design Guidelines* (Infrastructure NSW, Tyrrell Studio).

Open space throughout the Aerotropolis needs to accommodate a range of functions beyond active recreation to ensure place-based and sustainability outcomes. This includes:

- Water: Detention and stormwater flow paths along ephemeral creek corridors to the Wianamatta system (or Nepean system in parts of the Agribusiness precinct)
- Permeability: Areas of landscape where rainwater can permeate the soil profile, helping minimise stormwater run-off
- Urban Cooling: Areas for tree canopy and 'green' spaces that provide transpiration to cool surrounding areas
- Heritage: Containing culturally significant landscapes - Country - and heritage listed sites
- Biodiversity: Providing a foundation for the conservation and enhancement of important vegetation communities
- Corridors for wildlife migration

THE BLUE-GREEN INFRASTRUCTURE FRAMEWORK

The following elements form the core of the framework:

Physical elements:

- Alluvial corridors - 1% AEP year flood zone of major creeks
- The Filigree of creeks and dams
- Ridgelines

- Remnant vegetation with biodiversity values

Intangible and visual elements:

- Connection with Country
- Context of existing broader landscape
- Cumberland Plain character
 - grasslands with groups of trees within gently undulating landscape
- Rhythm of undulating terrain of creeks and ridgelines
- Views beyond the precinct to landscape landmarks - for example to the Blue Mountains
- Open views to big sky

Areas for specific needs of the natural system have been included. These are designated primarily for environmental protection, and include generous linear parks along creeks to accommodate water retention within the landscape and corridors to allow for wildlife to migrate through the urban fabric.

The urban fabric engages with this open space framework; amenities are oriented to the parks. Nature and its elements are an integral part of a daily life for workers, residents and visitors of Aerotropolis.

It is acknowledged the Aerotropolis precinct will be profoundly altered from its current rural setting. However, by employing landscape led urbanism principles and embedding key landscape elements of this place as an organising structure of the open space framework, the core character of this place can be preserved, protected and enhanced.



STORM WATER AND WATER CYCLE MANAGEMENT

By Sydney Water

An interim Stormwater and Water Cycle Management Study has been prepared by Sydney Water to outline how stormwater, wastewater, recycled water as well as trunk drainage and riparian zones, should be managed in the initial precincts of the Aerotropolis.

INTEGRATED WATER SERVICING

Water servicing for precincts are to feature total water cycle management that integrates and balances drinking water, wastewater, recycled wastewater and harvested stormwater. A final water balance will be provided that ensures water servicing will minimise demands on potable water supplies through alternative water sources.

Recycled wastewater will be provided to the area. Sydney Water has developed a proposed recycled water supply network from the Upper South Creek Advanced Water Recycling Centre at the Sub Regional planning level to service non-drinking uses across Aerotropolis. Recycled water storages within the network would be provided and be topped-up from the drinking water network when recycled water supply cannot meet demand.

The final balance of recycled water and harvested stormwater will be calibrated to achieve waterway health outcomes.

Sydney Water is also assessing alternate uses for highly purified recycled water such as environmental flows and augmentation of the drinking water supply.

The table overleaf provides an overview of Sydney Water's drinking water and wastewater servicing strategy.

Recommendations:

- Water servicing for precincts are to feature total water cycle management that integrates and balances drinking water, wastewater, recycled wastewater and harvested stormwater in line with the finalised scenario.
- All open spaces, areas of landscaping, parks and streets must be developed to include irrigation infrastructure to ensure demand and provide expected urban cooling benefits.
- A final water balance will be provided to ensure water servicing will minimise demands on potable water supplies through alternative water sources, such as recycled water.
- The final balance of recycled water and harvested stormwater will be calibrated to achieve waterway health outcomes.

Timing	Measures
Drinking Water	
Existing	<p>Each of the initial precincts fall in Cecil Park Water Supply Zone within the Prospect South Delivery System and currently have limited to no water services available.</p> <p>Cecil Park Reservoirs are currently at capacity and cannot accommodate demands from new developments without the additional proposed amplification work to transfer flow from Liverpool and trunk infrastructure proposed within Cecil Park Water Supply Zone (WSZ).</p>
Interim	<p>Sydney Water is committed to provide services to early developments.</p> <p>Sydney Water are currently delivering the following trunk drinking water infrastructure to increase supply to the area:</p> <ul style="list-style-type: none"> → Rising Main (DN900) and pump WP0432 at Liverpool → DN1200/DN1050 from Cecil Park reservoir up to Western Road, with offtakes at Range Road and Western Road connecting existing mains in Elizabeth Drive. <p>This work is in delivery and proposed to be operational in 2022.</p> <p>Sydney Water is also planning to deliver trunk infrastructure to support growth and major projects along Elizabeth Drive and Luddenham Road. Interim servicing may include offtakes from proposed mains in Elizabeth Drive to Badgerys Creek, Agribusiness and Northern Gateway precincts.</p> <p>Interim servicing for Aerotropolis Core precinct would be through proposed Oran Park Reservoir via Northern Road mains.</p>
Ultimate	<p>The current ultimate drinking water supply strategy for these precincts is to supply from Prospect South delivery system via the Cecil Park water supply zone and a proposed new water supply zone. A new reservoir (60ML) is proposed in the west at the end of Elizabeth Drive within the Agribusiness precinct.</p> <p>New drinking water reservoirs, pumping stations and trunk mains are required to fully service the precincts.</p> <p>Purified recycled water could also be introduced as a source for the drinking water supply however this would be a city-wide decision and has not been considered locally.</p>
Wastewater	
Existing	<p>Each of the initial precincts currently have very limited wastewater servicing available, with most areas relying on septic tanks for wastewater disposal.</p>
Interim	<p>Sydney Water is committed to working with developers for interim servicing to early developments prior to 2025/26. Interim servicing may include decentralised wastewater treatment, tankering or interim pumped transfer. Interim servicing would be designed for transition to long term servicing with the timing of transition to be assessed on a case by case basis.</p>
Ultimate	<p>To fully service the region requires several wastewater pumping stations (WWPS) and deep gravity trunk mains. Several new pressure mains will transfer flows to the proposed Upper South Creek Advanced Water Recycling Centre (USC AWRC). The AWRC first stage completion is targeted for mid2025. Trunk wastewater infrastructure is planned to be delivered in stages based on DPIE growth forecasts. The first stages are planned to be delivered in line with operation of the new AWRC.</p>

WATERWAY HEALTH

Landscape led planning is being applied to orient new urban development around the network of waterways that provide the central landscape features for the region. This planning recognises the cultural, ecological and recreational values of those waterways and includes Government waterway management objectives that will preserve those values. These objectives are being developed through the application of the NSW Government's Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land use Planning Decisions (risk-based framework).

The Stormwater and Water Cycle Management Study adopts these objectives and demonstrates how a range of integrated water cycle strategies are required and have been integrated with other government objectives regarding open space, active transport, native vegetation, riparian vegetation policy, urban cooling, flooding and airport specific risk management.

Achieving a reduction in stormwater runoff volumes represents a shift in stormwater management that requires a combination of at-source controls, rainwater and stormwater harvesting and vegetated Water Sensitive Urban Design (WSUD) elements including biofiltration and wetlands, that can mimic the existing hydrological characteristics of the rural catchment.

Recommendations:

- Development within the Aerotropolis is to ensure waterways, riparian corridors, selected farm dams, open water bodies and other water dependent ecosystems are protected, restored and maintained.
- All development and public infrastructure must comply with, and contribute towards, the waterway health objectives development by the NSW Government under the Risk Based Framework for Considering Waterway Health Outcomes in Strategic Land Use Decisions.

STORMWATER SYSTEM AND PRECINCT SCALE WATER QUANTITY MANAGEMENT

A range of trunk drainage and preferred WSUD stormwater management elements have been developed through consultation with Penrith and Liverpool Councils. These WSUD elements work together to preserve the local waterways that cross the precincts as well as waterways in the lower catchment.

Achieving the stormwater management objectives will require a shift away from stormwater filtration to an approach that is more focussed on the retention of stormwater in the landscape through a combination of:

- Rainwater tanks to supply non potable and irrigation demands on private lands and in street verges
- Maximising the retention and evaporative losses of stormwater through vegetated systems including passive irrigation, biofiltration street trees and wetlands
- Exploiting opportunities for stormwater harvesting across the catchments where constraints permit.

A coordinated approach will be required to ensure that that land-take and maintenance efforts are minimised to a consolidated number of effective stormwater assets located strategically.

The stormwater system also aims to manage peak flows for frequent events (e.g. 50% AEP) to minimise the risk of impacts to stream morphology as a result of an increase in imperviousness due to development.

To manage local runoff and the impact that the Aerotropolis has on downstream areas, storm flows will need to be detained within the landscape. In consultation with stakeholders the study has shown that a combination of on-site detention (for industrial areas), on-line detention (on 1st and 2nd order creeks) through natural drainage design and stormwater assets can sufficiently manage precinct scale runoff and must be employed throughout the Aerotropolis.

Recommendations:

- Trunk drainage is to be through natural creek lines or constructed natural drainage channels to help detain flows and contribute to biodiversity, public amenity and safety. The ongoing ownership and management of these assets must ensure adequate and sustainable funding for maintenance is available.
- Urban layouts, streets and drainage are to achieve effective perviousness and flow targets.
- Stormwater systems including on private lots, within the streetscape and trunk drainage must be designed to achieve the waterway health, urban cooling, tree canopy and open space outcomes through

Water Sensitive Urban Design treatment trains.

- An allocation of enough, suitably located land area to allow for stormwater assets must be provided.
- Stormwater assets in the public realm should be designed as multifunctional also contributing to waterway health, biodiversity and public amenity.
- Stormwater systems should manage peak flows for frequent events to minimise the risk of impacts to stream morphology.

RIPARIAN LAND MANAGEMENT

The protection, restoration and maintenance of waterways, riparian corridors, and water dependent ecosystems is essential in achieving the cultural, social and biodiversity aspirations as well as tree canopy targets of the Parkland City.

Creeks within the initial precincts are being validated and mapped with associated vegetated riparian zones to support waterway health. Water dependant ecosystems and key fish habitat is also being identified and mapped. A riparian revegetation strategy will be developed once fieldwork is complete, recommending the areas and likely costs of riparian land that should be revegetated.

As part of the early works, Sydney Water have undertaken a desktop spatial data review to guide urban design framework preparation:

- Validate waterways and map riparian zones to be protected;
- Identify groundwater dependent ecosystems and Key Aquatic Habitat;
- Assess the ecological condition of selected farm dams, and
- Riparian vegetation analysis.

Recommendations:

- Vegetated riparian zones (VRZ) adjacent to creeks and other water bodies will be mapped and must be protected, restored and maintained.
- Opportunities to revegetate beyond standard VRZs should be explored to maximize biodiversity outcomes and achieve urban canopy targets, particularly within the Wianamatta Precinct.
- The ongoing ownership and management of these assets must ensure adequate access and sustainable funding for maintenance is available

FLOOD MANAGEMENT

Flood modelling recently undertaken has identified additional areas beyond the Environment and Recreation zone that require consideration in the precinct plans. These areas have accounted for shifts in the extent of urban developable land within the Aerotropolis Core, Badgerys Creek, Northern Gateway and Agribusiness precincts.

The urban footprints have been kept outside the 1% AEP to ensure that areas of high hydraulic importance are kept free of blockages, to avoid adverse impacts on peak flood levels and flow velocities and to ensure consistency in the application of urban design principles for the Aerotropolis.

The mapping of indicative cross-sections have been adjusted across the precincts, as appropriate, to ensure consistency with the hazard categories used, as well as consistent naming of creeks.

WATER IN THE LANDSCAPE

By DPIE-Environment, Energy and Science Group and CT Environmental

The vision for Wianamatta-South Creek (and its tributaries) is to become a cool green corridor through the Western Parkland City, and be the core element of liveability and amenity for the residents. This vision relies on urban planners to explicitly keep water in the landscape by integrating waterways into the design of the city and residential neighbourhoods, and for the waterways to be healthy so they can provide the essential services and functions expected of a cool green corridor.

Currently, the Wianamatta-South Creek catchment is the most degraded catchment in the Hawkesbury-Nepean River system due to historical vegetation clearing and urbanisation. Increased urbanisation will further degrade the waterways if stormwater, wastewater and flooding regimes are not managed, upfront through an integrated ecosystem approach. This approach requires the waterways and hydrological cycle to be central considerations in both land use and water infrastructure planning.

To help deliver the vision, the NSW Government has developed performance criteria relevant to:

- the protection, maintenance and/or restoration of waterways, riparian corridors, water bodies and other water dependent ecosystems that make up the 'blue' components of the Blue-Green Infrastructure Framework
- a landscape led approach to integrated stormwater management and water sensitive urban design

The performance criteria (Tables 1, 2) are referred to as water quality and flow objectives and apply to all urban developments on land in the precinct. Compliance towards achieving the performance criteria must follow the protocol outlined in the Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions (OEH/EPA, 2017).

The performance criteria are responsive to the protection and improvement of the condition of high ecological value waterways and water dependent ecosystems (Figure 1, DPIE 2020) in the Western Sydney Aerotropolis. These ecosystems include some existing native vegetation (i.e. groundwater dependent vegetation) that are protected under the Biodiversity Conservation Act 2016 and Environment Protection and Biodiversity Conservation Act 1999, and some identified as environmentally sensitive waterways and riparian in existing Local Environment Plans. These ecosystems are mostly located in the floodplain, and are home to many threatened, critically endangered and high ecological value species of fauna and flora, including those considered iconic to the area (bass, bats and a range of birds) or are totems for the local Aboriginal communities (e.g. water dragons).

The Riparian Revegetation Strategy for the Western Sydney Aerotropolis (Sydney Water, 2020) identifies a strategy for the protection and improvement of riparian corridors and other water dependent vegetation. The strategy explicitly accounts for the high ecological value waterways and water dependent ecosystems (as shown in Figure 1), and flood and development constraints, while achieving the Western Parkland City vision using vegetation communities endemic to the Cumberland Plain (CT Environmental 2020).

The performance criteria are also responsive to the ephemeral nature of the waterways in the Western Sydney Aerotropolis. To stay ephemeral requires considered planning of the stormwater flow paths and consequent volume and timing of discharges. In some instances, there will be a requirement to undertake bed and bank stabilisation works to prevent erosion and provide habitat for fish and other aquatic life.

Table 1 Ambient water quality of waterways and waterbodies in the Western Sydney Aerotropolis

Water Quality Objectives	
*Total Nitrogen (TN, mg/L)	1.72
Dissolved Inorganic Nitrogen (DIN, mg/L)	0.74
Ammonia (NH ₃ -N, mg/L)	0.08
Oxidised Nitrogen (NO _x , mg/L)	0.66
*Total Phosphorus (TP, mg/L)	0.14
Dissolved Inorganic Phosphorus (DIP, mg/L)	0.04
Turbidity (NTU)	50
Total Suspended Solids (TSS, mg/L)	37
Conductivity (µS/cm)	1103
pH	6.20 - 7.60
Dissolved Oxygen (DO, %SAT)	43 - 75
Dissolved Oxygen (DO, mg/L)	8

* when showing compliance towards TN and TP through industry models, the DIN and DIP performance criteria should be instead to recognise that stormwater discharges of nutrients are mostly in dissolved form

Table 2 *Ambient stream flows and requirements of waterways and water dependent ecosystems in the Western Sydney Aerotropolis

Flow Objectives		
	1-2 Order Streams	3rd Order Streams or greater
Median Daily Flow Volume (L/ha)	71.8 ± 22.0	1095.0 ± 157.3
Mean Daily Flow Volume (L/ha)	2351.1 ± 604.6	5542.2 ± 320.9
High Spell (L/ha) ≥ 90th Percentile Daily Flow Volume	2048.4 ± 739.2	10091.7 ± 769.7
High Spell - Frequency (number/y)	6.9 ± 0.4	19.2 ± 1.0
High Spell - Average Duration (days/y)	6.1 ± 0.4	2.2 ± 0.2
Freshes (L/ha) ≥ 75th and ≤ 90th Percentile Daily Flow Volume	327.1 to 2048.4	2642.9 to 10091.7
Freshes - Frequency (number/y)	4.0 ± 0.9	24.6 ± 0.7
Freshes - Average Duration (days/y)	38.2 ± 5.8	2.5 ± 0.1
Cease to Flow (proportion of time/y)	0.34 ± 0.04	0.03 ± 0.007
Cease to Flow – Duration (days/y)	36.8 ± 6	6 ± 1.1

* numerical values for performance criteria will be finalised following public exhibition of the Urban design framework

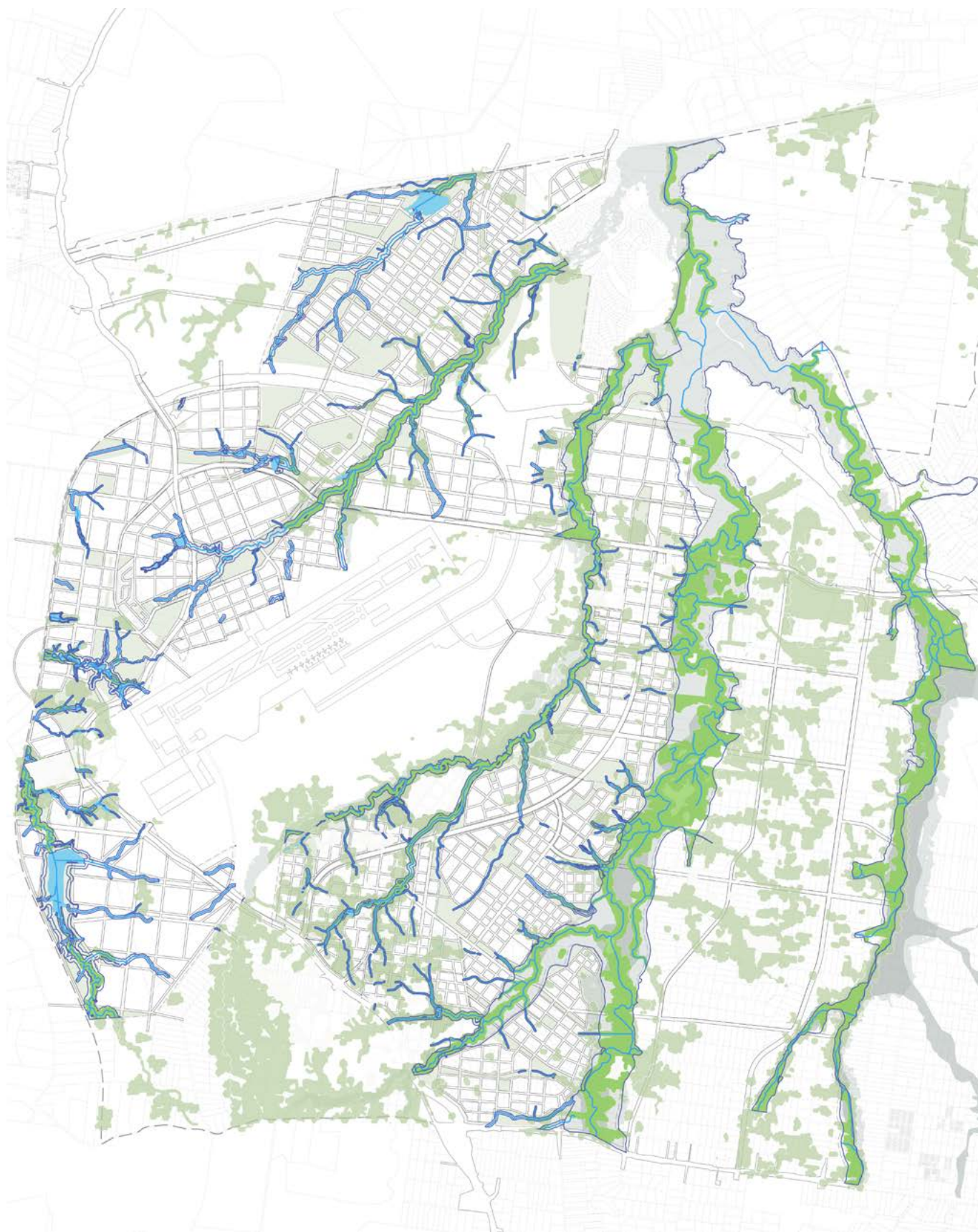


Figure: High ecological value (HEV) waterways, riparian vegetation, water bodies (including farm dams) and other water dependent ecosystems in the Western Sydney Aerotropolis. The map* shows the extent of existing high ecological value water dependent ecosystems both within and outside of the vegetated riparian zone (VRZ)

* map has been field validated, and will be finalised following public exhibition of Urban design framework

ACHIEVING THE PARKLAND CITY

Streets as a green and cool setting for public life

Based on substantial work undertaken by the Western Sydney Planning Partnership and the associated local Councils, the Western Sydney Street Design Guidelines have informed the street typologies proposed for Aerotropolis.

Proposed street profiles encourage active transport and create a green and cool setting for everyday life in the in the Western Parkland City.

GREEN STREETS AS AN INTEGRAL PART OF THE OPEN SPACE FRAMEWORK

- Generous areas of continuous deep soil have been allowed for within the street profiles to allow for large trees to be planted.
- Multi layered street tree canopy increases street comfort, reduces surface temperature and creates a cooler environment.
- Continuous tree canopy provides shade to the pedestrian zone, planting areas between carriageway and pedestrian zones to increase pedestrian comfort.
- Zones for seating and street furniture provide resting places and encourage public life under the tree canopies.

STREETSCAPE AS PART OF BLUE-GREEN GRID

- WSUD raingardens have been embedded in the street profile design to allow for passive street tree watering whilst also removing pollutants and reducing the storm water outflow.
- Streetscape with generous planting rich in diversity (both tree canopy and groundcover) contributes to the biodiversity within the urban fabric.

ACTIVE AND PUBLIC TRANSPORT PRIORITISED

- Priority has been given to comfort of pedestrians and cyclists.
- All streets can accommodate one-way cycle paths to facilitate efficient active transport
- Rapid bus lanes have been proposed for selected corridors.

ACTIVE, PUBLICLY ACCESSIBLE INTERFACE WITH OPEN SPACE

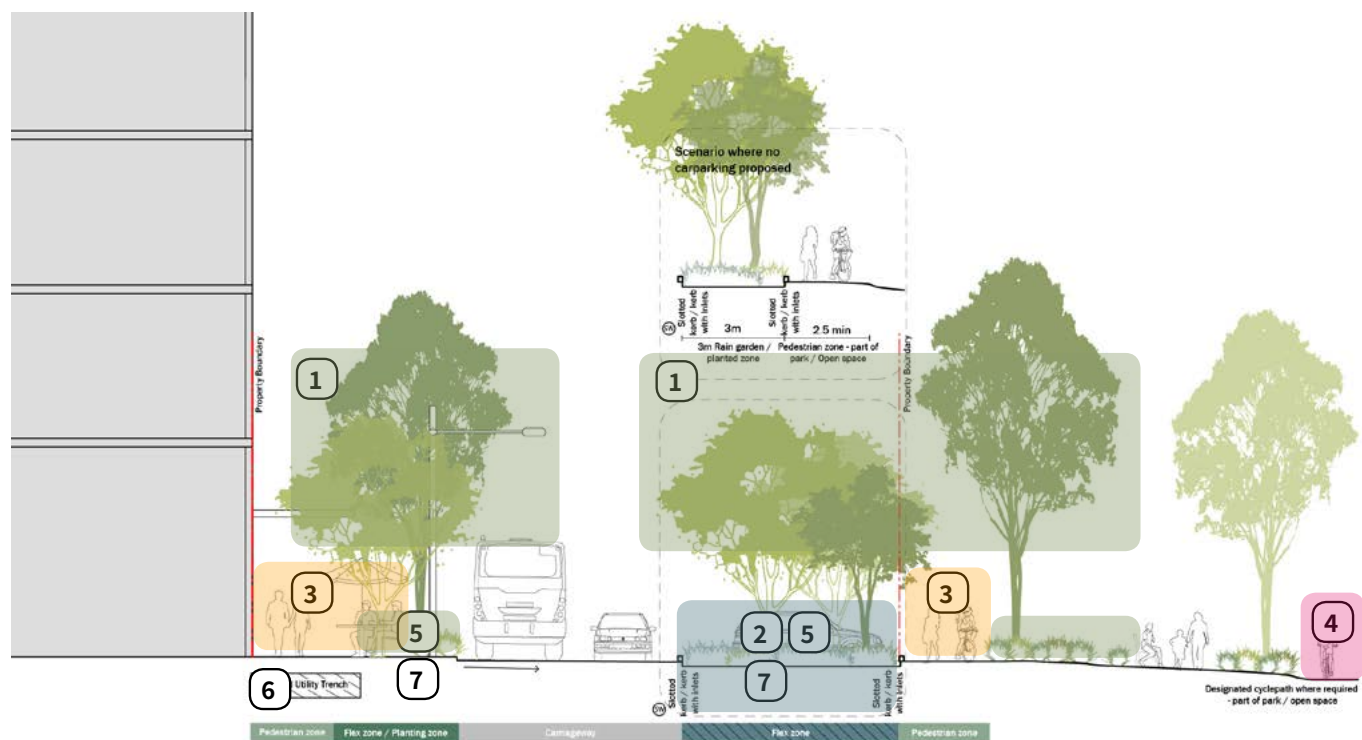
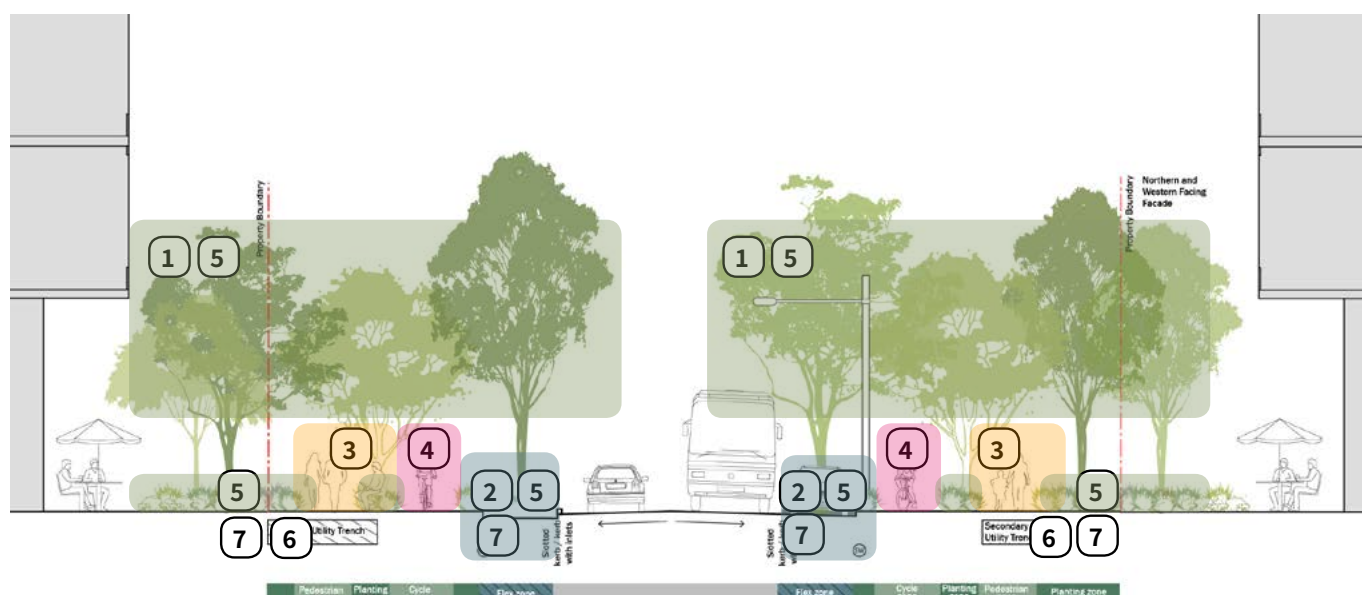
- Urban structure is oriented to the open space. Park Streets are proposed along the interface with open space to ensure public access and active interface.

MULTI-UTILITY CORRIDORS

- Compact, multi-utility trenches below footpaths have been proposed to maximise the area of unobstructed deep soil.

GROUND PERMEABILITY

- Proposed street typologies maximise areas of permeable (planting) and semi-permeable surfaces.

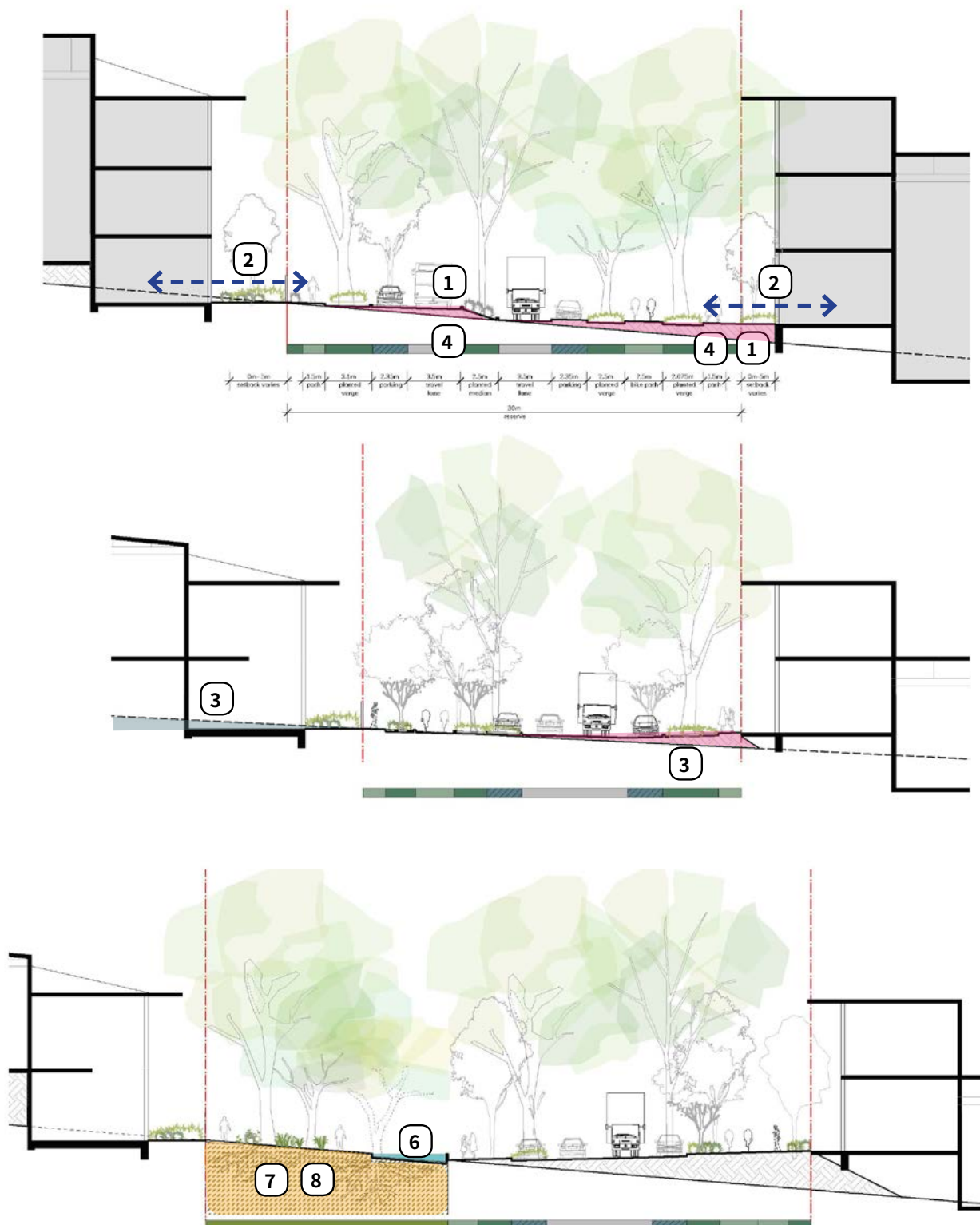


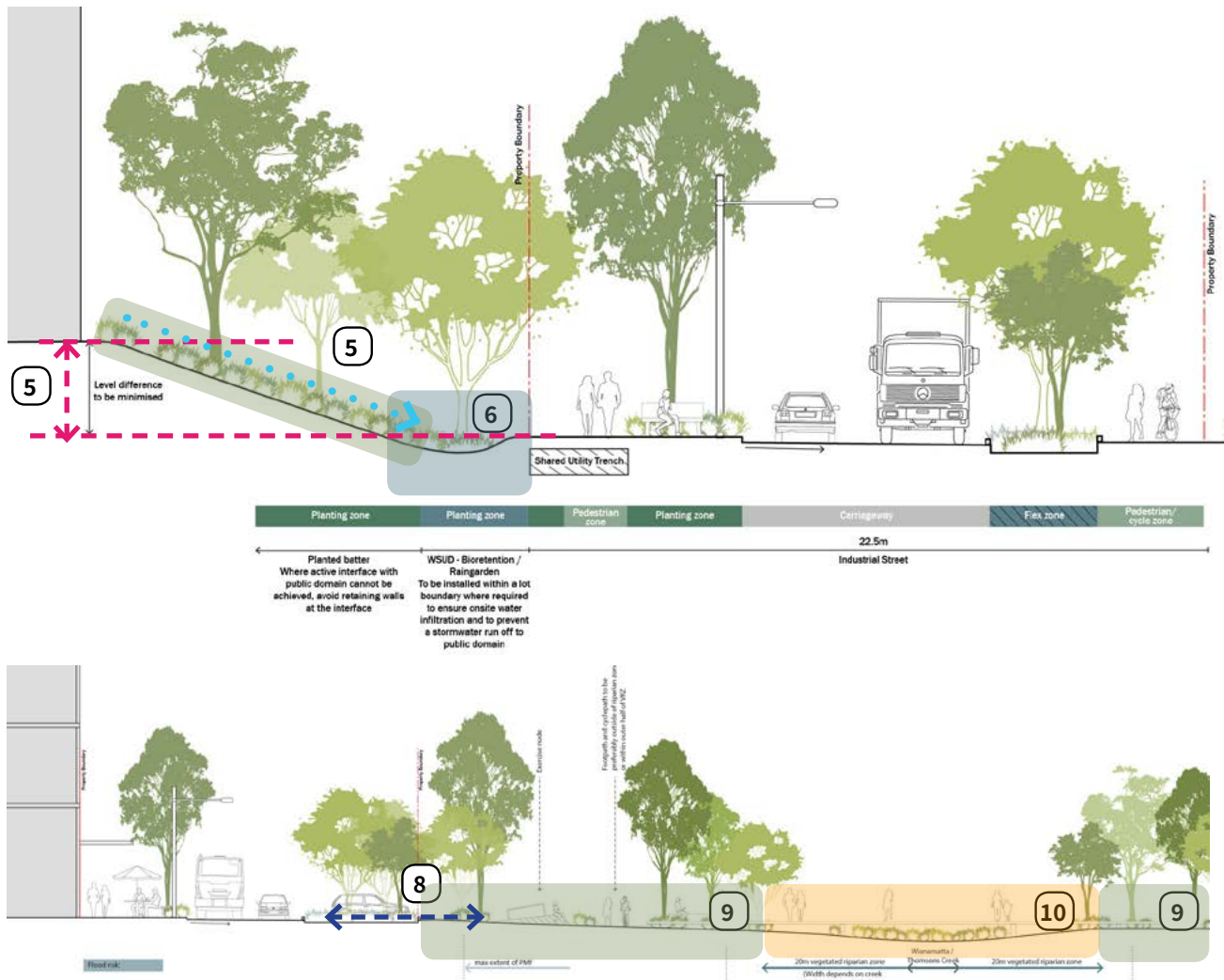
Annotations

1. Continuous street tree canopy
2. Water Sensitive Urban Design embedded in the street profile
3. Generous pedestrian zone under tree canopy
4. Active transport integral part of street profile
5. Tree canopy and ground cover planting rich in diversity integral part of Blue -Green system
6. Shared utility trenches
7. Ground permeability maximised consistent with Sydney Water WSUD principles

URBAN DEVELOPMENT RESPECTS LANDFORM

PUBLIC DOMAIN INTERFACE AND UNDISTURBED SOIL NETWORK PRINCIPLES





Public Domain Interface and Soil Preservation principles:

1. Roads and streets should as close as possible align to existing topography - sloped median on steeper streets - to reduce lower embankment within properties and preserve soil B Horizon.
2. Surface levels within private lots are to adjoin ground levels set by public domain as close as possible to enable active and joint interface. In industrial areas, this can be achieved by setting an office & administrative building surface level to ground level of adjoining public domain. Level difference is dealt internally within the lot.
3. Balance cut and fill to minimise imported soil.
4. Minimise incursion into soil B horizon where possible.
5. Surface levels within private lots to adjoin ground levels set by public domain as close as possible. Where levels varies, planted landscape batter deals with the level difference, retaining walls at the interface are to be avoided.

6. Ensure no water runoff from private lots to public domain. WSUD stormwater retention to be implemented within the lots where required.
7. Streets with increased planted verges and undisturbed soil profile proposed within Aerotropolis precinct to ensure continuous undisturbed soil is retained throughout the precincts in the areas proscribed for the undisturbed soil network.

Open Space Soil preservation and Riparian Corridor protection principles

8. Streets at interface with open space should as close as possible align to existing topography to minimise impact on undisturbed soil within parklands.
9. Within the zone of linear parks, natural soil profile is to be protected and engineered cut and fill and topographic alterations are to be avoided with the exception of localised earth works associated with sportfields, playgrounds, excavations for park amenities footings, shallow sub-bases to paths, tree planting holes and the like.

10. Creeks and the associated riparian zones are protected and incursion into this zone is to be avoided. Works associated with WSUD and creek restoration and small structures like paths, boardwalks, stepping stone creek crossings and the like are permitted providing the impact is minimised and permissible with Office of Water Guidelines. Path and road structures crossings over creeks are elevated on piers to minimise the impact on the riparian zones.

URBAN TREE CANOPY PRINCIPLES AND TARGETS

UTC PRINCIPLES

- Support the Western City District Plan overall canopy target of 40%
- Plant as many large trees as possible as the best possible measure to mitigate heat island effect.

A large tree will contribute much more shade over time than a small tree.

- Large tree shade in 10yrs: 60m² in 50 years: 200m²
- Small tree shade in 10yrs: 3m² in 50 years: 30m²

- Prioritise locally endemic species of the Cumberland plain.

ACHIEVING 40% URBAN CANOPY TARGET

To meet the Western City District Plan overall canopy target of 40%, the following canopy coverage is required:

- Streets: 65-95% (varies depending on street type)
- Parks: 60%
- Flood & Environment zones: 60%
- Infrastructure: 10%
- Lots (industrial): 15%

Mature canopy diameter defines tree spacing.

The diagrams to the right are an example of how canopy coverage of 90% can be achieved in an industrial street.

The diagrams deviate from the Western Sydney Street Design Guide in the following ways:

- cycle lane and pedestrian path are adjacent to allow maximum size of planting blister / verge / soil volume
- The guide currently only allows for medium sized trees

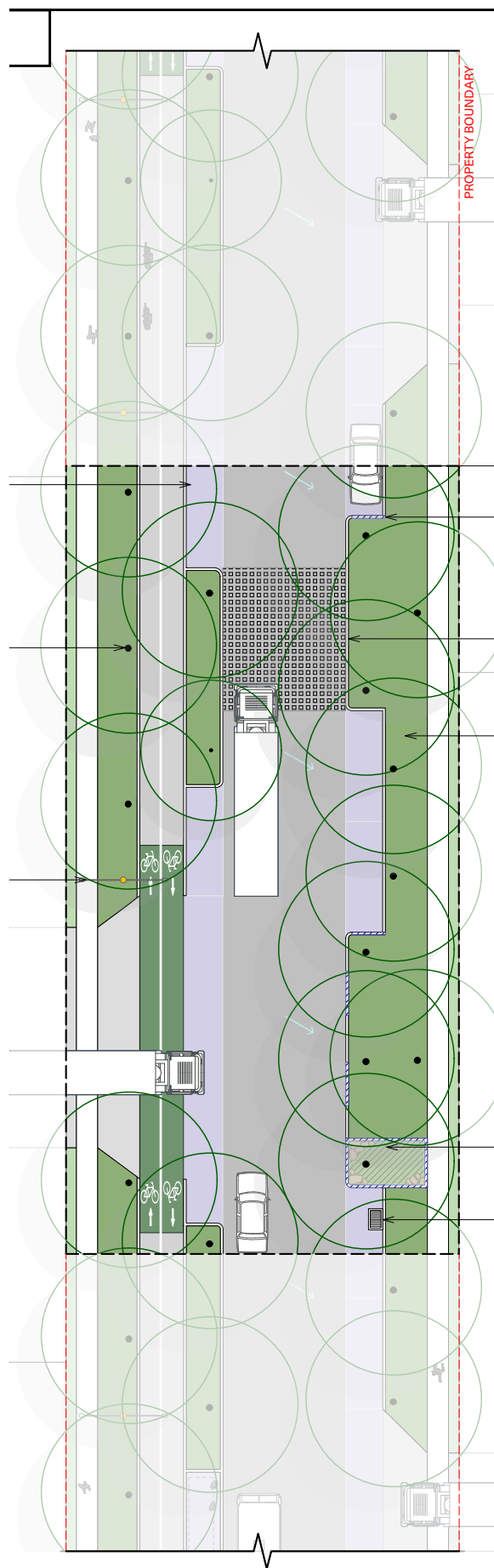
DEFINED TREE SIZES & SOIL VOLUMES

To achieve the UTC targets, the precincts have defined the following:

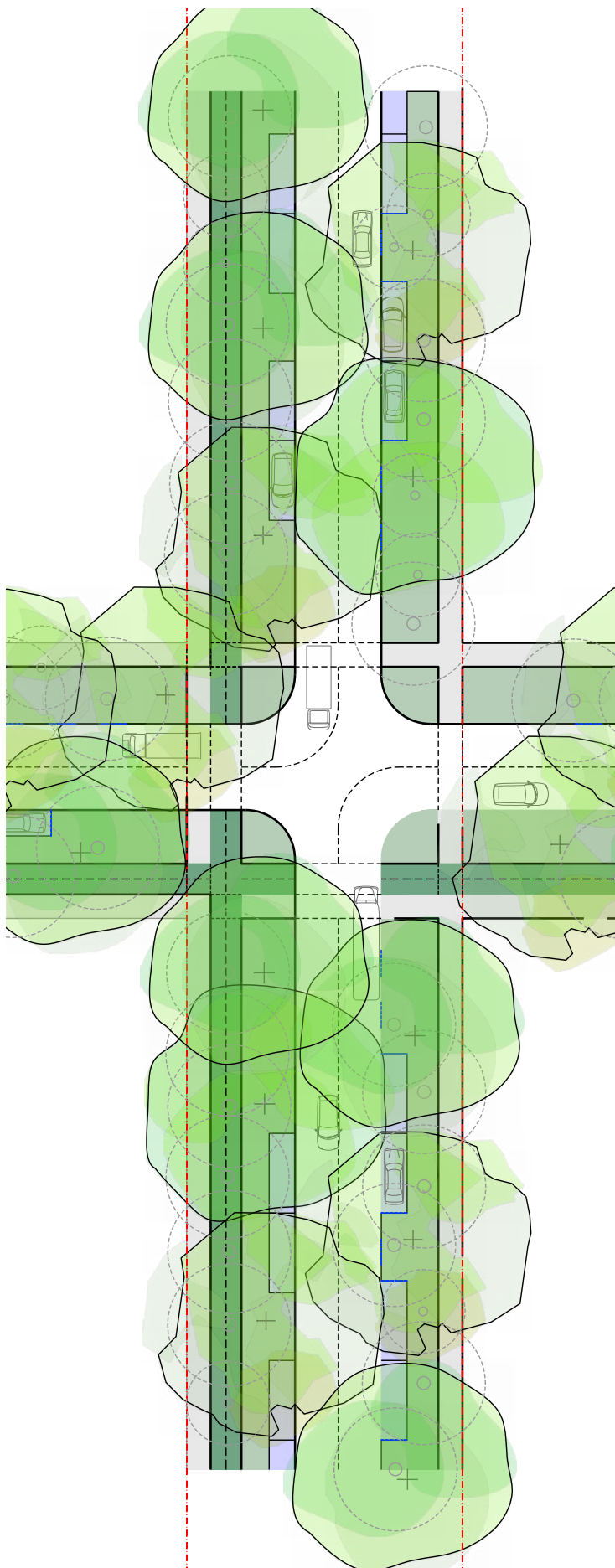
- Large Tree: 65-80m³ soil
- Medium Tree: 20-40m³ soil
- Small Tree: 5-15m³ soil

Sizes & soil volumes based on a combination of 'Landcom Street Guidelines' Andrew Morten, Arborist & City of Sydney unobstructed root volume guides.

Tree sizes deviate from those outlined in the WSSDG where the small soil volumes are the limiting factor dictating the small tree sizes.



Industrial street WSSDG



Proposed Industrial street width

WATER SENSITIVE URBAN DESIGN

TREATMENT TRAINS

A shortlist of stormwater management elements has been developed based upon Council preferences, stormwater volume reduction potential, ability to mimic natural flow regimes and cost effectiveness.

Consultation with Penrith and Liverpool Councils by Sydney Water has ultimately shaped the formation of preferred treatment trains for each land use zone.

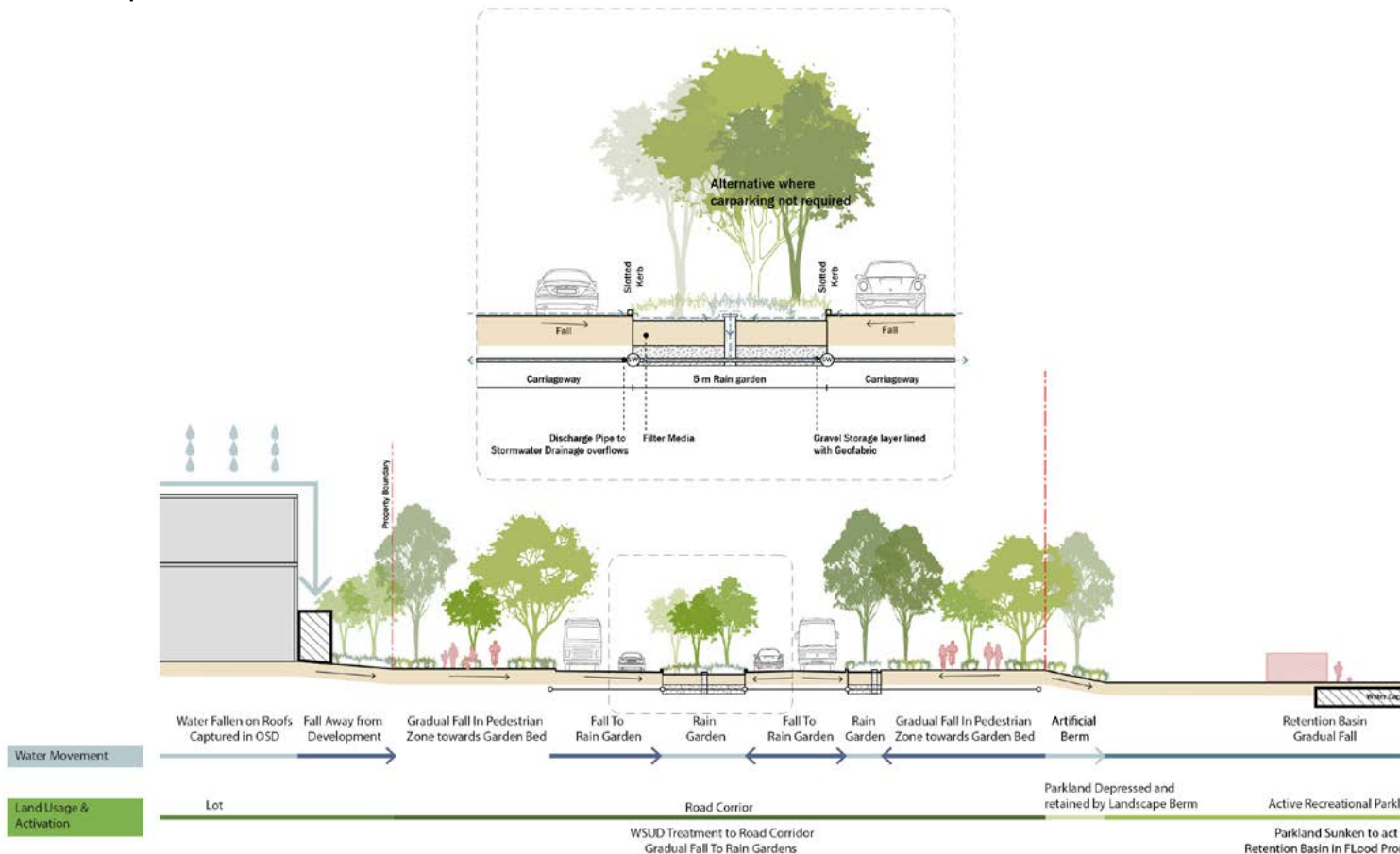
The following approaches have been adopted in developing the treatment trains:

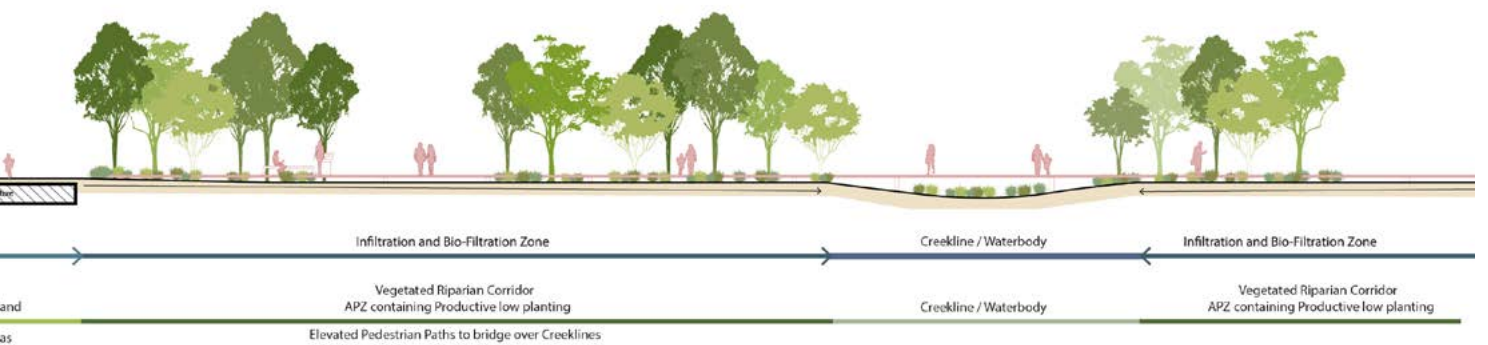
- There is a preference for regional scale biofiltration and wetland basins to be well integrated into the landscape and co-located within detention basins as appropriate
- For industrial and commercial development, on-lot measures may include a combination of robust and low maintenance elements including of rainwater tanks, biofiltration basins and proprietary filtration devices.
- Street scale WSUD measures should be avoided but biofiltration street trees may be incorporated the streetscape

STREET TREES AND APPLICATION OF WSUD OUTCOMES

Street trees are designed to be passively irrigated with street water consistent with Sydney Water guidelines.

This principle should be applied across all streets throughout the Aerotropolis precincts.





ELEMENTS OF THE OPEN SPACE FRAMEWORK

REGIONAL ALLUVIAL PARKLANDS ALONG WIANAMATTA AND MAJOR CREEKS

- Alluvial parklands are core biodiversity and habitat corridors.
- Active recreation and park and community amenities of a regional and district character are included outside of 1% AEP flood zone.
- Passive, non structured recreation (like walking path and boardwalks) is incorporated in medium flood risk zone, providing impact on riparian corridor is minimised.
- Regional active transport routes are incorporated within the parklands framework.

LINEAR PARKLANDS ALONG TRIBUTARY (OFTEN EPHEMERAL) CREEKS

- Waterways of Strahler Order 2 and higher will be maintained in a natural state, including the maintenance and restoration of riparian area and habitat such as fallen debris. Where a development is associated with or will affect a waterway of Strahler Order 2 or higher, rehabilitation will occur to return that waterway to a natural state to enable natural processes and functionality to be maintained.
- Parks have sufficient width to allow for vegetated riparian corridor and pockets of passive and active recreation of a local character (fitness nodes, seating nodes, nature playgrounds, community gardens).
- Active transport routes are incorporated within these parks.

RIDGELINE & HILLTOP PARKS

- These parks are established on the local high points to capture the breeze and allow for long views.
- Dependent on the size and location, sportfields, active and passive recreation and associated park amenities of a district and local character are to be found with these parks.

URBAN PARKS AND POCKET PARKS

- These parks are surrounded by built form and generally located within the local city core or neighbourhood centre.
- They are associated with community and cultural amenities like library and serve as a "village green" for local residents and workers.
- More "urban" in their nature, these parks can accommodate non-structured passive and active recreation, playgrounds, kick about spaces and community and park amenities of district and local character.

NATURE PARKS

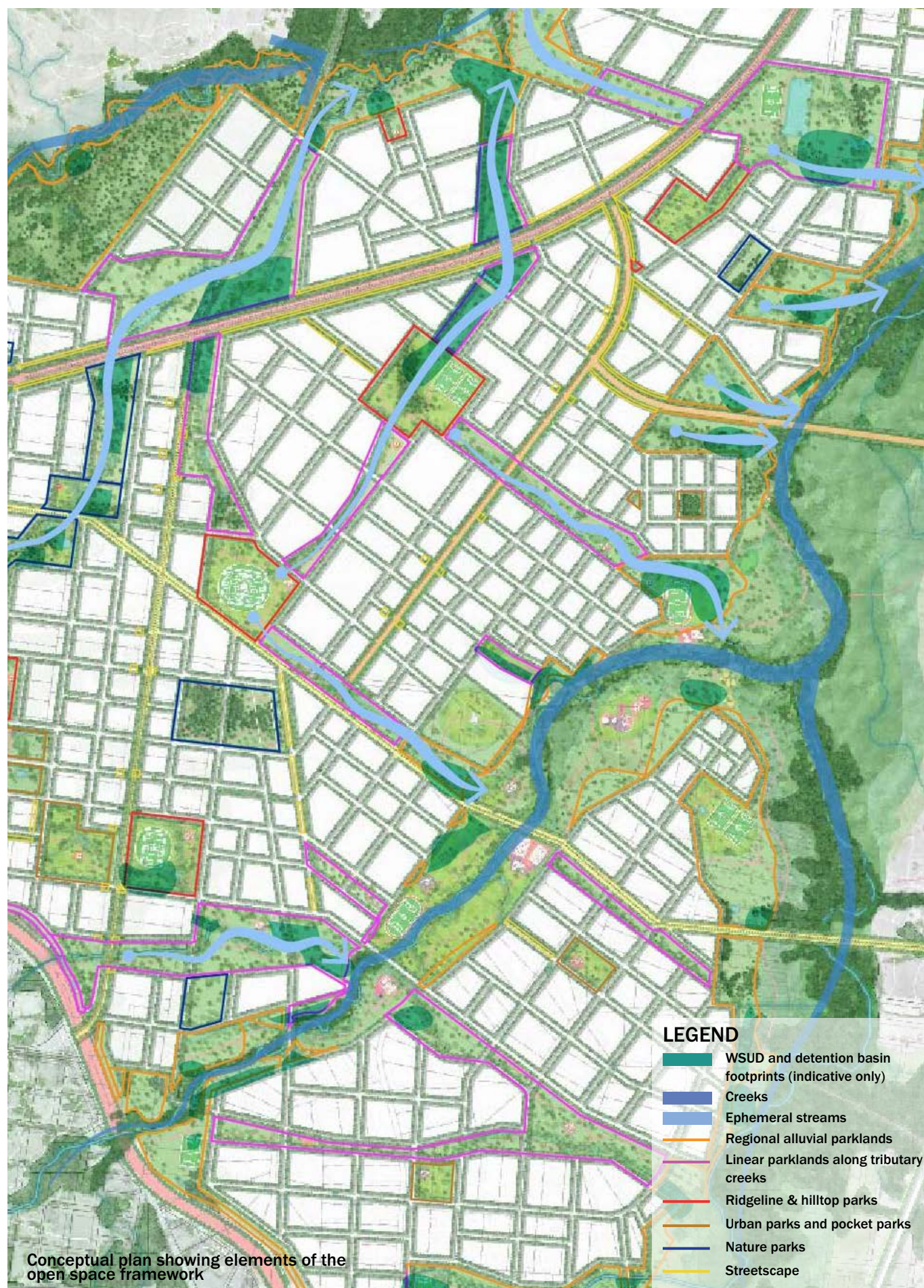
- Protecting existing native vegetation within open space.
- These areas will be protected and enhanced and have no negative impact on the environment.

STREETSCAPE

- Multi layered continuous tree canopy and ground cover planting rich in diversity create a green and cool setting for everyday life.

"GATEWAY" LANDSCAPE

- Abstracted Cumberland Plain landscape at entrances to the Parkland City from major roads



URBAN TYPOLOGIES AND WATER PERMEABILITY

The concept of an Urban Typology has been developed as part of the 'Beyond Business as Usual' vision of the Western Parkland City. A landscape led approach integrates landscape and urban development so work together. This approach also achieves higher land use efficiencies by co locating uses such as recreational open space and conservation areas.

Urban areas will play an important role in urban cooling by ensuring there is sufficient areas of tree canopy and water to sustain the landscape. Urban Typologies are areas of urban development comprising the range of uses typical of the place.

Urban Typologies explore how development can achieve the Parkland City benchmarks of permeable area and canopy cover, at a range of scales:

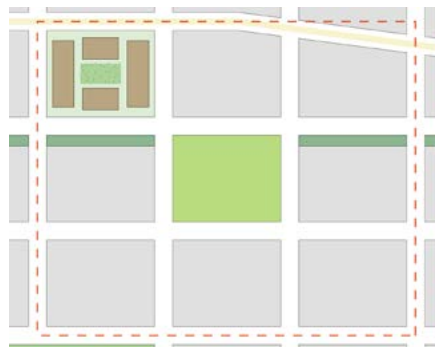
- from an individual lot (or amalgamated lots);
- a super lot large enough to create a public domain of streets and public open space;
- or at a large master plan or sub precinct scale.

It is critical to note that the typologies serve a number of purposes:

1. Assist in retaining water in the landscape and irrigate tree canopy and urban cooling
2. Contribute to the broader integrated water management system
3. The typology may not fully meet all stormwater requirements on every site and other measures may also be required – like tanks etc
4. The great advantage of the 'Parkland' solution is that it can be adjusted to meet higher requirements without needing tanks etc. It also starts to bring the Wianamatta-South Creek spine to life
5. The typology is a 'tool kit' that is flexible and performance based



An individual lot



A super lot large enough to create a public domain of streets and public open space



A large master plan or sub precinct scale

The more land is amalgamated the more flexibility there is for development footprint:

- the public domain can work harder
- individual lot requirements can be simpler

Urban Typologies are areas net of the following areas:

- 1% AEP areas of flood
- Regional open space, playing fields
- Major infrastructure, motorways, regional roads
- Riparian areas
- Areas of high biodiversity value for conservation

This reflects a place-based approach and ensures that the environmental performance requirements are appropriate to the various development types. A one size fits all approach won't work.

The Urban Typologies in the initial WSAP precincts are as follows:

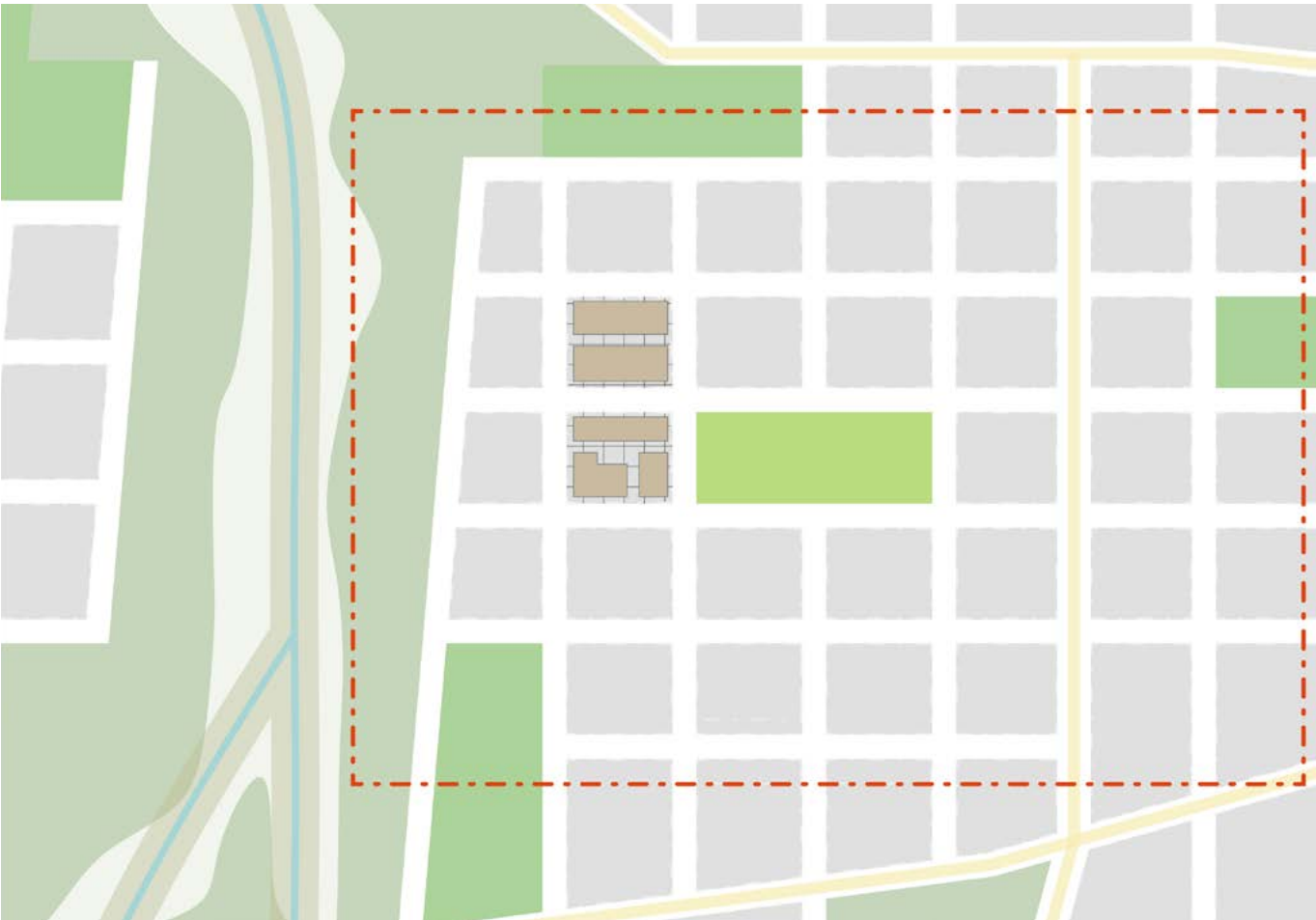
- High density mixed use centre – mixed use; includes commercial, retail, community, cultural, visitor, high density residential uses
- Medium density mixed use centre – non-residential/ mixed use; includes some commercial, local employment, local services, medium density residential uses (only in mixed use)
- Employment – Business and light industrial; Lower density business uses with or without associated warehouse, production, smaller scale warehousing, ancillary uses
- Employment – Large footprint industrial; logistics, larger scale warehouses, production

The following table outlines acceptable solutions regarding water permeability to each of the urban typologies:

Urban Typology	Lot Requirements		Typology Elements					
	Site Cover	Permeability	Lot Area		Streets		Open Space	
			% of Overall Area	Permeability	% of Overall Area	Permeability	% of Overall Area	Permeability
High density mixed use centre	60%	40%	45%	40%	35%	35%	20%	90%
Medium density mixed use centre	50%	50%	55%	50%	30%	35%	15%	90%
Employment – Business and light industrial	60%	40%	55%	40%	30%	40%	15%	90%
Employment – Large footprint industrial	70%	30%	60%	30%	25%	40%	15%	90%

HIGH DENSITY MIXED USE CENTRE

ACCEPTABLE SOLUTION



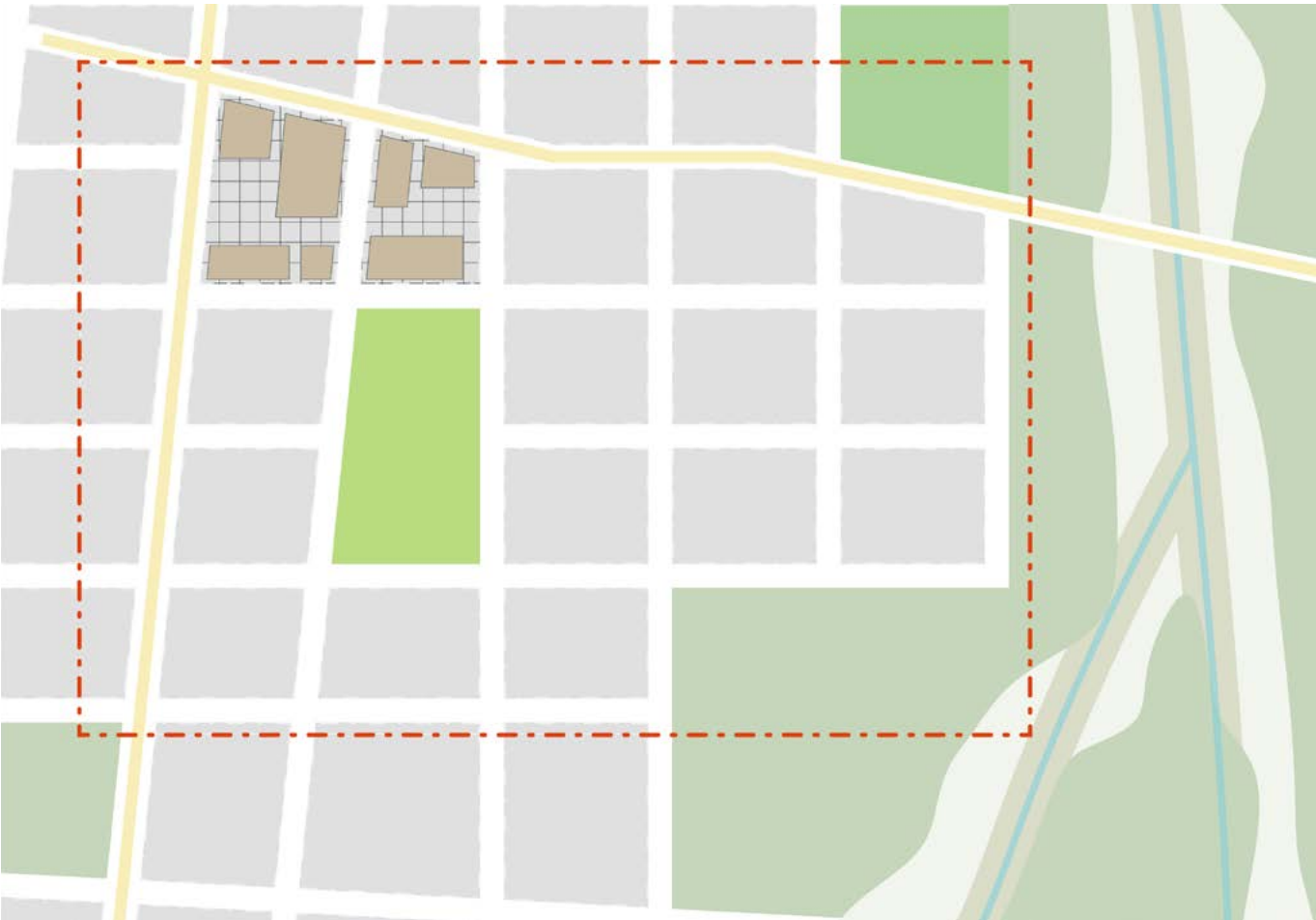
Typology Elements	% of Typ.	Permeability
Streets	35%	35%
Open Space	20%	90%
Lots	45%	40%
Total	100%	~ 40%

PARKLAND SOLUTION



MEDIUM DENSITY MIXED USE CENTRE

ACCEPTABLE SOLUTION



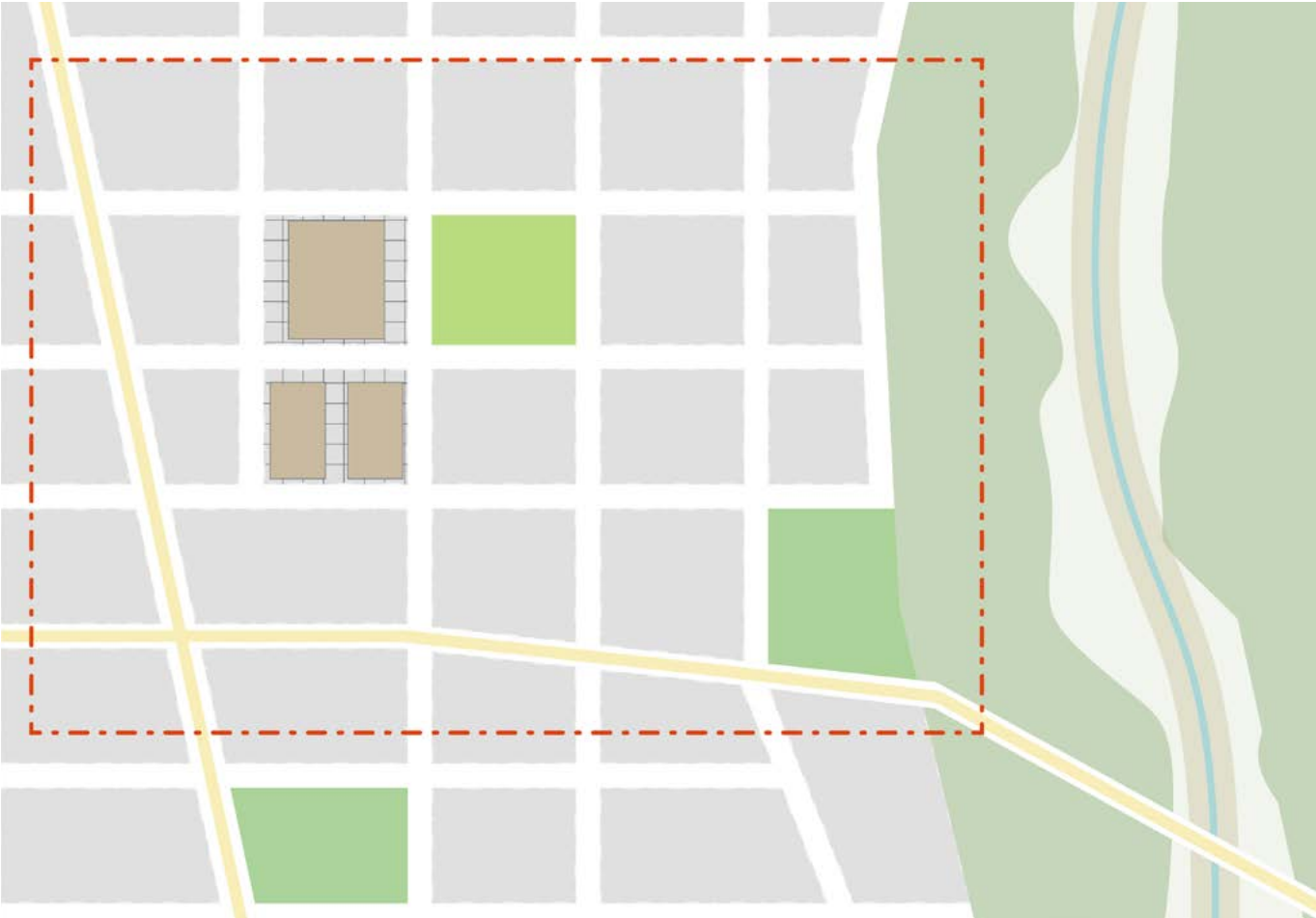
Typology Elements	% of Typ.	Permeability
Streets	30%	35%
Open Space	15%	90%
Lots	55%	50%
Total	100%	~50%

PARKLAND SOLUTION



EMPLOYMENT - BUSINESS AND LIGHT INDUSTRIAL

ACCEPTABLE SOLUTION



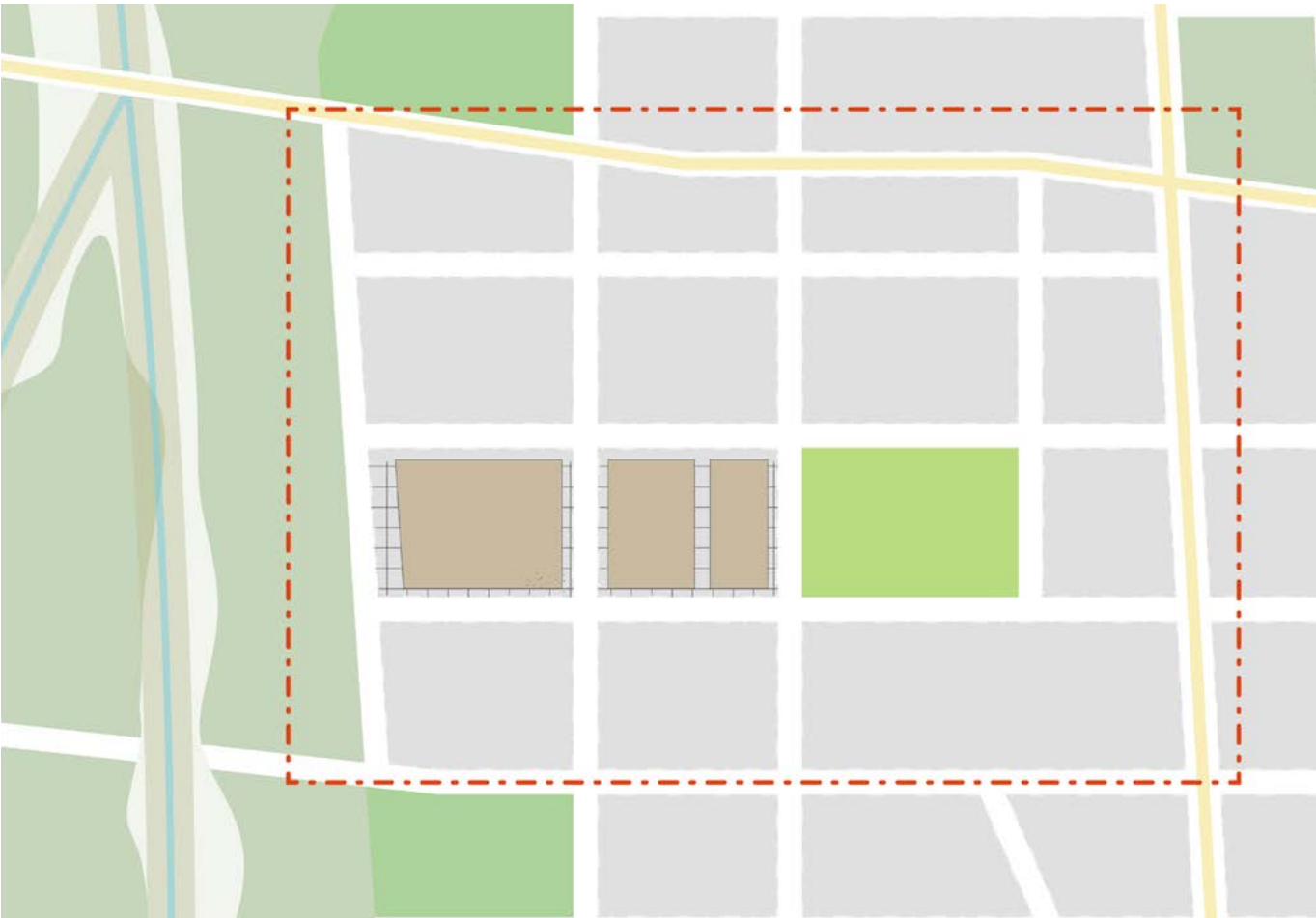
Typology Elements	% of Typ.	Permeability
Streets	30%	40%
Open Space	15%	90%
Lots	55%	40%
Total	100%	~ 40%

PARKLAND SOLUTION



EMPLOYMENT - LARGE FOOTPRINT INDUSTRIAL

ACCEPTABLE SOLUTION



Typology Elements	% of Typ.	Permeability
Streets	25%	40%
Open Space	15%	90%
Lots	60%	30%
Total	100%	~ 30%

PARKLAND SOLUTION



Typology Elements	% of Typ.	Permeability
Streets	28%	42%
Open Space	15%	90%
Lots	57%	15%
Sub Total	100%	~ 40%
Blue / Green	x Ha	80%*
Total		~ 45%

PLANTING STRATEGY

Successful delivery of the landscape and planting vision is paramount to the realisation of the Parkland City.

Design Intent

Existing vegetation on site is a remnant of the broader Cumberland Plain vegetation that occupied the region pre-European settlement.

The overarching planting strategy aspiration is to preserve, restore and build upon the Cumberland Plain woodland and grassland character, that is typical for this place.

The landscape planting strategy for the project will draw upon existing remnant vegetation communities, their pattern and characteristics.

The existing landscape character of the site, its topography, its hydrology and its geomorphology will guide the proposed planting strategy, balanced with consideration for airport operations.

Remnant vegetation communities inform the planting palette

The planting palette for the riparian zones of the creek corridors and the associated floodplains will be informed by planting found within the Alluvial Woodland communities of Wianamatta, Thomsons Creek and Badgerys Creek corridors.

The following vegetation communities are currently present within the alluvial zones - River-flat Eucalypt Forest, Swamp Oak Floodplain Forest.

As the floodplains transition to the hillside, the alluvial riparian woodland gently transition to grassy open woodland and grassland (Shale Plains Woodland) and grassy open forest (Shale Transition Forest) and Castlereagh Ironbark Forest; remnants of these vegetation types are found within Badgerys Creek precinct. Closer to the ridgelines, Cumberland Plain Open Woodland is the predominant remnant planting community.

The vegetation character of scattered trees with open canopy, ground cover dominated by grasses and herbs, sometimes with layers of shrubs and/or small trees - this will inform the planting palette for the precinct.

Protecting, enhancing and restoring existing vegetation communities

Existing native vegetation has been incorporated in the open space framework where possible and will be protected, enhanced and further reinforced through the connected landscape system.

Within the framework, native Cumberland plain open woodland and grassland vegetation community will be restored.

Riparian corridors of tributary creeks within the open space will be rehabilitated and revegetated with appropriate riparian species.

Diversity and planting quantity

Maximising planting palette diversity is a key landscape outcome for the realisation of the Parkland City.

Planting diversity and quantity within alluvial zones of the key creeks will be maximised to restore the health of the creeks, increase biodiversity and strengthen resilience of the Blue Green system.

Streetscape

Streetscape is an integral component of the overall open space framework and significantly contributes to the biodiversity and blue-green system within the urban fabric.

The aspiration is to create a rich, diverse and multi layered streetscape planting, that will draw upon the native Cumberland Plain species, their pattern and characteristics.

The planting palette will be a mix of native and non native species, that are appropriate for the climate of Western Sydney and urban streetscape conditions and contribute to the planting palette richness.

The Aerotropolis Framework

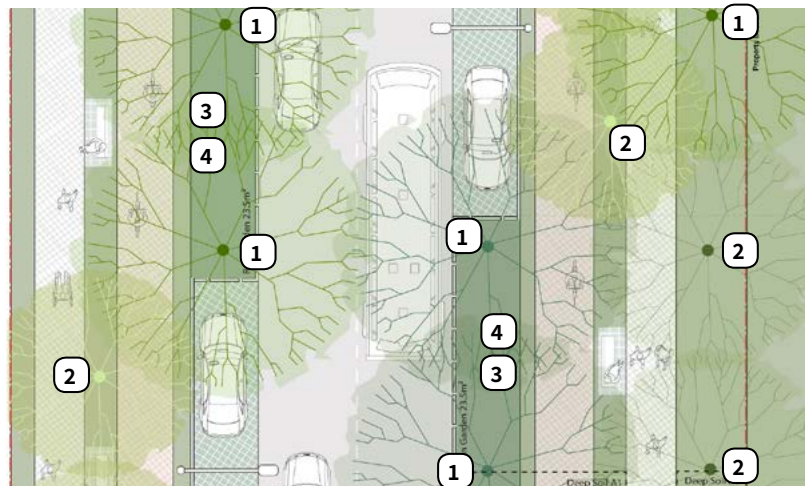
Large and tall trees - the key species of Cumberland Plain - set the structure. The spacing and species selection of the street trees planting is inspired by the Cumberland Plain scattered pattern and therefore it is proposed to be alternating, intentionally planted in a non-boulevard manner.

The smaller trees, that form the lower canopy layer, provide the continuous shade for pedestrians. These trees will be a combination of native and exotic species, that are appropriate for the climate and conditions of Western Sydney.

The rich and diverse groundcover planting is built upon native grass species, herbs and low shrub layer. This is complemented by non native species to provide all year interest. Native trees, shrubs and plants from the riparian corridors form the core planting palette for the raingardens and bioretention basins.

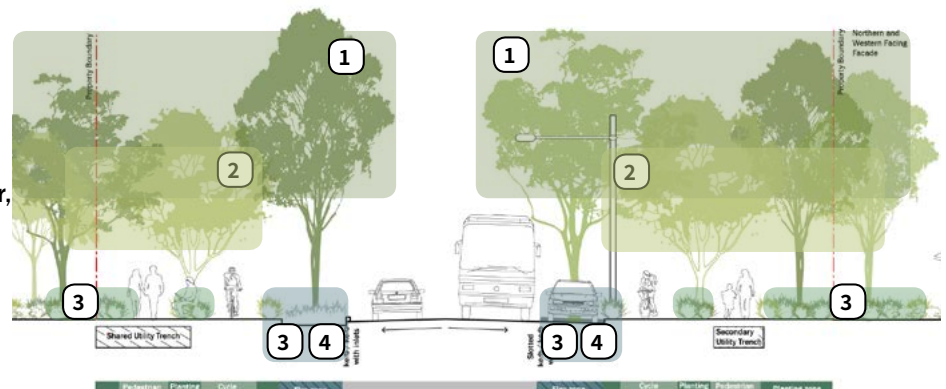
Annotations

1. Large and tall trees set the structure
2. Smaller trees form the lower canopy layer and provide continuous shade for pedestrians.
3. Ground cover planting rich in diversity integral part of Blue -Green system
4. Water Sensitive Urban Design embedded in the street profile



Sustainability and Resilience

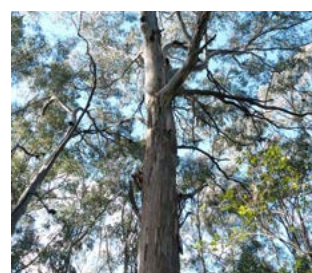
The planting strategy is developed according to water sensitive urban design (WSUD), passive watering and species with generally low water requirements are proposed. However, Wianamatta Street Trees can have higher water use to enable evapo-transpiration to aide urban cooling, and to minimise storm water runoff.



Spotted Gum



Rough-barked apple



Forest red gum



Textured foliage (Casuarina)



Textured bark (Paperback)



Seasonal interest (Narrow-leaved paperbark)



Grasses (Kangaroo Grass)



Rushes (Knobby club rush)

MOVEMENT NETWORK

Enabling an interconnected system

The overarching approach to movement across the Aerotropolis is to enable an interconnected network that provides equitable access for jobs, businesses, residents and recreation purposes. The movement network for the Aerotropolis has been coordinated by the Planning Partnership and led by Aecom, in association with the urban design teams.

WALKING AND CYCLING

A hierarchy of safe cycleways to major centres will help to identify and prioritise key projects.

1. Principal Bicycle network – highly used routes that connect to major destinations, on cycleways that are separate from motor vehicles and pedestrians
2. Local bicycle network – lower use corridors that connect to priority corridors and neighbourhood destinations within catchments
3. Quiet local streets – connecting residential destinations and local services in low traffic environments, design treatments make provision for people on bikes.

PUBLIC TRANSPORT

Transport network planning for the Aerotropolis and broader Western Parkland City establishes a clear public transport network. Metro stations are complemented by bus corridors, which provide connections to centres within and outside of the Aerotropolis.

The proposed network includes local and transit-focused streets that will connect to key centres including the Aerotropolis Core and the Airport. Rapid bus corridors will provide direct connections to Liverpool, Parramatta and Campbelltown. Direct connections will be provided from these centres to the airport, to the Aerotropolis Core and to Luddenham Road Metro Station.

ROAD NETWORK

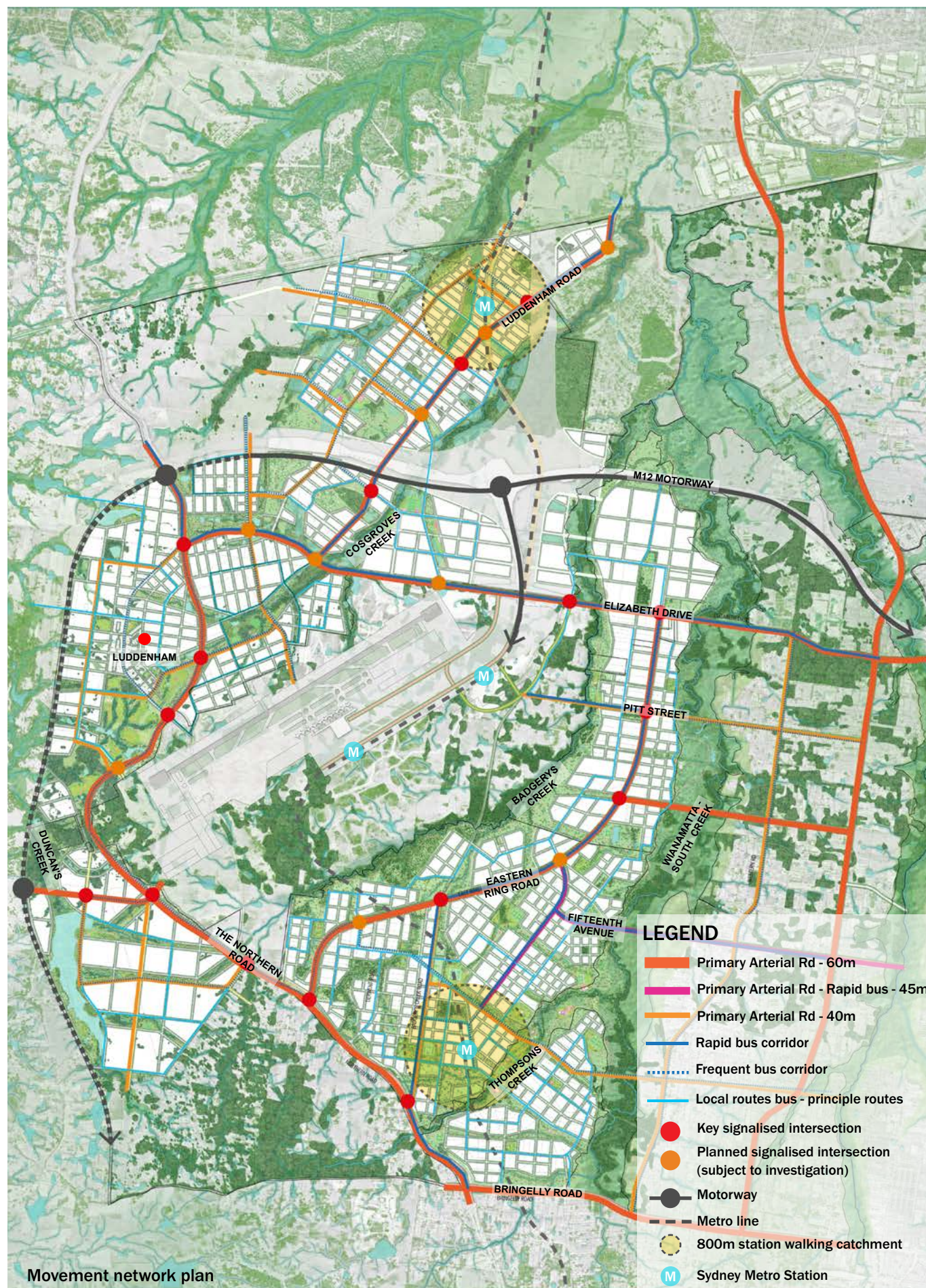
The streets and places of the Western Parkland City will be smarter, healthier and more focused on people.

People in the Aerotropolis will be able to walk to the Metro on safe and shaded streets, enjoy frequent and direct bus services, have convenient access to schools and shops, and benefit from a comprehensive network of cycleways. To realise this vision and support the functions of the Airport and high-tech sector, a network of smart motorways and arterial roads will efficiently accommodate time sensitive freight and private vehicle trips.

Planning for different movements considers local networks that pass-through centres and that link places where people want to go, as well as freight and bypass networks to bypass centres and directly link people and goods to the wider network.

FREIGHT NETWORK

The strategic freight network includes the most significant corridors that support the movement of goods. Key freight links will serve the Airport to support economic activities along Eastern (Airport) Ring Road. The upgrade of The Northern Road is designed to serve the Agribusiness Precinct and the Airport Freight and Logistic Precinct. The proposed M12 Motorway will be the major access route to the Airport and connect to Sydney's motorway network.



STREET TYPOLOGIES

Street types below those of a motorway and arterial classification across the Aerotropolis are founded on the Western Sydney Street Design Guidelines. These have been adapted to suit place based requirements for each precinct.

ARTERIAL ROADS

Transport for NSW has undertaken substantial work to consider regional and district movement requirements, including freight and rapid bus transit. The Western Sydney Street Guidelines do not apply to arterial roads, and so engagement with Transport for NSW has occurred in order to understand road and intersection requirements, relationships to non-car based travel and implementing utility corridors. The 60 metre, 45 metre and 40 metre road sections describe the arterial road environments throughout the Aerotropolis.

WESTERN SYDNEY STREET GUIDELINES

These guidelines address complexities of movement and vehicle types along with stormwater, urban heat island impacts, water sensitive urban design and creating comfortable and attractive places.

The objectives of the guidelines have been incorporated into associated streets across the Aerotropolis:

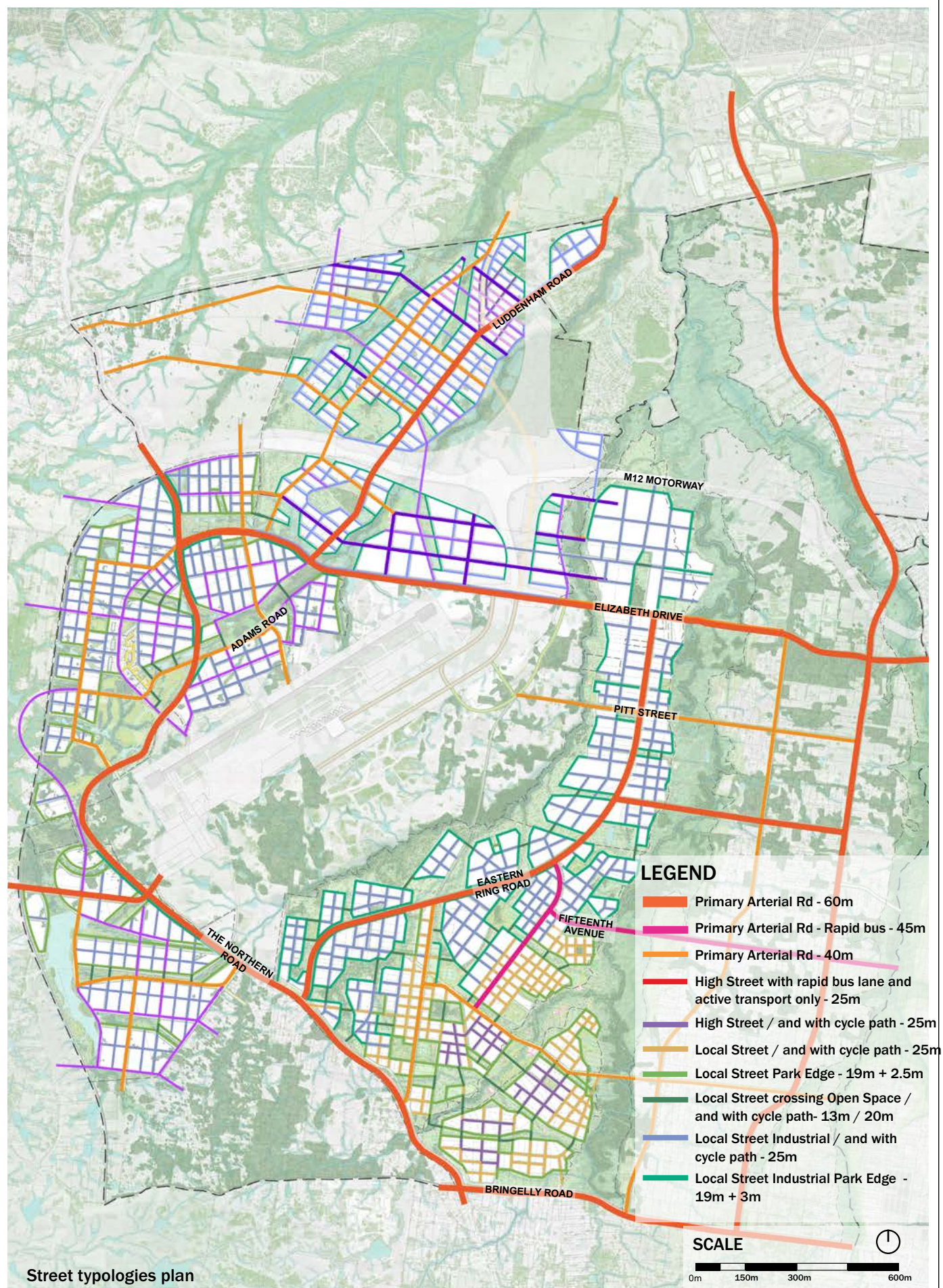
- Streets encourage social activation through their design
- Streets are self-explaining slow environments that are safe and comfortable for all users
- Streets are inclusive with footpaths on both sides
- Streets are safe for cycling, with separated bicycle facilities on busy streets
- Continuous canopy cover is achieved on both sides of every street
- Water sensitive urban design is integrated into every street
- Carriageway widths are designed to maximise space for alternate uses and users
- Ensure future transport solutions maximise place outcomes for streets

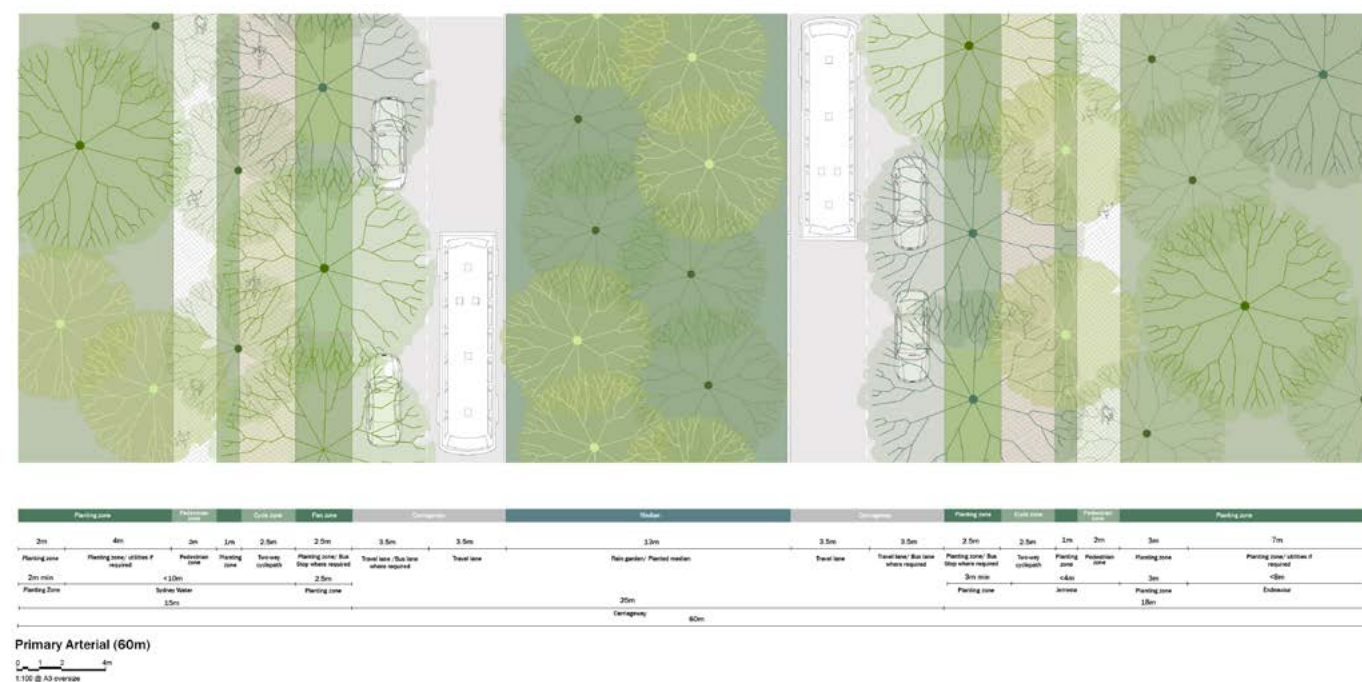
The street section typologies across the Aerotropolis take the general approaches in the guidelines but adapt them based on place specific and precinct outcomes, particularly to apply landscape led urban design principles and recommendations from TfNSW - active and public transport. Carriageway widths are consistent, but verge areas and some configurations vary according to:

- All streets can accommodate bus routes
- All streets can accommodate separated bicycle lanes to promote active transport.
- More generous footpath width proposed for pedestrian comfort.
- More generous verge areas proposed to ensure sufficient soil volumes of deep soil are provided to enable planting of large street trees.

Precinct Wide Street Types

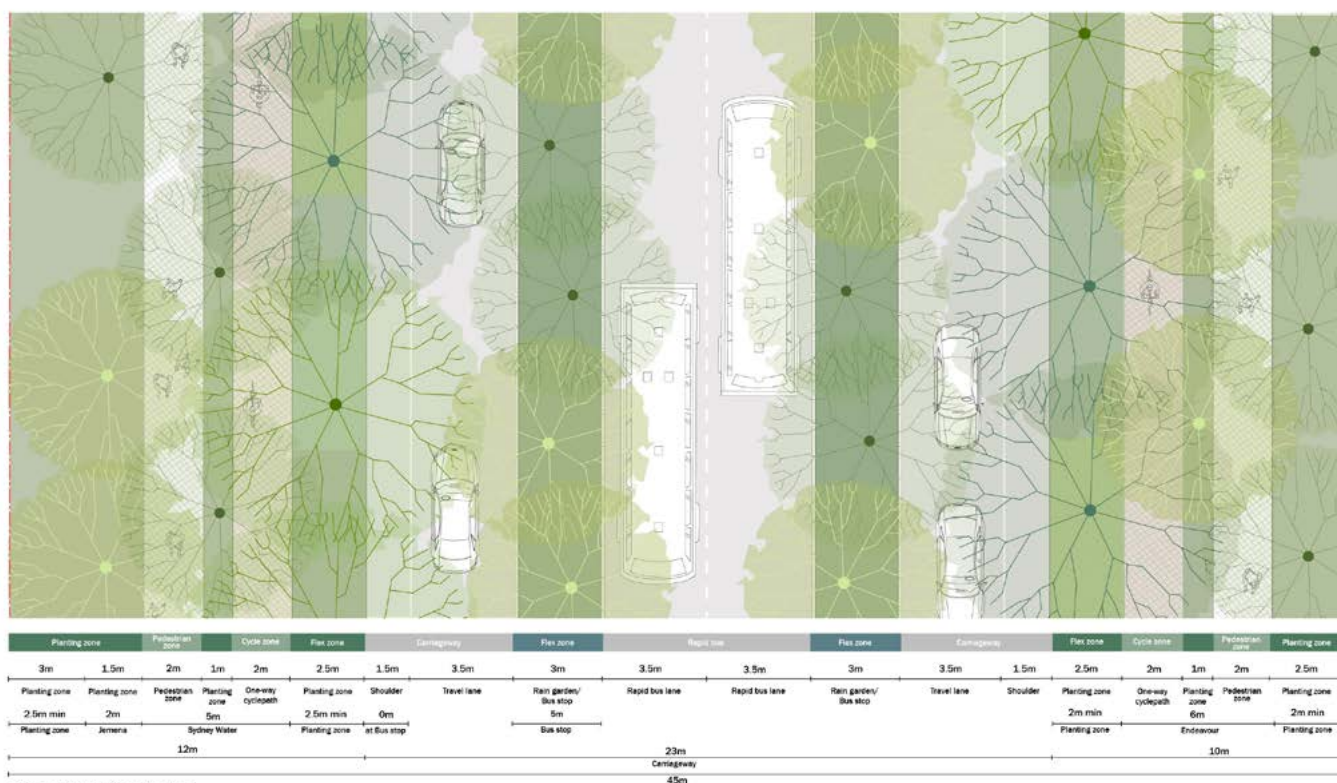
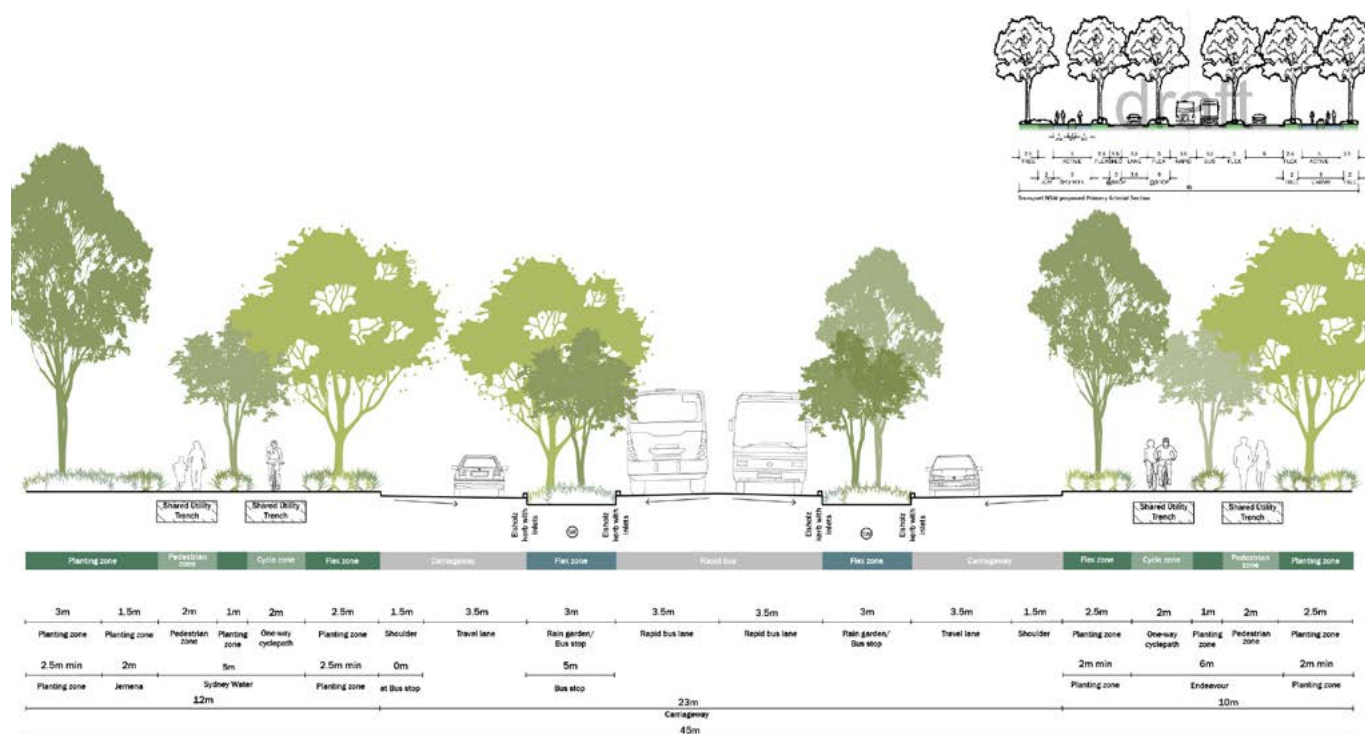
Primary arterial road	60 metres
	45 metres
	40 metres
High street with rapid bus lane and active transport only	25 metres
High street with cycle path	25 metres
Local street with cycle path	25 metres
Local park street	19 metres (varies) + 2.5m
Local street crossing open space	13 metres
	- with cycle path 20m
Industrial street with cycle path	25 metres
Industrial park street	22.5 metres (varies)



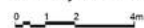


45 metre arterial

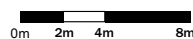
Rapid bus corridor



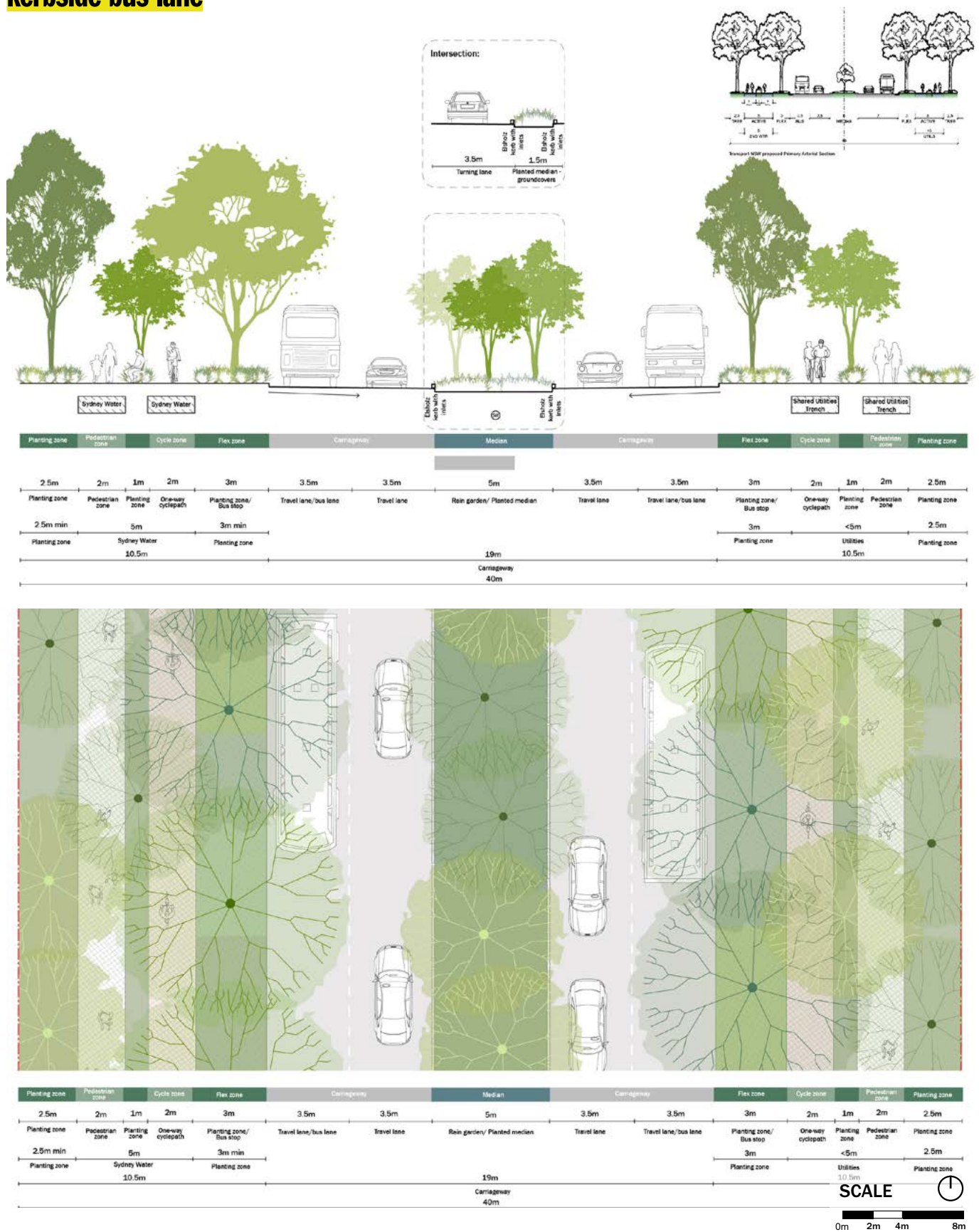
Primary Arterial (45m)



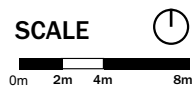
SCALE



40 metre sub - arterial kerbside bus lane

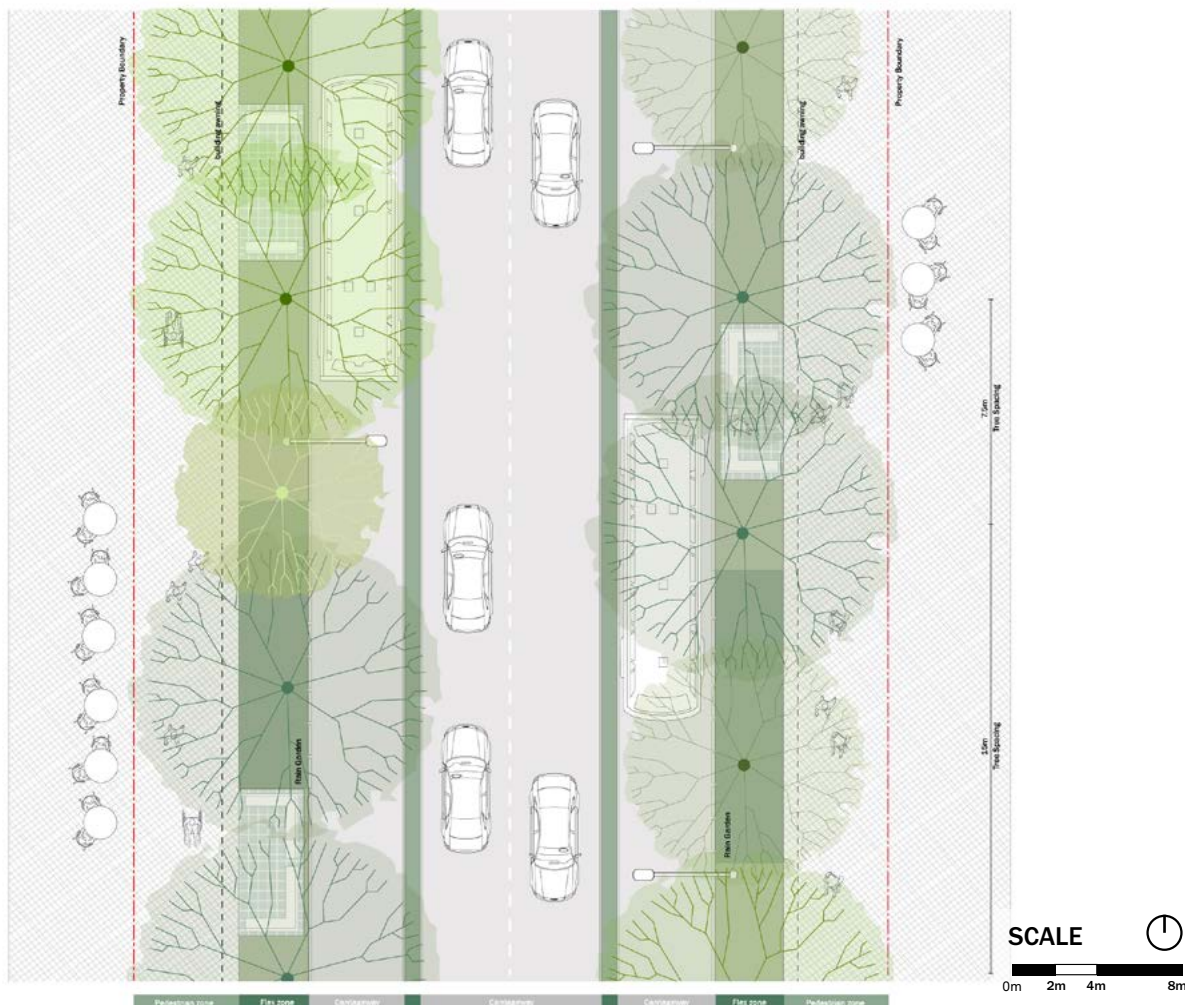
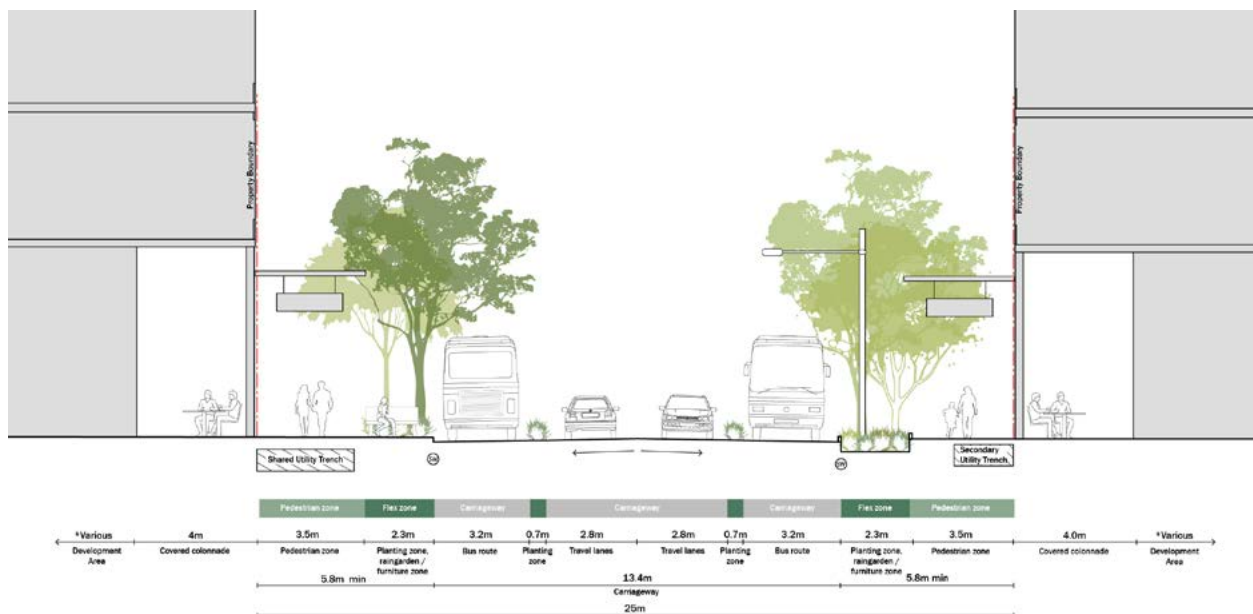






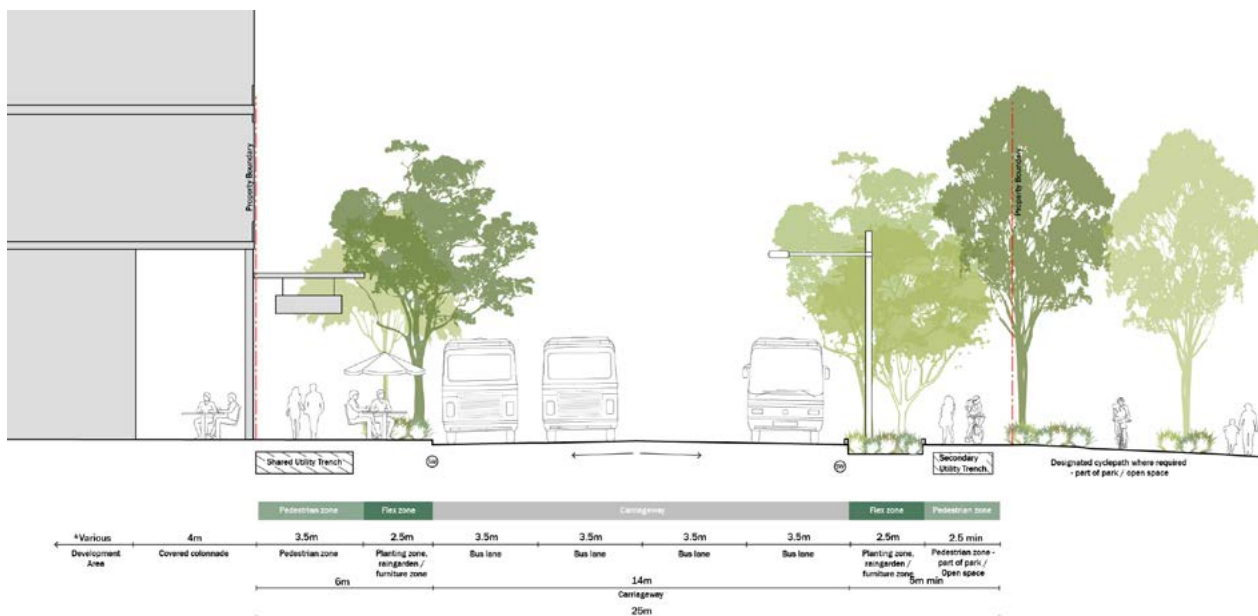
25 metre high street - commercial centre

Bus lane

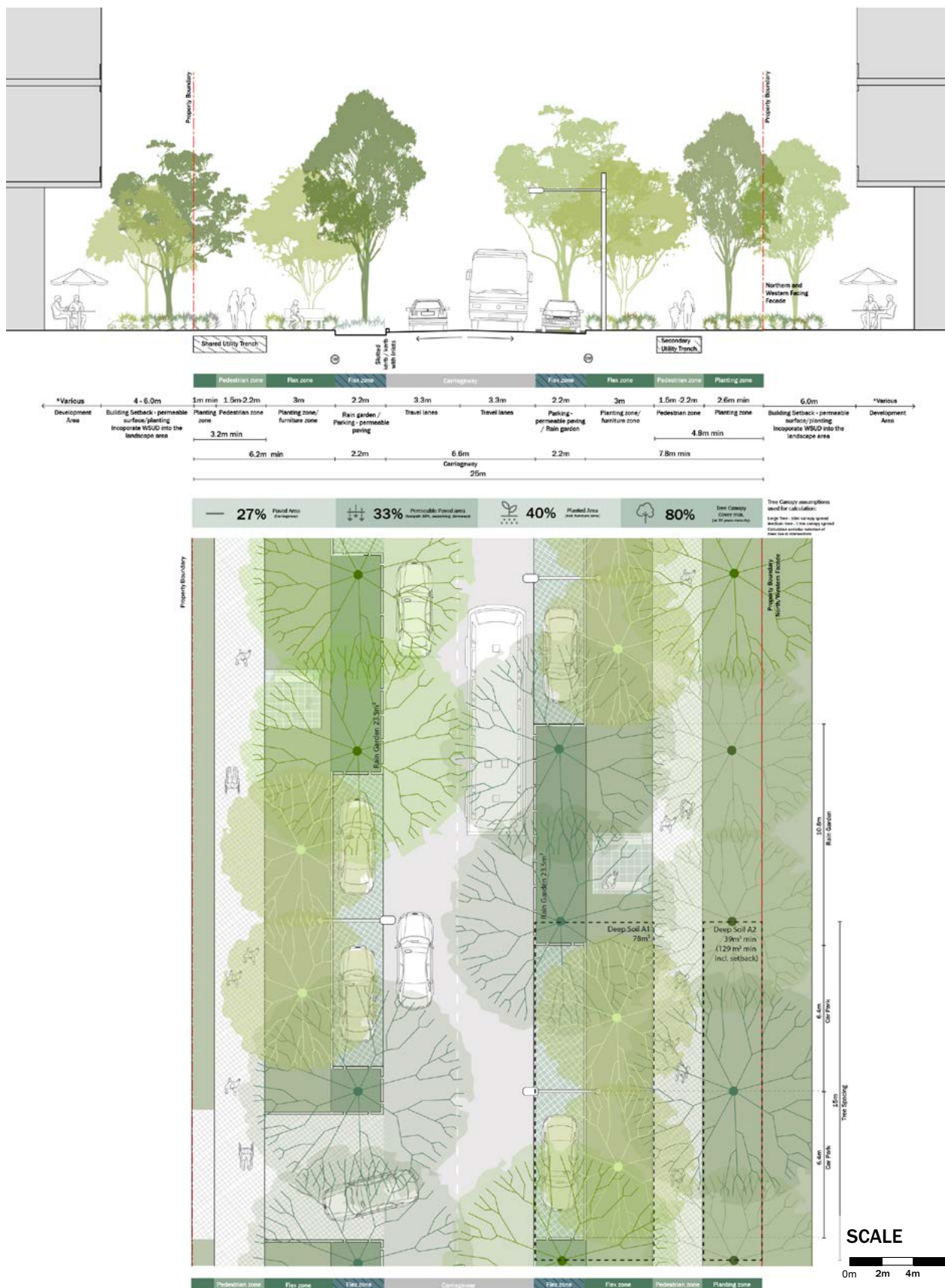


25 metre high street - commercial centre

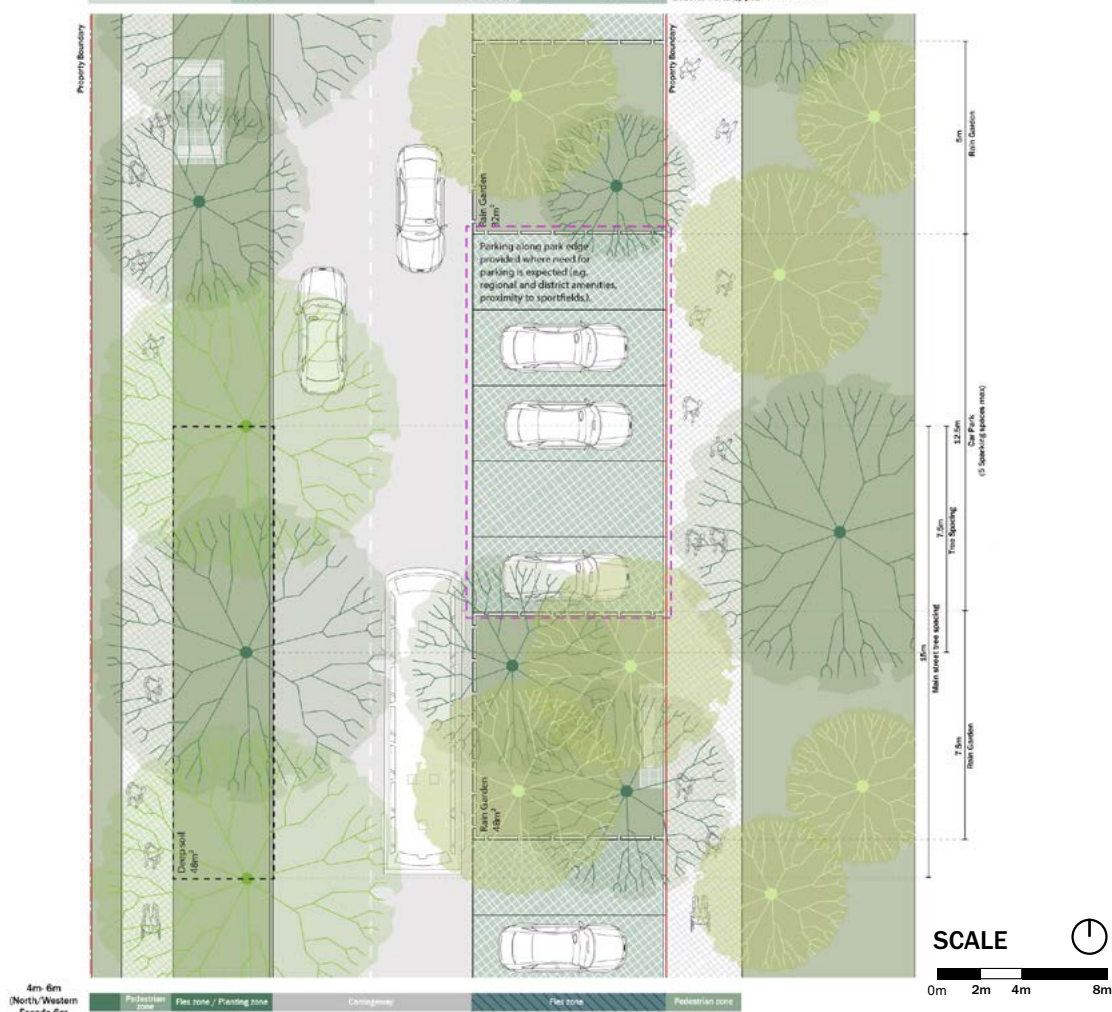
Rapid bus and active transport only



25 metre local street

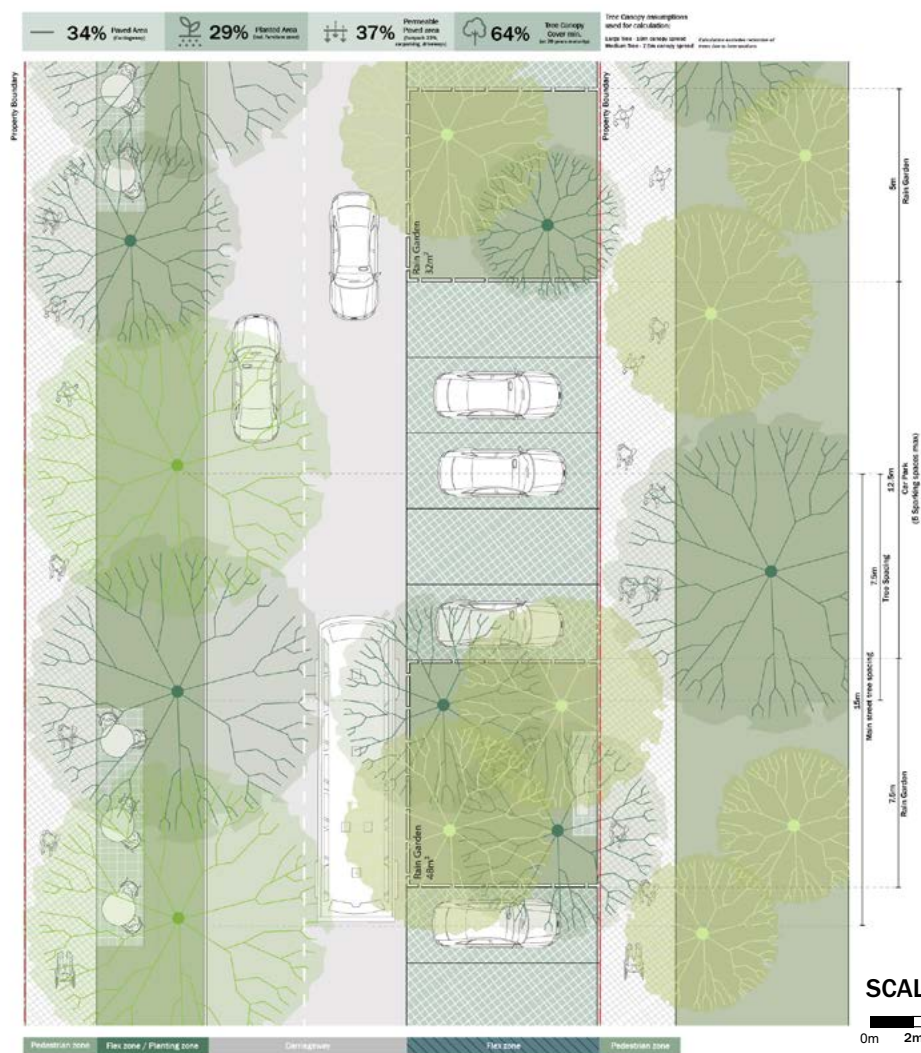
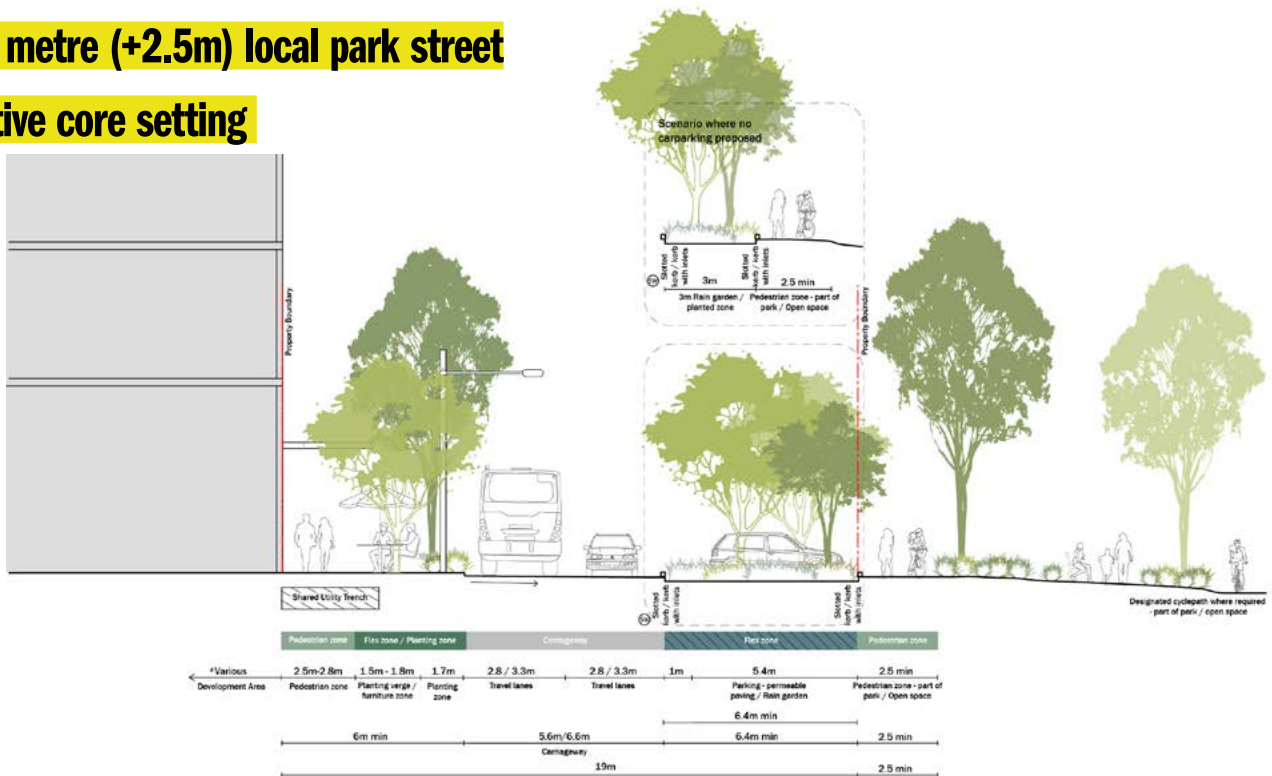




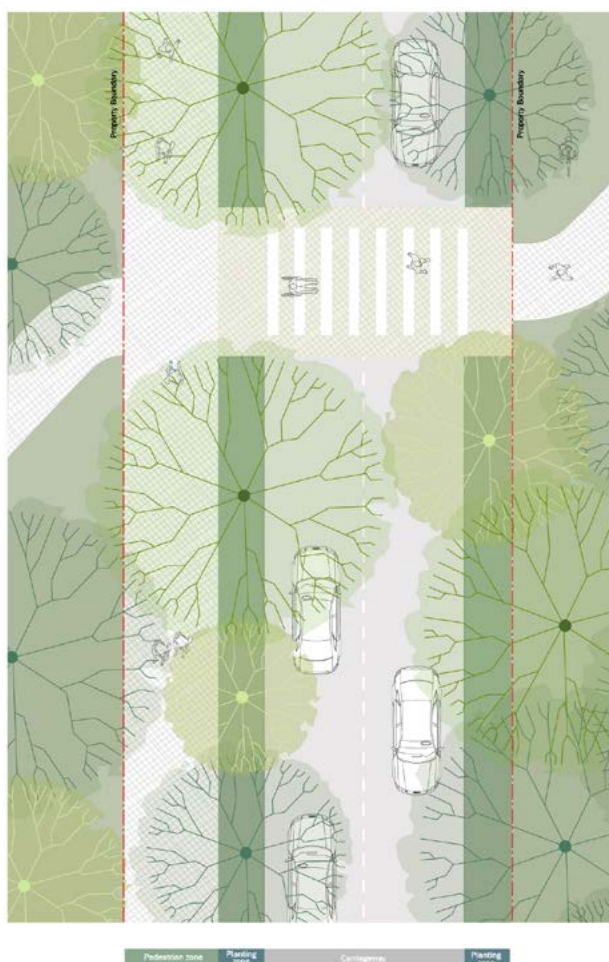
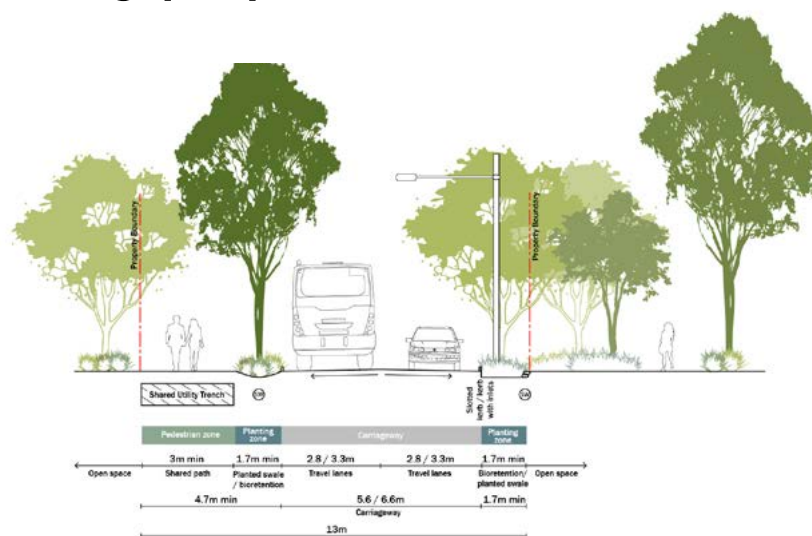


19 metre (+2.5m) local park street

active core setting



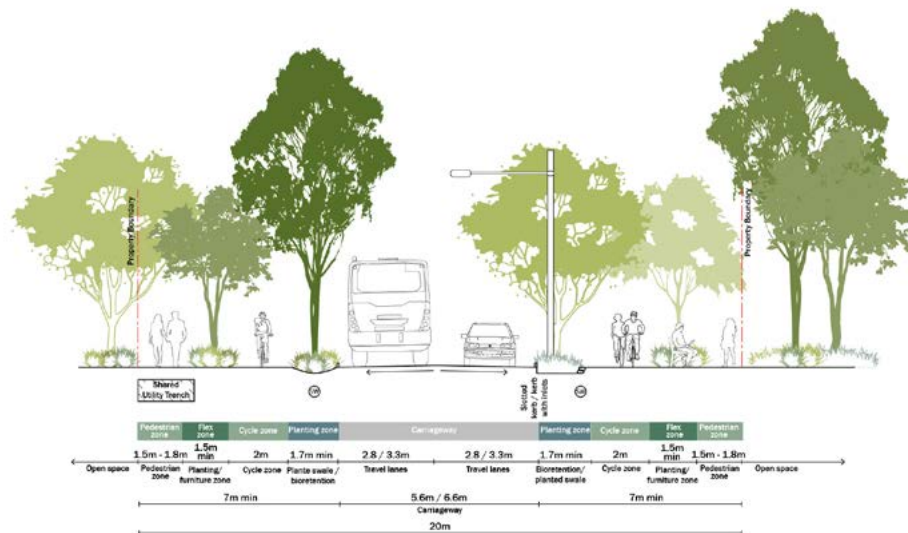
13 metre local street crossing open space



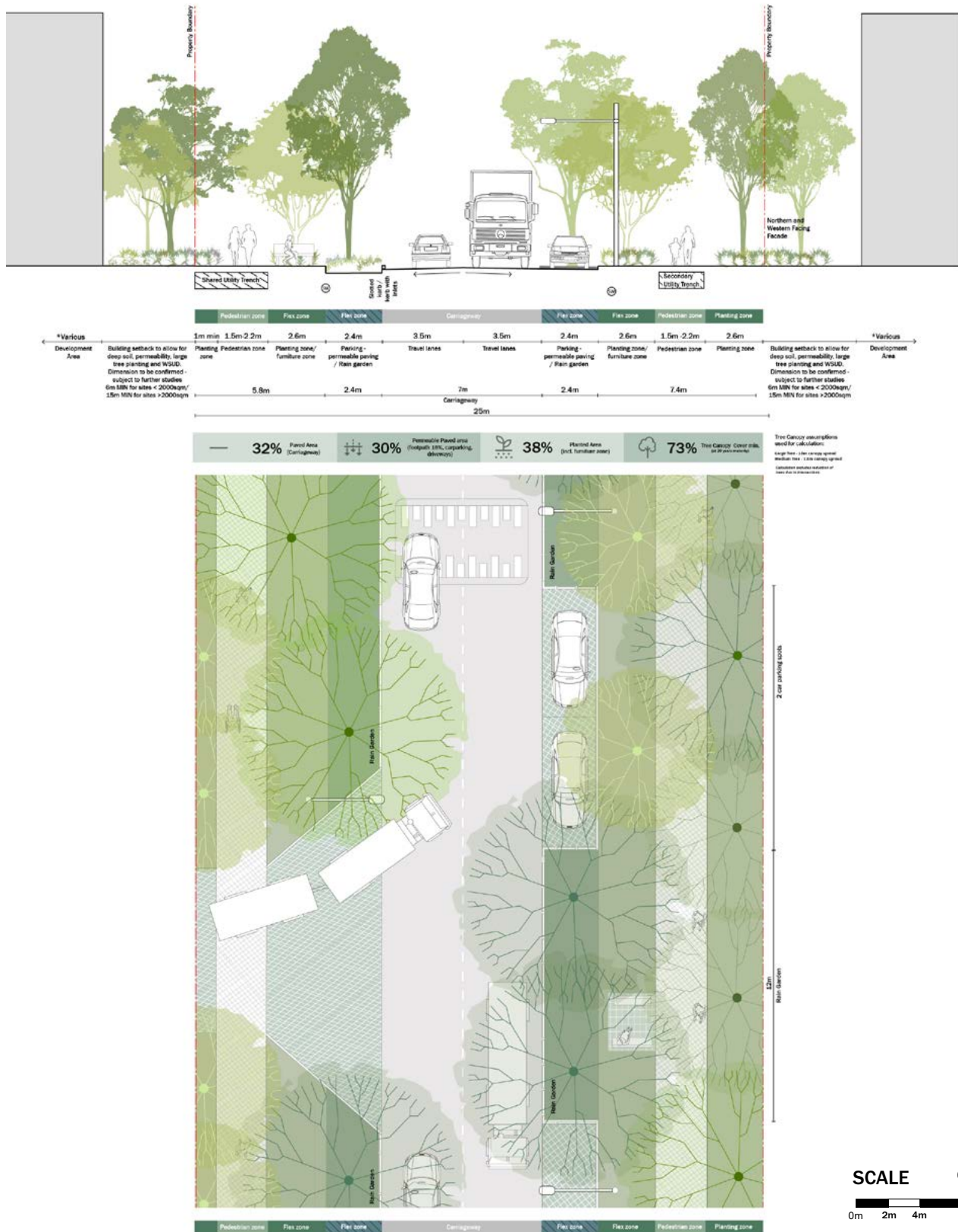
SCALE

0m 2m 4m 8m

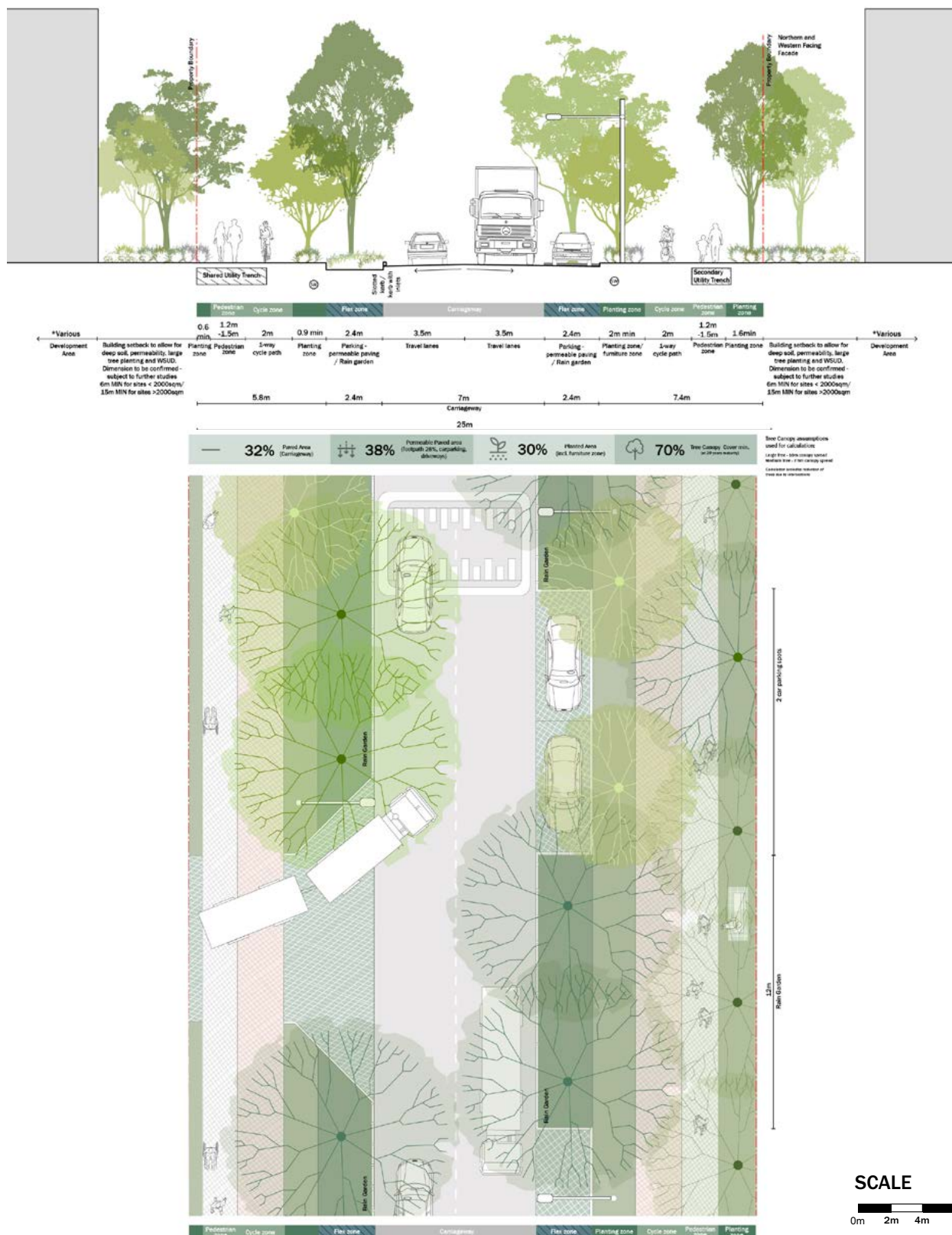
20 metre local street crossing open space with cycle paths



25 metre industrial street



25 metre industrial street with cycle paths





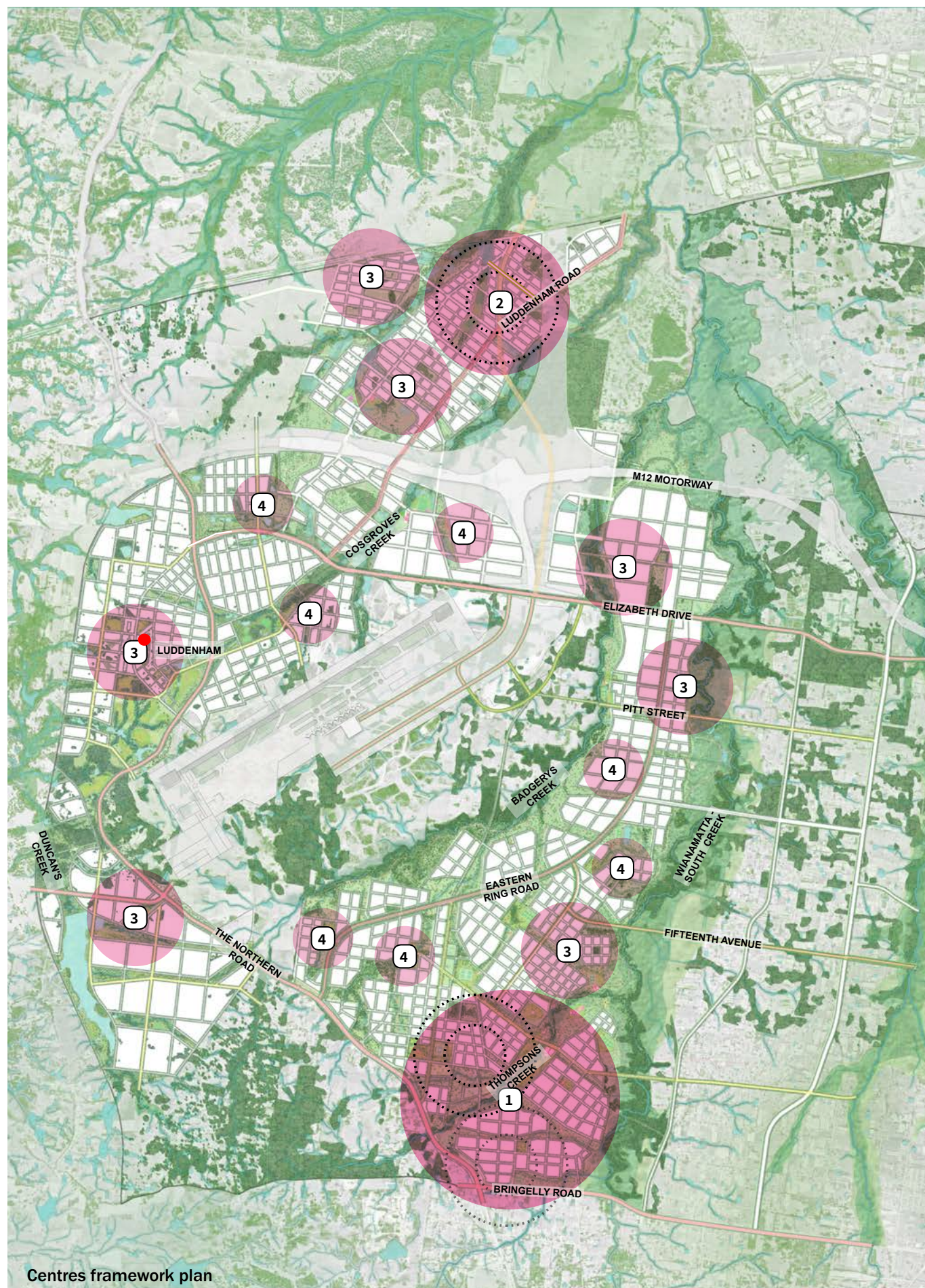
THE CENTRES FRAMEWORK

CENTRE FRAMEWORK SPATIAL PRINCIPLES

1. Distribute centres to support the 30 minute city
 - 30 minutes by public and/or active transport to employment
 - 30 minute walkable / active / public transport networks support local neighbourhoods.
 2. Provide a centre or point of focus at the heart of all neighbourhoods
 - Centre locations must take account of the barrier impacts of major roads.
 - Centres will vary in size, role and type based on their catchment.
 3. Provide a hierarchy of centres linked to active and public transport
 - Centres are located to be associated with a public transport service
 - Higher order centres are provided with a Metro station
 - All centres are located on the inter-connected active transport network
 4. Ensure density and catchment is prioritised in higher order centres
 - Metropolitan and strategic centres are of the highest order
 5. Locate centres in areas of high amenity
 - Centres will help activate parkland corridors
 - Centres are located to link public transport to open space
-
1. Metropolitan centre – A Metropolitan Cluster or Aerotropolis City Centre acts as a regional-scale mixed-use centre focusing on retail, services and business activity, serviced by a metro station.
 2. Specialised centre/precinct – strategic innovation and focused on an employment generator or theme - and contains a metro station.
 3. Local centre – Local convenience and a mix of uses (not residential). Smaller scale scale and more local convenience.
 4. Neighbourhood hub – the District plan refers to employment activity hub or Indigenous business hub. In the enterprise zone this could be a hub of business, with community facilities.



Centre hierarchy



Hierarchy of centre	Role and Intent	Typical uses	Transport connectivity	Critical criteria
<p>A Metropolitan Cluster or Aerotropolis Centre acts as a regional-scale mixed-use centre focusing on retail, services and business activity.</p> <p>Type: Aerotropolis City Centre</p>	<p>An Aerotropolis Centre is the centre of the Parkland Western Sydney Metropolitan Cluster and includes multi use purposes for a diversity of uses and a full range of community uses:</p> <ul style="list-style-type: none"> – Commercial office development – Employment opportunities – Multiple supermarkets and department stores – Higher-order services – Health and Education services – Creative and cultural uses 	<p>Business, commercial, office, shop top housing, retail, health, education, tourism, hotels, community facilities and recreation</p>	<p>Located central to the train station, and includes a bus interchange</p>	<p>Located around metro/mass transit nodes and highly accessible areas</p> <p>Part of a mixed use precinct</p> <p>In close proximity to the regional park.</p> <p>Initially focused from the metro to Thompsons Creek, centre activity will extend east of Thompsons Creek over time as intensity increases.</p>
<p>Strategic centre for the broader regional area to support the 30-minute city</p> <p>Type: Leppington</p>	<p>Provides the centre for the 30 minute city, particularly for jobs in the region and core strategic services and includes:</p> <ul style="list-style-type: none"> – Commercial office development – Employment opportunities – Multiple retail, supermarkets and bulky goods – Higher-order services 	<p>Major business, commercial, office, shop top housing, retail, and community facilities, and higher order services.</p>	<p>High levels of public and active transport accessibility, particularly a train station.</p>	<p>To provide a mix of land uses supported by Metro/mass transit or interchanges</p> <p>Provide high levels of amenity, accessibility</p>
<p>Specialised centre/precinct</p> <p>Type: Sydney Science Park</p>	<p>Strategic innovation centre and focused on an employment generator or theme - this could be Sydney Science Park, or perhaps a future centre in the Agribusiness or defence and Aerospace and defines strategic centre.</p> <p>They are a focal point where they include public transport and transport interchanges, they are an important part of a 30-minute city. While they are diverse and vary in size, they provide access to day to-day goods and services close to where people work in the Aerotropolis. They do not need to provide residential accommodation.</p>	<p>Business, office, industrial, employment focus with a specialised focus e.g. agribusiness, defence, aerospace, health and education</p> <p>A broad range of specialty retail</p> <p>A concentration of social infrastructure</p> <p>District level commercial and business uses supporting light industry</p> <p>Residential uses as shop top housing or multiple dwellings to support the employment uses.</p>	<p>High levels of public and active transport accessibility and connectivity to green corridors</p>	<p>To provide a specialised land use focus, whether health and education or aerospace and defence as an agglomeration of uses, supported by other mix of uses, including residential to create a living population.</p>

Hierarchy of centre	Role and Intent	Typical uses	Transport connectivity	Critical criteria
Local Centres Type: Badgery's Creek, Northern Gateway Aerotropolis Core Luddenham Village *	<p>Local Centres are smaller retail centres, approximately 1.5km apart, which meet the convenience retailing needs of the community which it serves, whilst acting as a local gathering place, particularly for employers/employees. They include local convenience and a mix of uses, but does not have to include residential in the Aerotropolis. Smaller scale and more local convenience and provide a place making opportunity for local communities and surrounding workers.</p> <p>Local centres protect or expand employment opportunities, and integrate and support creative enterprise</p> <p>Local centres are in areas of high amenity to help activate parkland corridors and link to public transport.</p>	<p>A supermarket or large grocery store</p> <p>Retail facilities and specialty shops, personal services and some commercial floor space</p> <p>Co-location and increased provision with social infrastructure (community facilities & open space)</p> <p>Smaller scale mix of uses supporting industrial, office and employment uses</p> <p>Luddenham Village: minor increase in residential dwellings</p>	<p>Active transport infrastructure which supports frequent trips to access goods and services within and between centres.</p> <p>Active transport connections to green corridors.</p> <p>High level of pedestrian accessibility from surrounding development,</p> <p>Provision of bus access, drop off points and car parking between buildings and the street</p>	<p>Located adjacent to areas of open space for activation purposes.</p> <p>Ideally located on a frequent public transport spine.</p>
Neighbourhood Centres or business hubs Type: Badgery's Creek Northern Gateway Aerotropolis Core	<p>Neighbourhood Centres provide daily convenience goods and small range of services to support workers and include:</p> <ul style="list-style-type: none"> – A small amount of retail floor space (not a supermarket, large grocery store or significant specialised retail) – Multiple retail premises (not just a petrol station or one stand-alone store) – An activity hub or Indigenous business hub, with business and or recreation facilities, or with community facilities to support the employees and workers <p>Does not include residential uses.</p> <p>Location must take into account the barrier impacts of major roads and different sizes.</p>	<p>Local convenience shops</p> <p>Local professional services</p> <p>Local office and business uses normally adjacent to open space or amenity areas to co-locate</p>	<p>Focus for bus network</p> <p>High level of pedestrian accessibility from surrounding development,</p> <p>Provision of bus access, drop off points</p>	<p>Located adjacent to areas of open space for activation purposes.</p> <p>Ideally located on a frequent public transport spine.</p> <p>Locations in the centre hierarchy plan are indicative.</p>

SUSTAINABILITY

As informed by Alluvium and Mosaic Insights

Sustainable - regenerative development (sometimes called 'regenerative sustainability') is the new frontier for city and precinct design, supporting cyclical resource flows (circular economy) and striving to achieve a net positive ecological, social and economic impact. This concept has grown out of the original sustainability movement which had its origins in the latter part of the last century.

Sustainability for the Western Sydney Aerotropolis is when the planning design delivery and operation of its precincts supports cyclical resource flows and strives for a net positive outcomes on all scales and by all parties across ecological, social and economic sectors.

A fundamental principle of regenerative development is that it is based on an understanding of, and response to, local place and ecosystem.

This resonates strongly with the Aerotropolis vision to 'respect and connect Country' and the landscape-led approach. The Aerotropolis can be an exemplar, showcasing how urban developments can build in long-term resilience to the effects of climate change.

While the conventional approach to sustainable development is focused on minimising adverse outcomes, regenerative development targets 'net positive' outcomes and supports cyclical resource flows. Regenerative goals may seem ambitious and challenging in today's context, but they are a necessary path towards resilient, thriving cities and suburbs.

As a significant new land release, Aerotropolis provides an effective opportunity to lock in the principles and foundations of regenerative development. While some outcomes may not be achievable upfront, the transition can be modelled and planned for (for example, transition to a carbon positive precinct by 2050).

A WATER SENSITIVE AEROTROPOLIS

- Water is supplied as a priority from within the catchment (rain and stormwater then recycled water) for non potable uses
- Co-governance / compliance arrangements are put in place to share water across property boundaries
- Fit for purpose water use for all residential, landscape, commercial and industrial uses.
- Third pipe for harvested stormwater or recycled wastewater is available to all residential, landscape commercial and industrial uses
- Green infrastructure (WSUD) is integrated into built and natural environments
- Green infrastructure to provides water treatment, urban cooling, ecosystem services and amenity
- WSA is designed as a sponge to increase perviousness significantly
- Landscapes adversely impacted by contaminated soils and salinity are actively managed and restored
- Rainwater is captured at a range of scales – lot, neighbourhood, regional
- Raingardens and wetlands are interspersed throughout the built environment and landscape
- Vegetation/trees in the public and private domain is supported by soil volumes and passive irrigation
- Tree canopy targets are met at the

A ZERO WASTE AND CIRCULAR ECONOMY AEROTROPOLIS

- Adopt principles of AVOID first, REDUCE, REUSE, RECYCLE last in material choices and construction methods
- Educate and embed behaviours, practices and systems through adoption of Sustainability / Resilience Framework and planning controls, services and information and education – individuals and businesses
- Design out waste in supply chain and manufacturing and eliminate single use items:
 - by using design guides for buildings with prefabricated/modular, long life and loose fit, flexible and adaptable solutions
 - adaptable and reusable infrastructure - temporary facilities that can be remodelled as the WSA grows/changes
 - eliminate construction waste with programs with volume builders to encourage waste minimisation in building design
 - use of recycled and renewable materials

- Establish Circular Economy Hubs for innovation and including Resources Recovery Processing infrastructure
 - plan now to process materials locally establishing local economies and circular systems within the Aerotropolis and on the boundary with Western Sydney councils
 - match suppliers with the local markets
 - testing innovative construction approaches - link with new CRC
- Provide processing and treatment facilities at a range of scales
 - lot, neighbourhood, regional
 - basement processing, micro-factories, large scale processing and
- Establish network based drop off points in preference of door to door collection.

A LOW CARBON AEROTROPOLIS

- Plan for greater than 100% renewable energy supply to make WSA a net exporter of clean energy to the NSW grid.
 - Include diversity of renewable energy supply including solar, wind, green hydrogen, and bio-energy (anaerobic digestion of organic waste)
 - Provide decentralised local generation and supply
 - Develop integrated systems for energy generation – waste and water
 - Develop multi modal transport system that prioritises walking and cycling in the 30-minute city
 - Promote pedestrian and cycling network
 - • Design and regulate for greening Infrastructure in public realm and private spaces for cooling, shade, amenity
 - Implement in the Street Design Guidelines the transition from individual use of infrastructure such as on and off road to shared adaptive infrastructure
 - Adaptable infrastructure for Charging stations – public facilities transition to private charging
 - Design roof space for energy generation, open space and amenity, gardens, food production, water harvesting, urban cooling
- Provide space for local food production and distribution / retail / sharing – via markets, community gardens on public land and private spaces - lot, neighbourhood and regional scale
 - Create equity of access to solar or renewables - removal of barriers to solar or renewables - Cost, rentals, heritage, solar access
 - Establish circular economy markets to reduce waste and transport emissions
 - Distributed and diverse share economy facilities and libraries

A COOL AND GREEN AEROTROPOLIS

- Green infrastructure
 - Vegetation providing (evapo-transpiration, shade from large trees)
 - Water providing (evaporative cooling through misting and irrigation breezes over water bodies, healthy vegetation, green roofs, walls and facades providing shade, insulation and evapo-transpiration)
 - Design of places providing air flow, green open space and appropriate building morphology so that the cooling from green space can be harnessed and spread throughout the city, e.g. having green open space upwind of the area of interest.
- Built environment
 - Highly reflective building materials to minimise light and heat absorbtion
 - Shade through eaves and overhangs, awnings
 - Permeable pavements
 - Street tree pits redesigned for deep soils and passive irrigation
 - Passive irrigation of vegetation to increase evapo-transpiration
 - Adequate vegetation around buildings
 - Natural ventilation and passive solar design to built form
 - Solar panels for shading

STAGING AND SEQUENCING

ALIGNING STATE INVESTMENTS

The Initial Precincts are the first stage precincts to be developed in the Aerotropolis. Sequencing within the Initial Precincts provide the priorities across infrastructure development and to align Government investment with achieving targets established in the Western Sydney Aerotropolis Plan.

Staging and sequencing across the Aerotropolis has been informed by the PIC and in order to communicate priorities across infrastructure development. The Aerotropolis PIC will provide more detailed timing of infrastructure.

Sequencing of the Initial Precincts is based on the following criteria:

- Tri-level government Western Sydney City Deal commitments
- Job creation potential
- focus on and around the new Metro Stations to support the new public transport
- leverage the M12, Northern Road and associated access to the airport and Elizabeth Drive upgrades
- Government priority areas within the Aerotropolis Core
- Leveraging off investment ready large land holdings
- Support for focused centres in the agribusiness precinct – Luddenham Village and Agriport
- Infrastructure utility investment extending from existing infrastructure
- Acknowledging environmental constraints.

KEY REQUIREMENTS FOR SEQUENCING OF DEVELOPMENT AND INFRASTRUCTURE

1. Development does not compromise the orderly provision and staging of the transport network, utilities and servicing.
2. Early development prioritises/ leverages off locations with mass transit capacity and is well supported by high levels of public and active transport accessibility.
3. Development does not result in isolated areas requiring out of sequence servicing by transport networks, utilities and services.
4. New roads provided as part of new development are integrated with any proposed local and regional road network and does not result in isolated and poorly connected road sections.

Three broad sequencing of the precincts are proposed. The NSW Government supports the sequencing within the precincts to generally occur in the manner as outlined.

AEROTROPOLIS PRIORITIES

The first areas of priority are:

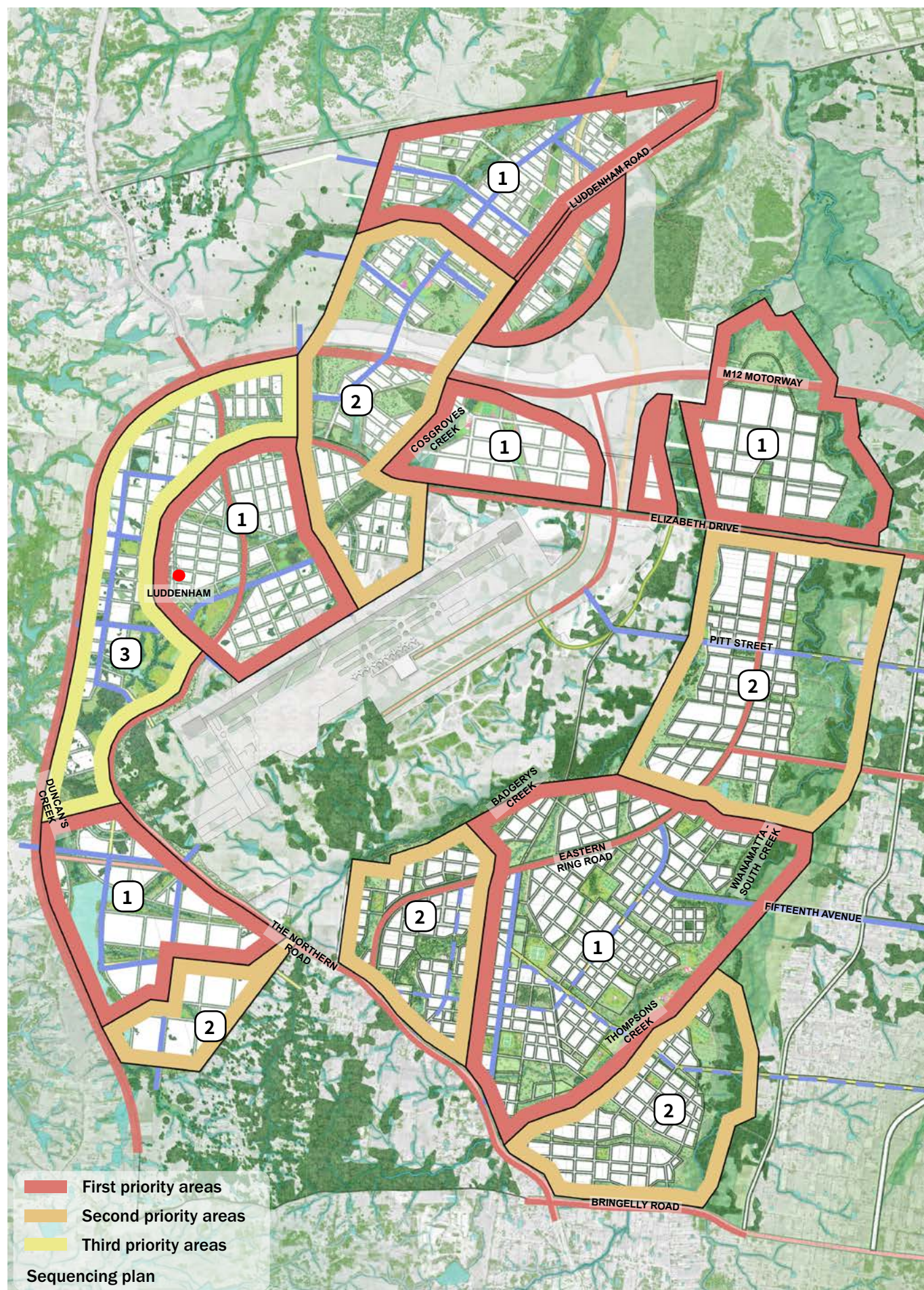
- High density employment areas within walking/ active transport distance from committed Metro Stations at Luddenham and Aerotropolis Core
- Associated large unfragmented landholdings
- Land adjacent and outside of the M12 corridor and interchange area that can support access to the Western Sydney International (Nancy-Bird Walton) Airport
- Agribusiness land in the northern area enabling access to the Western Sydney International (Nancy-Bird Walton) Airport from The Northern Road.
- Agribusiness land in the southern area that links to Northern Road and airport entry

The second areas of priority are:

- Mixed use zoned land east of Thompsons Creek in relatively close proximity to the Metro and Aerotropolis Core Centre that can bolster employment and resident populations
- Connecting developed areas between the Aerotropolis Core, Badgerys Creek and Northern Gateway precincts.
- Land to the immediate west of Badgerys Creek Road

The third areas of priority are:

- Land that is further from either committed infrastructure and / or more difficult to develop owing to environmental and topographical constraints



PART 3: THE INITIAL PRECINCTS

The urban design frameworks for each initial precinct establish a pathway for landscape-led design outcomes. Country, water and parkland frame dense urban neighbourhoods and other employment lands, where a sustainable city model will emerge over the next forty years.



An aerial perspective of the Aerotropolis Core, looking north east.

AEROTROPOLIS CORE, BADGERYS CREEK AND ADJACENT WIANAMATTA - SOUTH CREEK

A connected system of landscapes, land use, transport and social infrastructure, the urban design framework provides a vision for a new city.



Artist impression of the Aerotropolis Core metropolitan centre

URBAN DESIGN FRAMEWORK

AEROTROPOLIS CORE

The Core is the City Centre for the Aerotropolis, forming a complementary centre to the metropolitan cluster of centres including Penrith, Liverpool and Campbelltown.

The Core is a Parkland City in the true sense. It is a dense urban neighbourhood focused on both the new metro station and Wianamatta - South creek system. Thompsons Creek will form the regional park, complemented by a network of linear corridors associated with retained creeks.

It has the capacity accommodate 50,000 to 60,000 jobs and up to 24,000 residents by 2056.

Annotations

1. An intense, large centre with several nodes - one at the Metro Station; a northern focus integrated with creek parkland and Fifteenth Avenue; a Kelvin Park centre.
2. Lower order, but still intense employment land lies north and west of the centre - each with its own focus amenity.
3. West of Badgerys Creek Road, development is coordinated over time to achieve creeks and existing vegetation in linked open space.
4. Open space aligned to existing ephemeral creeks.
5. Larger ridge top parks help share views and connect Wianamatta to the urban core.
6. Kelvin Grove is provided impetus via a potential additional Metro station (not a government commitment).

BADGERYS CREEK

The Badgerys Creek precinct is entirely employment focused. It will complement the role of the business park within the Western Sydney International (Nancy-Bird Walton) Airport as well as the Northern Gateway employment functions.

Flanked by Badgerys Creek and the Wianamatta - South Creek, these major green corridors will provide the amenity for future workers. Centres providing conveniences will help to activate these corridors and the employment zone. The precinct will comprise logistics, commercial industry, high technology industry and associated employment uses.

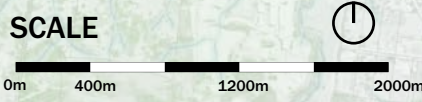
7. Thompsons Creek and the adjacent Wianamatta become the Aerotropolis regional park.
8. Badgerys Creek coordinated into an enterprise grid, utilising existing road and lot patterns where possible.
9. Badgerys Creek precinct centres aligned with the linear creek corridors to maximise amenity benefits.
10. Coordinated development north of Elizabeth Drive to integrate with Northern Gateway west of Badgerys Creek.
11. Waste transfer station retained for circular economy site (consistent with PIC), with potential future network shown.
12. Land north of the M12 corridor becomes conservation area.
13. High risk* (dark green) flood areas limited to creek and ecological functions.

WIANAMATTA - SOUTH CREEK

The Wianamatta - South Creek precinct is defined by the Environment and Recreation zone as established by the Western Sydney Aerotropolis Plan. It accommodates a range of environmental and recreation functions, including water flows associated with the creek environment, ecology and biodiversity functions, recreation (walking) paths and separate active transport (bicycle) routes, as well as contained areas of active recreation, particularly focused around the Thompsons Creek regional park. The precinct is complemented by a series of east-west corridors through the Aerotropolis Core and Badgerys Creek precincts to achieve a sustainable green grid.

14. Medium risk* flood areas provide active transport and parkland uses.
15. Low risk* flood areas contain active recreation and shared passive open space areas through to development.
16. Fragmented land within the Environment and Recreation zone (Wianamatta South Creek) is publicly accessible through long term development.
17. Existing quarries transition over time to employment land uses. Vegetation is retained where it aligns with flood and biodiversity objectives.

*Risk areas as defined by Liverpool City Council.



Note: This project has considered the extent of the Wianamatta-South Creek corridor adjacent to the initial precincts. Future precinct planning work throughout the Rossmore and Kemps Creek precincts will consider appropriate land use, urban design and landscape outcomes for the additional parts of the Wianamatta-South Creek corridor not addressed in this report.

OPPORTUNITIES AND CHALLENGES

The key opportunities and challenges to address in the urban design framework

AEROTROPOLIS CORE

Opportunities

- Leverage the accessibility and catalyst opportunities provided by the Metro Station
- Utilise the ephemeral creek network and ridgetops to establish the structuring elements of the urban design framework
- Retain existing roads where they can contribute to a legible urban neighbourhood arrangement
- Retain and enhance existing vegetation that has biodiversity values
- Provide urban density and activation to the Wianamatta interface
- Leverage Thompsons Creek acquisition as the focus for a city centre regional park
- Respect and conserve heritage items

Constraints

- Address existing ownership and lot arrangements
- The Kelvin Park road structure and lot arrangement does not suit a city / mixed use outcome
- Locate land uses to reflect ANEF contour requirements established by the WSAP
- Building heights and densities will need to conform to OLS limitations
- No development to be identified within the 1% AEP mapping
- Existing extractive industry activity
- Provide for Metro service and tunnel areas

BADGERYS CREEK

Opportunities

- Utilise existing road corridors
- Leverage access opportunities associated with Elizabeth Drive
- Provide connections over Badgerys Creek to integrate with the Northern Gateway precinct
- Retain and enhance existing vegetation that has biodiversity values
- Respect and conserve heritage items
- Protect avoided land as identified in the Cumberland Plain Conservation Plan for their high value biodiversity

Constraints

- Land fragmentation and ownership patterns, especially south of Elizabeth Drive
- A disconnected road network
- Substantial extractive industry activity
- Future noise and public safety areas resulting from the airport require land use limitations
- Access limitations north of the future M12
- Existing waste transfer activities north of Elizabeth Drive

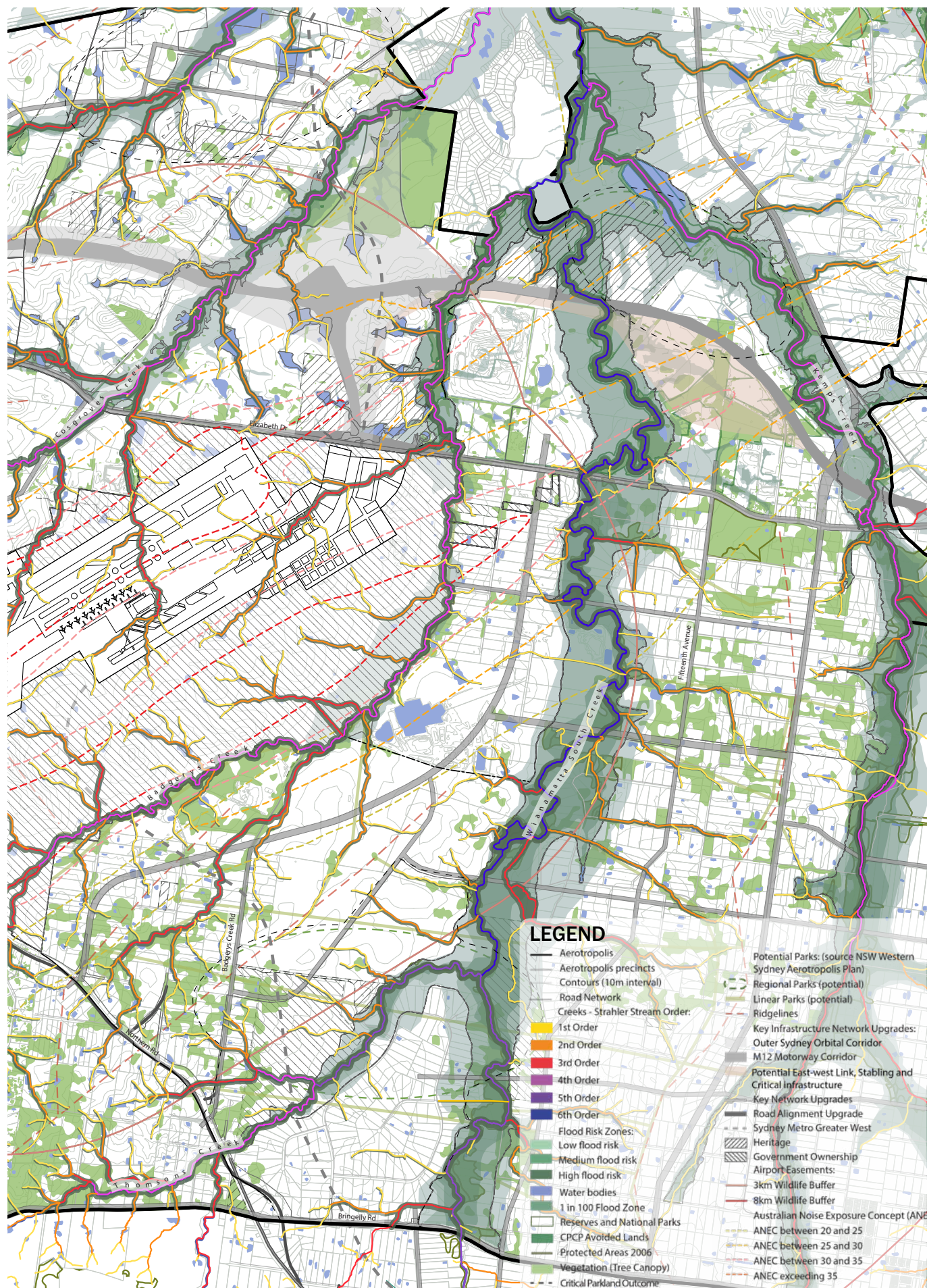
WIANAMATTA

Opportunities

- Retain and enhance vegetation of biodiversity value
- Respect and conserve heritage items
- The Wianamatta corridor can function as an active transport network
- Provide active transport crossings of the creeks
- Protect avoided land as identified in the Cumberland Plain Conservation Plan for their high value biodiversity

Constraints

- Private and fragmented ownership across the Wianamatta corridor
- The 1% AEP flood extent limits development opportunities
- Storm water flow requirements need to be considered when planting new vegetation so as not to cause problematic blockages



THE KEY PRINCIPLES AND STRUCTURE

Complementing the Western Sydney Aerotropolis Plan and the common principles applying to all precincts, the following spatial and design principles have been used to inform the urban design frameworks across Aerotropolis Core, Badgerys Creek and Wianamatta - South Creek.

THE STRUCTURE

The urban structure of the urban design framework is described in the diagram overleaf, and identifies:

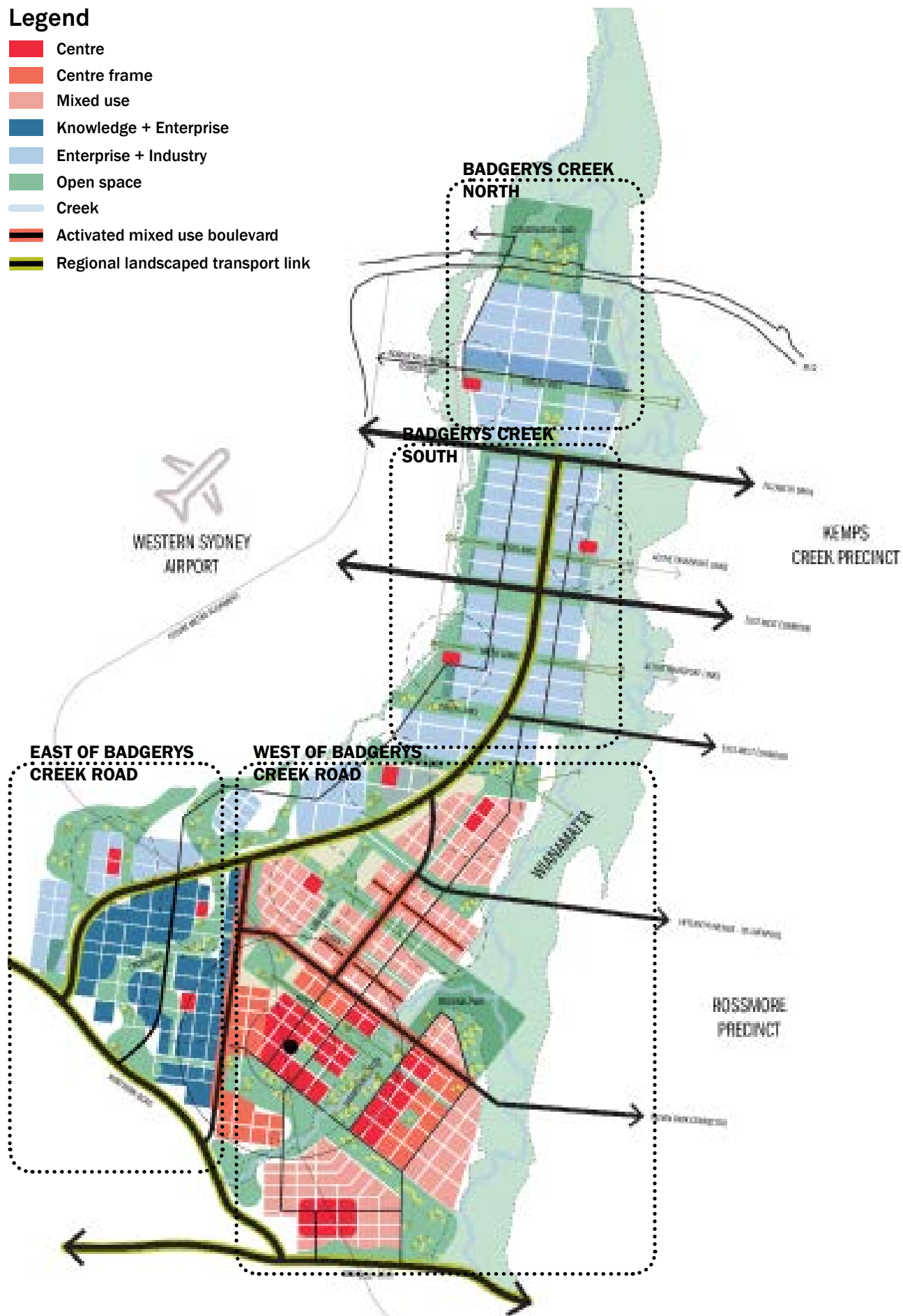
- A structured urban centre with a grid of streets connecting Thompsons Creek and Metro
- A mixed use frame to Thompsons Creek, enhancing its function as a regional park
- A focus on the Wianamatta - South Creek system as the driving component to the Western Parkland City
- East of Badgery's Creek Road: Neighbourhood clusters framed by existing ephemeral creeks and associated parkland
- West of Badgery's Creek Road: The ephemeral creek and associated vegetation disintegrates the enterprise structure
- Badgery's Creek South: A clear urban grid focused on existing roads, with integrated green corridor connections enhancing urban cooling and amenity
- Badgery's Creek North: A connected enterprise neighbourhood linking across Badgerys Creek to the Northern Gateway precinct

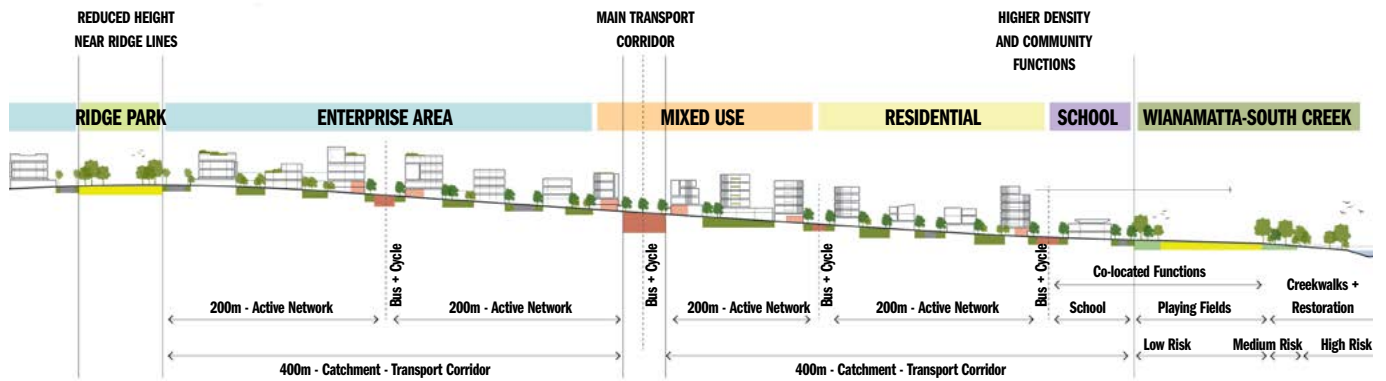
SPATIAL AND DESIGN PRINCIPLES

- The street grid is aligned to the creeks and ridgelines
- Open space is aligned to creeks, existing vegetation and ridgelines
- Parks containing active recreation are located on the ridgeline pertaining to the Aerotropolis Core, and to Wianamatta - South Creek Creek
- The Aerotropolis Core is a highly structured and connected urban environment with a clear relationship between streets, contained parks and linear creek corridors
- Density and centres are located adjacent to creeks or open space amenity
- The green grid connects between Badgerys Creek and Wianamatta - South Creek via ephemeral creek corridors within the Aerotropolis Core or wider planted avenues within the Badgerys Creek precinct
- The street hierarchy is designed to provide direct rapid bus access from Liverpool, Penrith and Campbelltown to the core
- Employment density is maximised within the 800 metre catchment of the Metro Station
- Within the mixed use zone, areas of residential development may occur, subject to employment targets being achieved
- Whilst the Eastern Ring Road is a focus for freight traffic, parallel streets offer frequent public transit functionality
- Service access roads generally provide an interface to major roads such as the Eastern Ring Road
- Active recreation is located outside of high and medium risk flood areas
- Active recreation is located to be accessible to public transit, and where possible, co-located with other social infrastructure such as schools
- Arrival points are given definition through parkland interfaces or urban boulevards

Legend

-  Centre
-  Centre frame
-  Mixed use
-  Knowledge + Enterprise
-  Enterprise + Industry
-  Open space
-  Creek
-  Activated mixed use boulevard
-  Regional landscaped transport link

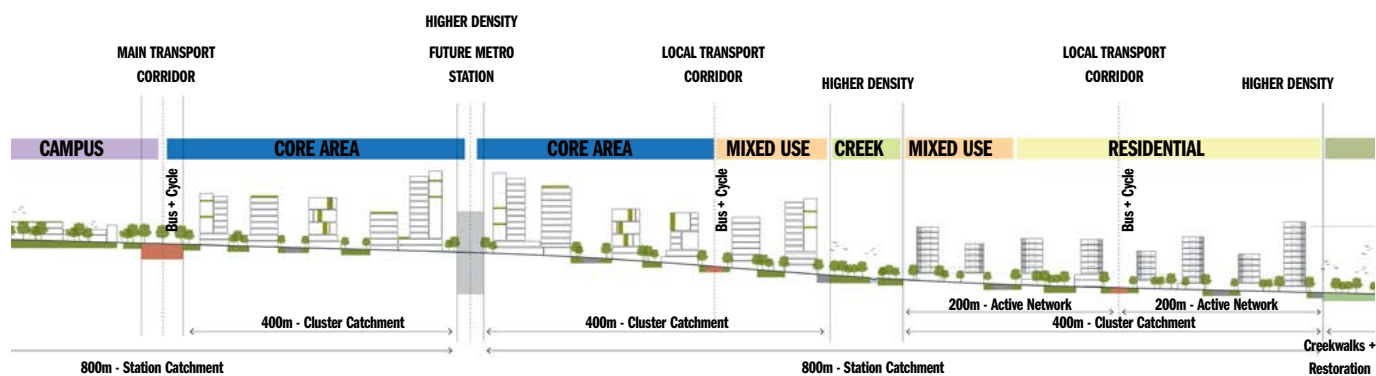




RIDGE TO WIANAMATTA PRINCIPLES

The section diagram above describes the general relationship between built form, topography and the Wianamatta across a range of land uses:

- The ridgetop parks are activated by dense, high quality enterprise uses, and offer amenity to attract quality businesses
- A primary rapid bus connection and active transport pathways service the broad catchment of enterprise and mixed use zones
- A secondary frequent bus corridor can service enterprise and residential neighbourhoods
- Mixed use and employment activity is aligned to the rapid bus corridor
- Residential neighbourhoods are limited and contained away from busy roads
- Schools integrate with local centres and activate the Wianamatta corridor



INTEGRATING DENSITY WITH AMENITY

The section diagram above describes the approach to the alignment of density across the Aerotropolis Core and Badgerys Creek precincts:

- The highest densities are arranged within the high amenity city core, associated with the Metro, and adjacent the Wianamatta corridor
- A clear and urban interface is provided to open space, creeks and Wianamatta corridors
- Mixed use activity should activate creek corridors within a walkable catchment of the Metro
- Residential development may be located outside the Metro walkable catchment, subject to demonstration that employment targets are being achieved
- Schools and local centres should be arranged to activate open space and the Wianamatta corridor where possible



ACTIVATING ENTERPRISE AREAS

The section diagram above describes how Enterprise areas should be arranged to allow integration with transport, open space and centres:

- Frequent bus and active transport corridors should be capitalised upon to ensure a walkable catchment to jobs
- The street grid should enable walkable access to frequent bus corridors
- Support areas such as local centres should be located to activate creek / open space corridors
- Bus corridors will service support / local centres

Attracting Jobs and Industry

The following elements need to be combined across the Aerotropolis Core and surrounding precincts to ensure high quality business can be attracted, and so that jobs targets can be achieved.



Accessibility

- Sydney Metro Western Sydney Airport Line
- Frequent bus network
- Active transport
- Comfortable and attractive walking routes



Dense Mixed Use

- Encouraging the 'rub' - creative interactions
- Amenity for time poor workers
- Clustered activity between industry facilitated via quality street networks
- Institution and industry clusters (e.g. universities)



Nearby residential

- The half hour city
- Residential connected to centres by convenient and rapid transit

Amenity

- Quality open space near to workers
- Density adjacent to amenity
- Creating a centre identity

THE BLUE-GREEN INFRASTRUCTURE FRAMEWORK

The Blue-Green infrastructure framework is an interconnected network of creeks, drainage basins, parks, playing fields and streetscapes. Vegetation and planted areas on private lots also contribute to this framework.



Conceptual block model showing Thompsons Creek and the regional park

PUBLIC DOMAIN PLAN

Existing creeks and open space is a key structural and organising element of the urban fabric.

The Public domain framework of the Aerotropolis Core and Badgerys Creek consists of an interconnected, well accessible and diverse framework of waterways, parks and open spaces, streetscape and civic spaces.

With Thompson Creek regional park at the heart of Aerotropolis Core, it is the linear parklands along the riparian corridors of tributary creeks and green street framework that form the principal network of the public domain.

These areas accommodate a range of functions beyond recreation including:

- creek lines, water retention and soil permeability within the urban landscape,
- protecting existing native vegetation and wildlife habitats, especially those identified in the draft Cumberland Plain Conservation Plan and to meet the requirements of the Biodiversity Certification Order of the Sydney Region Growth Centres 2006
- providing a foundation for biodiversity enhancement
- allowing wildlife to migrate through the urban fabric
- providing new urban tree canopy to achieve urban cooling
- containing and protecting culturally significant landscapes and heritage sites

→ active transportation routes - both regional and local. The Public domain framework connects the precincts to the regional systems of Wianamatta and Badgerys Creeks. This interconnected system provides a foundation for achieving a healthy, resilient and cool parkland city.

The open space framework has been guided by performance criteria outlined in Draft Greener Places Design Guide (GANSW, 2020).

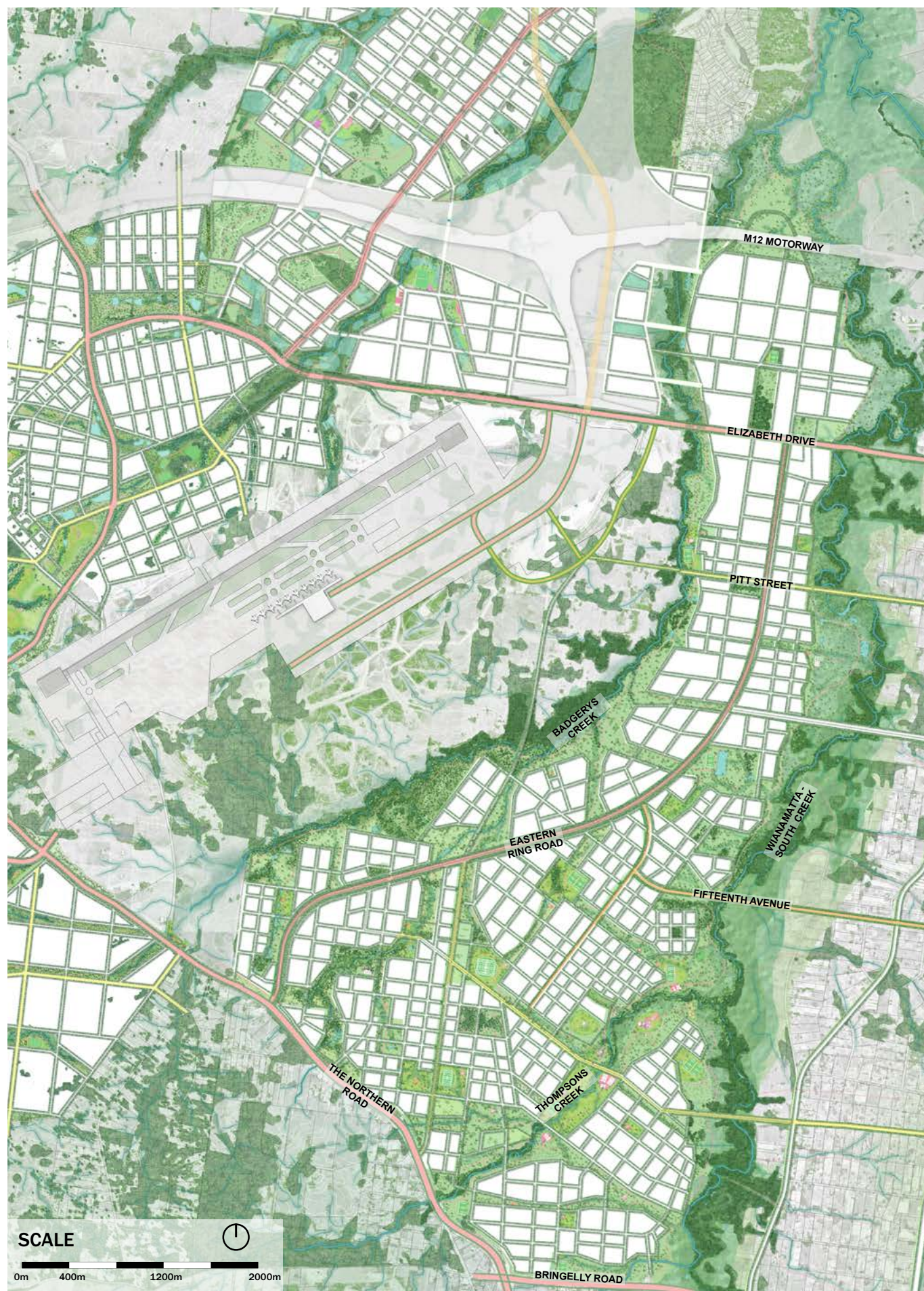
- Accessibility and Connectivity:
 - Proposed open space framework is a well connected system. Most urban areas in Aerotropolis Core and Badgerys Creek precincts are within 200-300m walking distance to the nearest open space and accessible by public transport and active transport.
 - Park edge streets are provided along edges of built form and open space to ensure active interface and public access.

- Distribution and Quantity:

- Distribution of open space is a reflection of identified key landscape elements as led by the landscape urbanism principles (waterways, ridgetops, existing vegetation). This is complemented by additional urban parks to achieve even distribution throughout the precincts in proximity to residents and worker population.

- Size and Shape: Size and shape of open space varies, reflecting the range of functions beyond recreation.

- Quality and diversity: Diversity of open spaces is derived from its position and function within the system. The open space system will have a natural "Cumberland Plain" parkland character with areas of greater recreation and leisure intensity.



OPEN SPACE TYPOLOGY

Regional Alluvial Parklands along Wianamatta and major creeks

- Creek focused and alluvial parklands are the core ecological corridors.
- Active recreation and park and community amenities of a regional and district character are included outside of the 1% AEP flood extents.
- Passive, non structured recreation (like walking path and boardwalks) is incorporated in medium flood risk extent, providing impact on riparian corridor is minimised.
- Regional active transport routes are incorporated within the parklands framework.

Linear Parklands along tributary (often ephemeral) creeks

- Waterways of Strahler Order 2 and higher will be maintained in a natural state, including the maintenance and restoration of riparian area and habitat such as fallen debris. Where a development is associated with or will affect a waterway of Strahler Order 2 or higher, rehabilitation will occur to return that waterway to a natural state to enable natural processes and functionality to be maintained.
- District and regional in terms of ecological importance and water retention function.
- Parks have sufficient width to allow for vegetated riparian corridor and pockets of passive and active recreation of a local character (fitness nodes, seating

nodes, nature playgrounds, community gardens).

- Active transport routes are incorporated within these parks.

Ridgeline & Hilltop Parks

- Ridgetop parks connect Country, topography, sky and landscape
- These parks are established on the local high points to capture the breeze and allow for long views.
- Dependent on the size and location, sportfields, active and passive recreation and associated park amenities of a district and local character are to be found with these parks.

Urban Parks and Pocket Parks

- These parks are surrounded by built form and generally located within the local city core or neighbourhood centre.
- They are associated with community and cultural amenities like library and serve as a "village green" for local residents and workers.
- More "urban" in their nature, these parks can accommodate non-structured passive and active recreation, playgrounds, kick about spaces and community and park amenities of district and local character.

Nature Parks

- Areas proposed around protected existing native vegetation.
- These areas are often incorporated within linear parklands and ridgeline parks.
- A non structured, low impact recreation focus of a district and local character is incorporated, ensuring no negative impact on the remnant vegetation community.

Streetscape

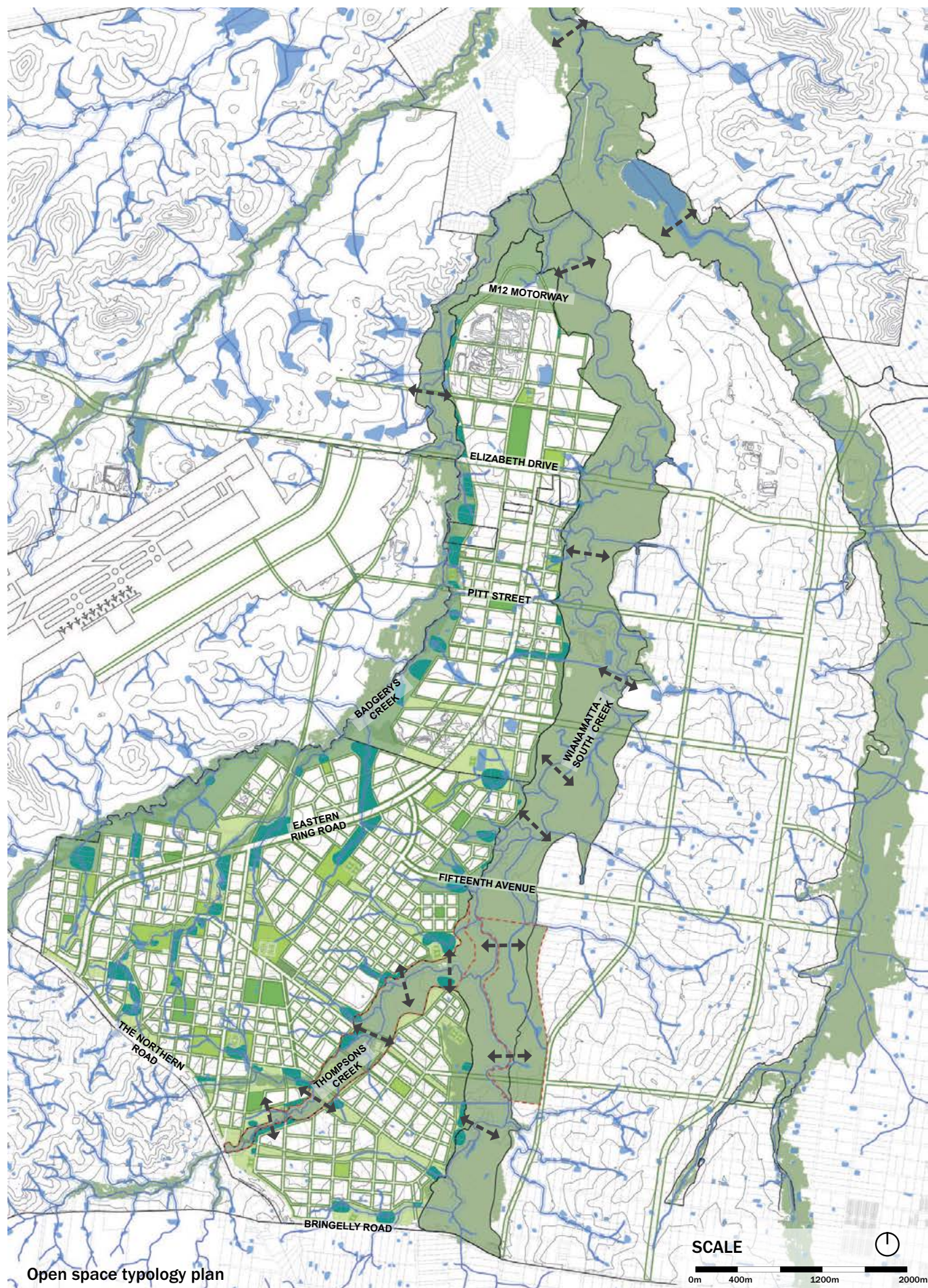
- Multi layered continuous tree canopy and ground cover planting rich in diversity create a green and cool setting for everyday life.

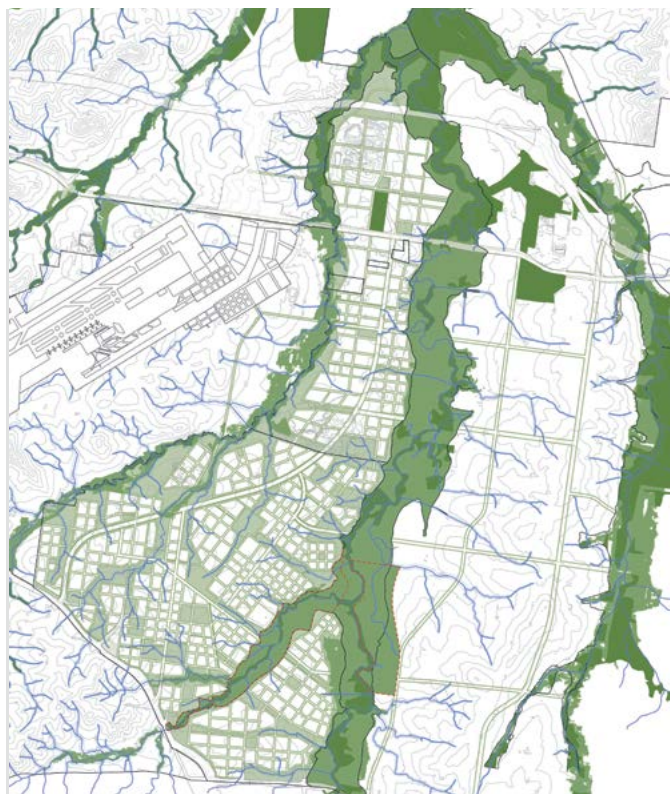
"Gateway" landscape

- Abstracted Cumberland Plain landscape at entrances to the Parkland City from major roads.

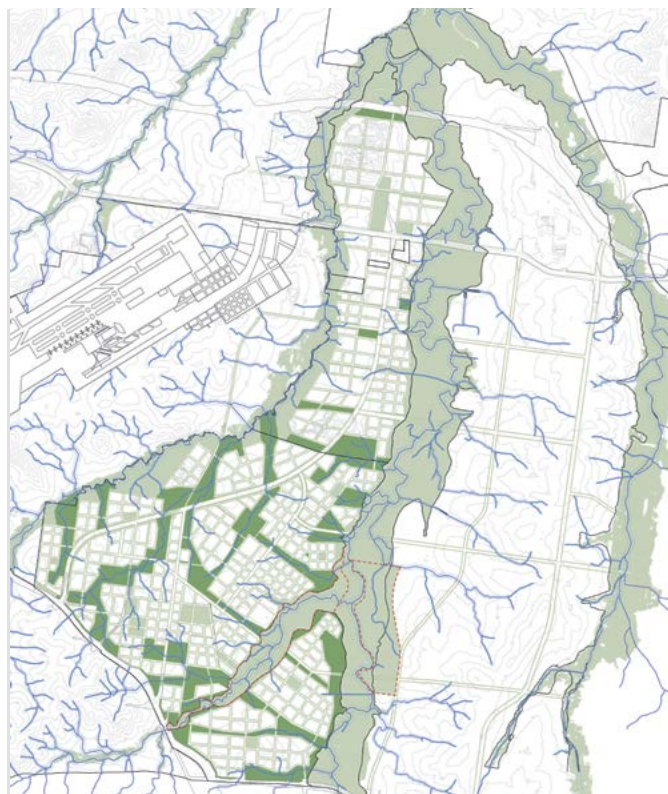
LEGEND

-  Indicative WSUD and detention basin footprints
-  Creeks
-  Waterbodies
-  Riparian corridor parklands, broader landscape
-  Linear parklands
-  Urban parks incl. Ridgeline & Hilltop parks
-  Nature parks
-  Streetscape
-  Active transport crossing

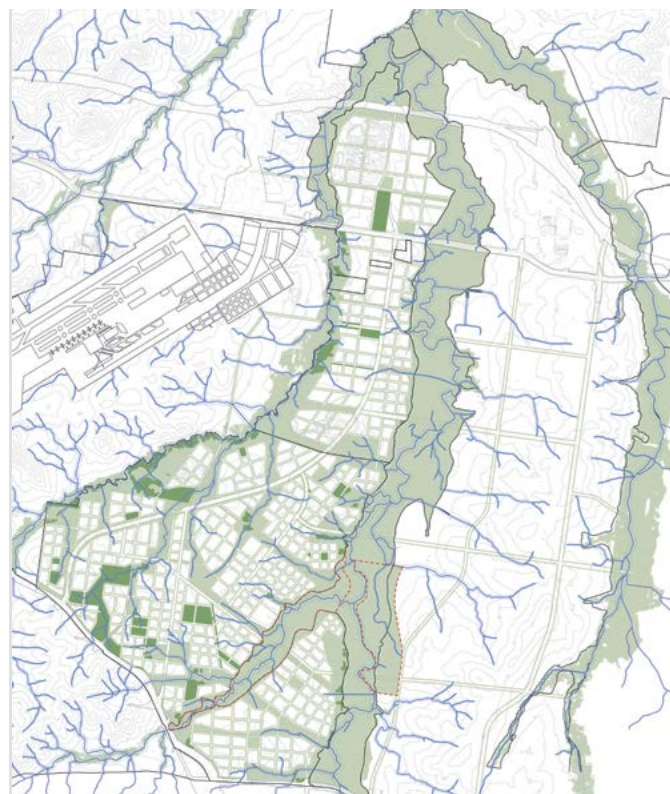




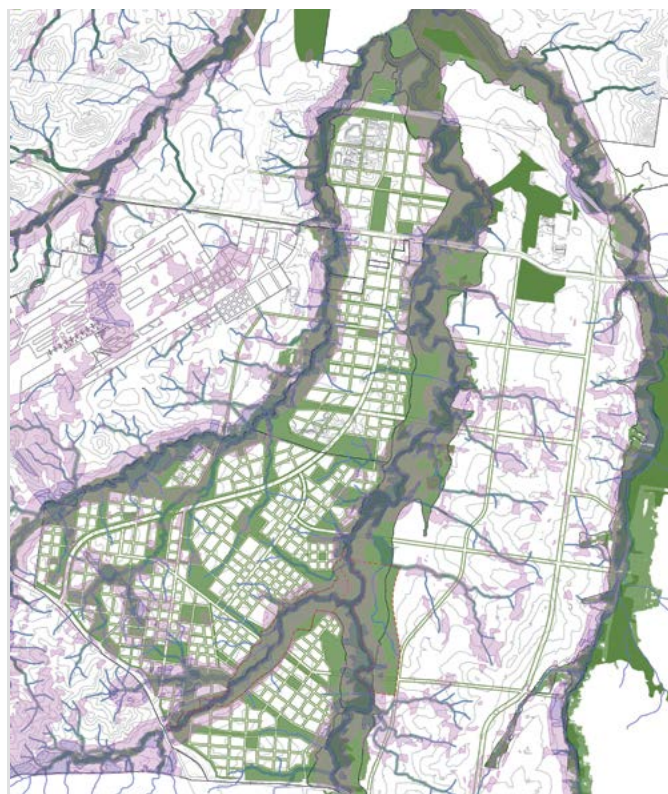
**Alluvial Regional Wianamatta -
South Creek Parkland**



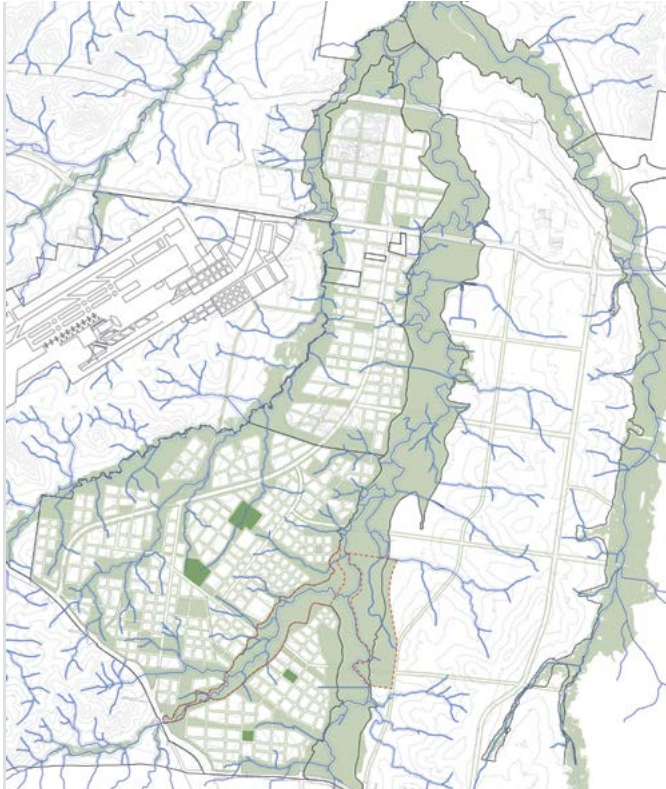
Parklands along tributary creeks



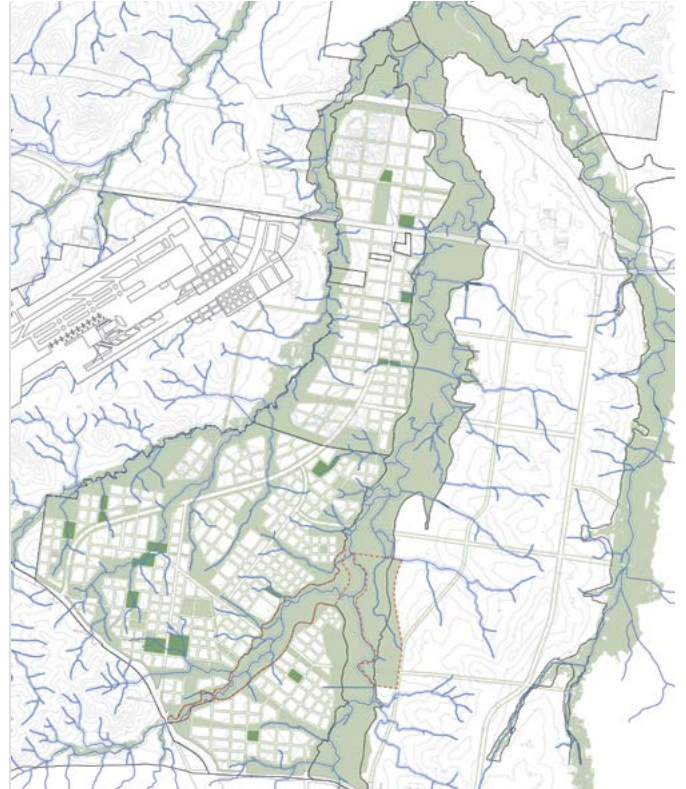
Nature Parks



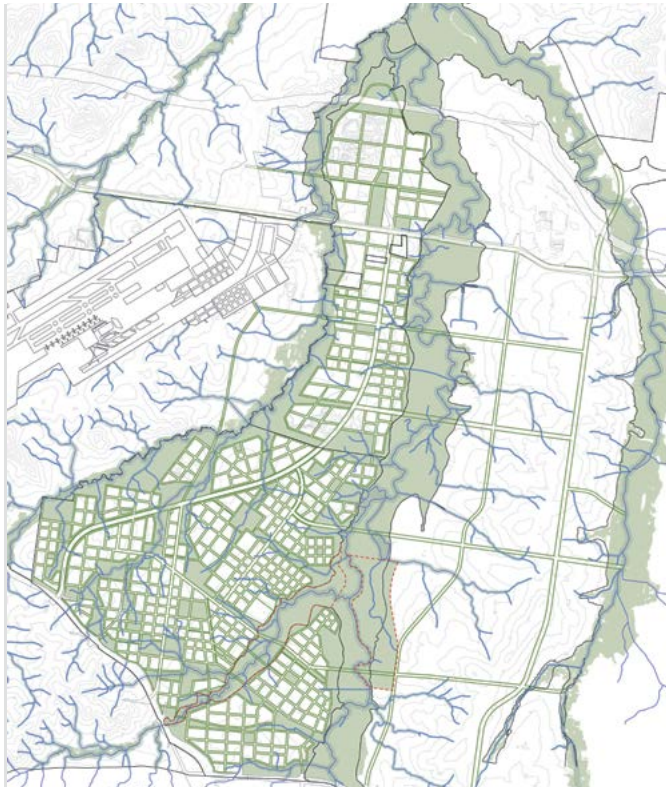
**Sites of cultural significance incorporated to open space
- Indigenous heritage overlay**



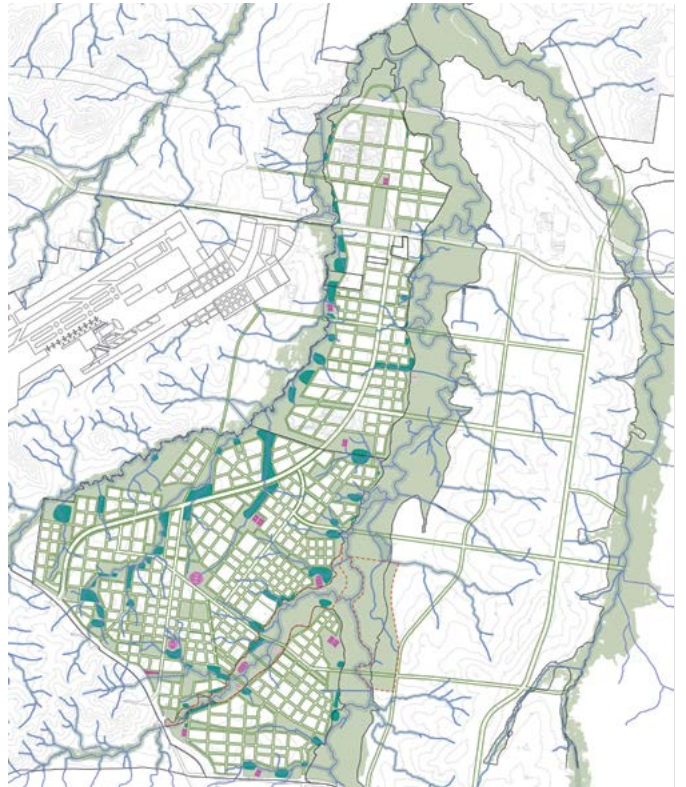
Hilltop and Ridgeline Parks



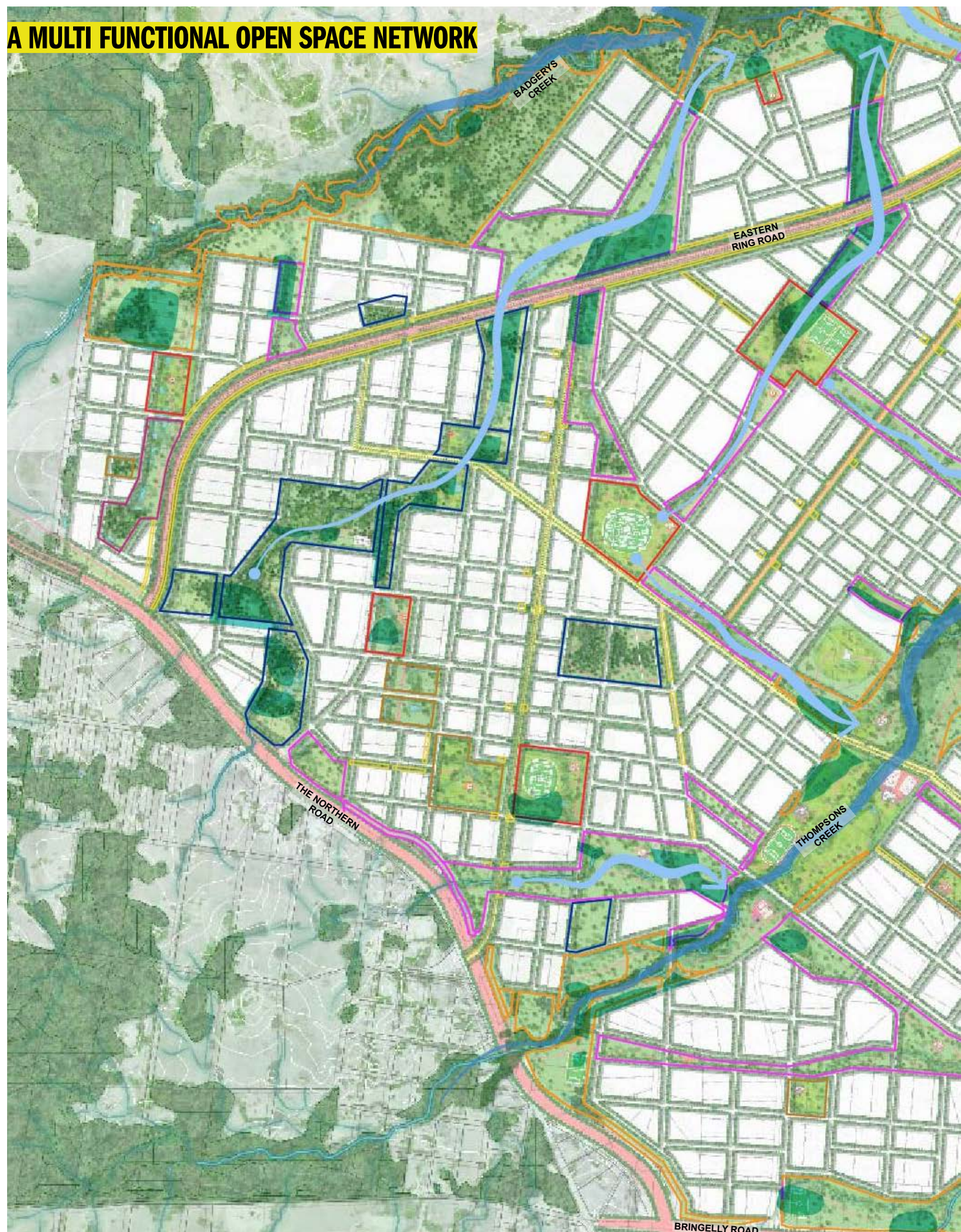
Urban Parks & Pocket Parks

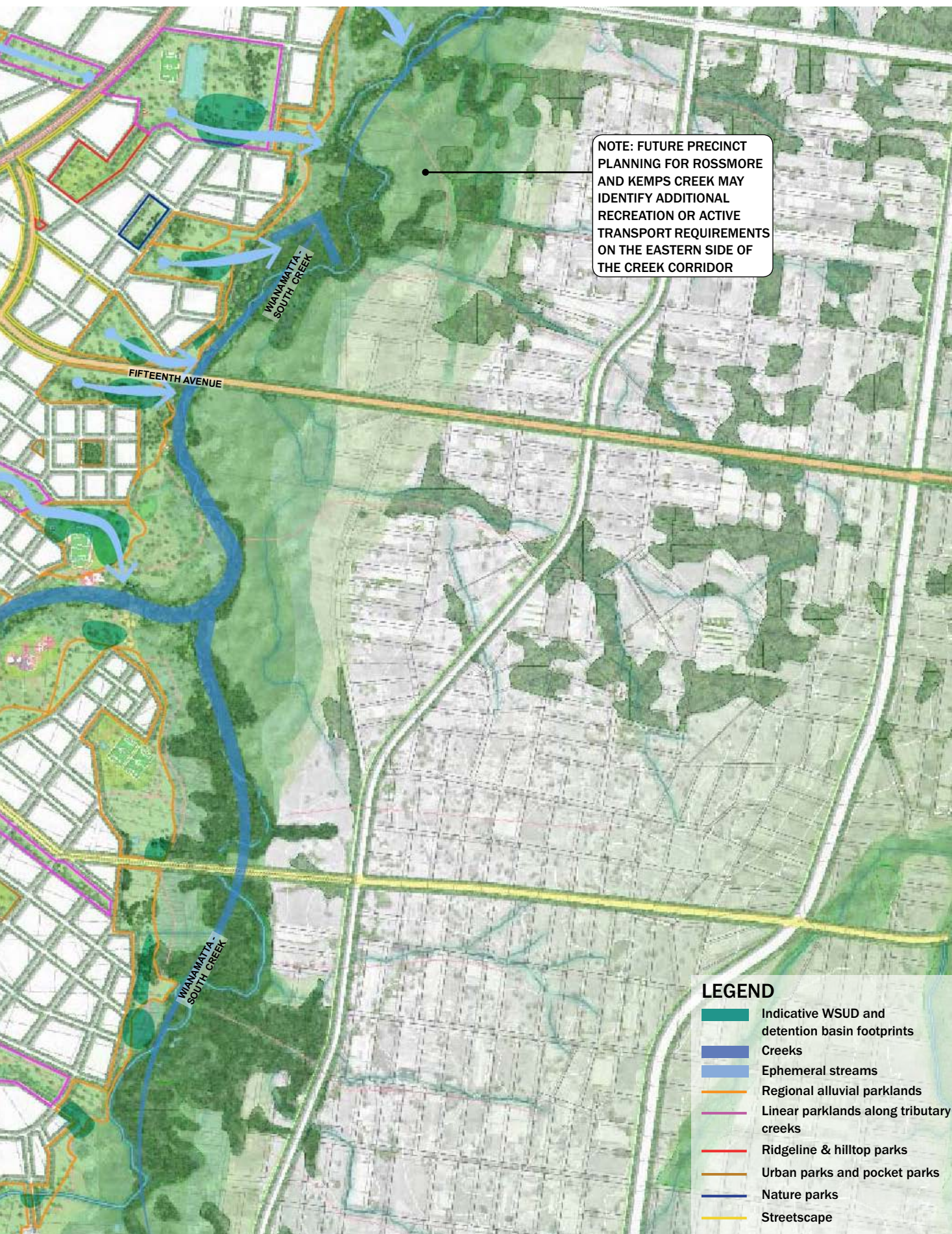


Streetscapes



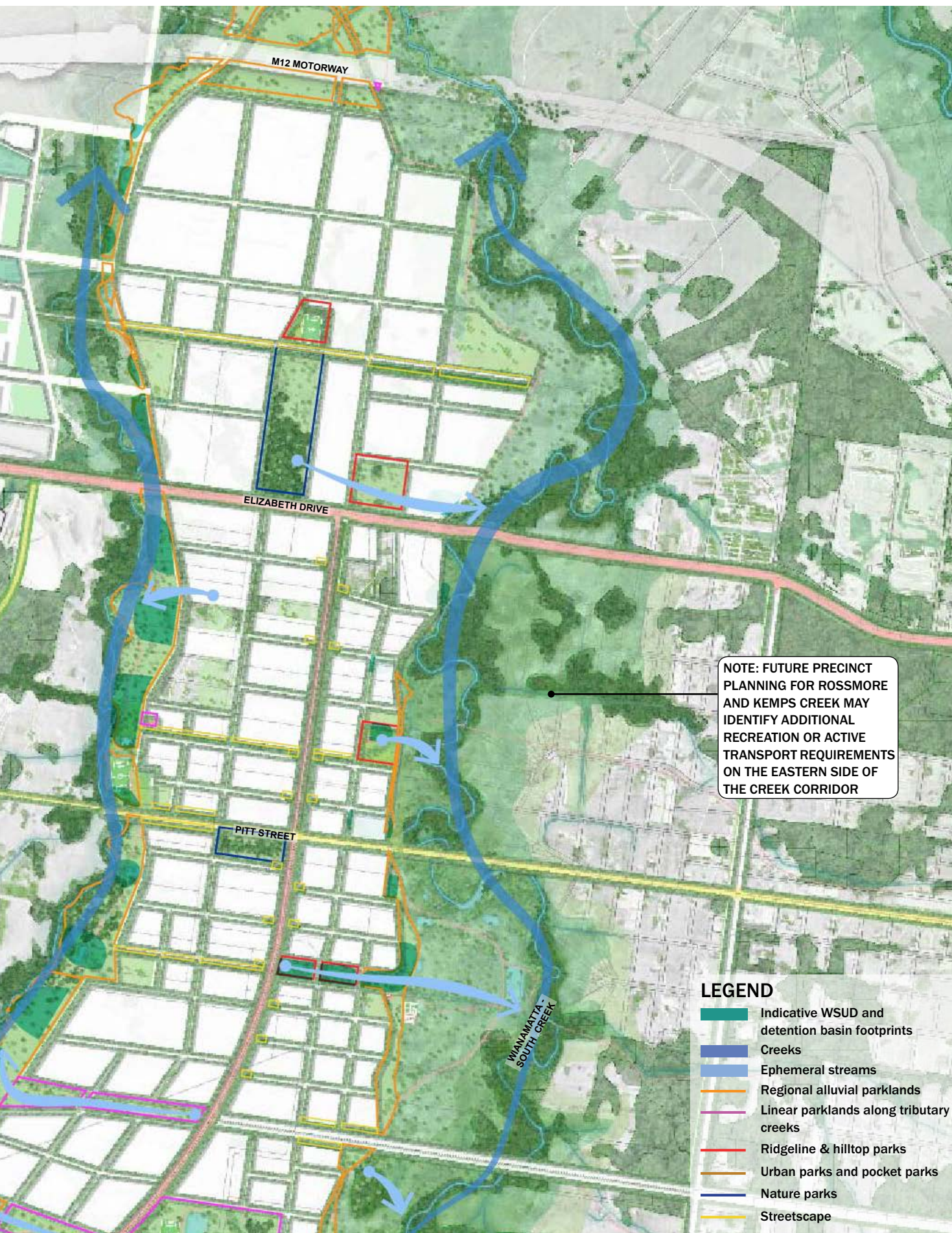
Active recreation





A MULTI FUNCTIONAL OPEN SPACE NETWORK





ENV RETENTION

With EcoLogical Australia

Biodiversity Certification provides direction to ensuring the protection of 2,000 ha of native vegetation in the Sydney Region Growth Centres (Growth Centres) and facilitating the strategic loss of ecological values on 'certified lands' without triggering further assessment under the former Threatened Species Conservation Act 1995 (TSC Act). To inform planning of the initial precincts for the Western Sydney Aerotropolis, this requirement only applies to land to the south of Elizabeth Drive in the Badgerys Creek precinct and Wianamatta-South Creek precinct and all the Aerotropolis Core precinct.

This strategic loss is offset through the retention and management of areas of higher ecological value across the Growth Centres and through a levy that will be used to protect and manage areas of high ecological value outside of the Growth Centres. A Strategic Assessment under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) was approved by the Commonwealth (Department of Sustainability, Environment, Water, Population and Communities (SEWPaC).

Remnant native vegetation is present in reserves and parts of lots. Where remnant native vegetation is present, the following Threatened Ecological Communities (TECs) were identified in varying conditions in the Growth Centres portion of the Aerotropolis:

- Cumberland Plain Woodland, listed as Critically Endangered under the NSW Biodiversity Conservation Act 2016 (BC Act) and Commonwealth EPBC Act;
- River-Flat Eucalypt Forest, listed as Endangered under the BC Act;
- Castlereagh Swamp Woodland, listed as Endangered under the BC Act; and
- Castlereagh Shale-gravel Transition Forest listed as Endangered under the BC Act and Critically Endangered under the EPBC Act.

Biodiversity outcomes within the subject site are driven by multiple strategic objectives including:

- the need to maintain parity with the *Sydney Region Growth Centres Biodiversity Certification Order* (Order). This requires the protection of a minimum 227.18 ha of Existing Native Vegetation (ENV) mapped in the Draft Growth Centres Conservation Plan 2007; and

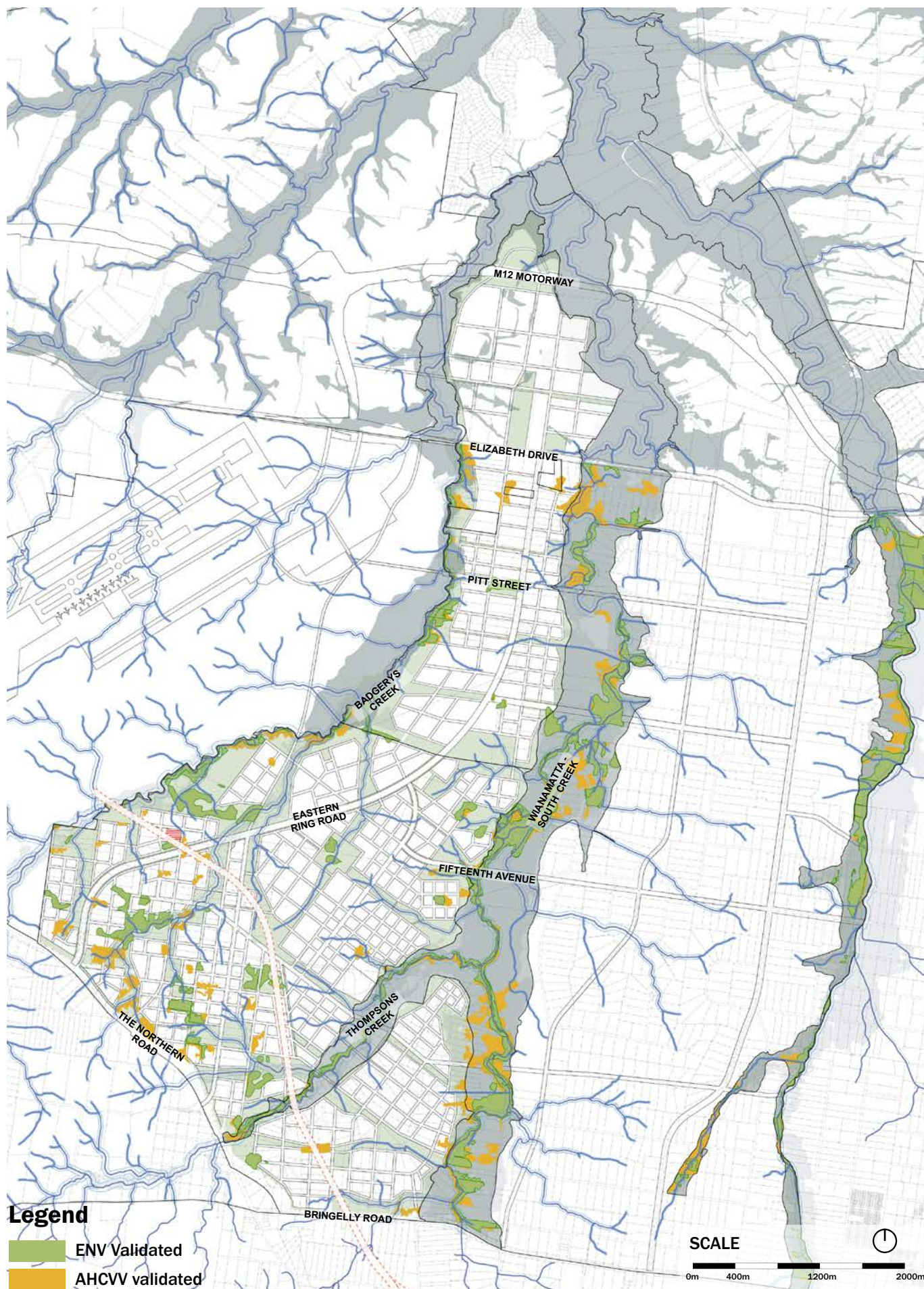
- to deliver the vision of a Parkland City and maintain Wianamatta-South Creek as a regionally significant ecological corridor, which is identified both within the Greater Sydney Region Plan (Greater Sydney Commission, 2018) and the Western Sydney District Plan (Greater Sydney Commission, 2018).

Currently 183.7 ha of validated ENV is within land zoned Environment and Recreation under the State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (SEPP), resulting in a shortfall of 43.48 ha of ENV,

To account for the shortfall in ENV, the precinct plan has been shaped to provide for the areas of mapped ENV within open space network within the Aerotropolis Core precinct and Badgerys Creek precinct.

Changes to the statutory framework is also required to overcome this shortfall and to allow lands within the open space network to be included as ENV. It is recommended that these areas are zoned Environment and Recreation with appropriate planning controls in the SEPP. These lands will also need to be incorporated within the High Biodiversity Values map of this SEPP. This will result in retention of 45.06 ha of additional ENV within the open space network. This is 1.58 ha more than the minimum requirement for ENV protection.

There is also a total of 81.4 ha of Additional High Conservation Value Vegetation (AHCVV) present within the Wianamatta-South Creek Precinct, of which 23.3 ha has been field validated. AHCVV is defined as meeting the same criteria as ENV (i.e. a 10% or greater canopy cover and a patch size of 0.5 ha or more) however, was not mapped in the original Draft Growth Centres Conservation Plan 2007. It is noted if it is proposed to count the field validated AHCVV towards the 2,000ha target once the Order to confer biodiversity certification on the *Sydney Region Growth Centres SEPP 2006* is amended, it will also need to be zoned Environment and Recreation and mapped as AHCVV on the High Biodiversity Value SEPP map.



UNDISTURBED SOIL NETWORK

The Undisturbed Soil Network is a network of interconnected and undisturbed site soils, essential to the health of the Green and Blue systems.



Within the urban fabric of Aerotropolis Core and Badgerys Creek precincts, this system naturally occurs within the linear parklands formed along riparian corridors of tributary creeks and connects most of the urban parks through this system. Streets with additional planted strip have been proposed in areas where there is a need to strengthen the connection of this framework.

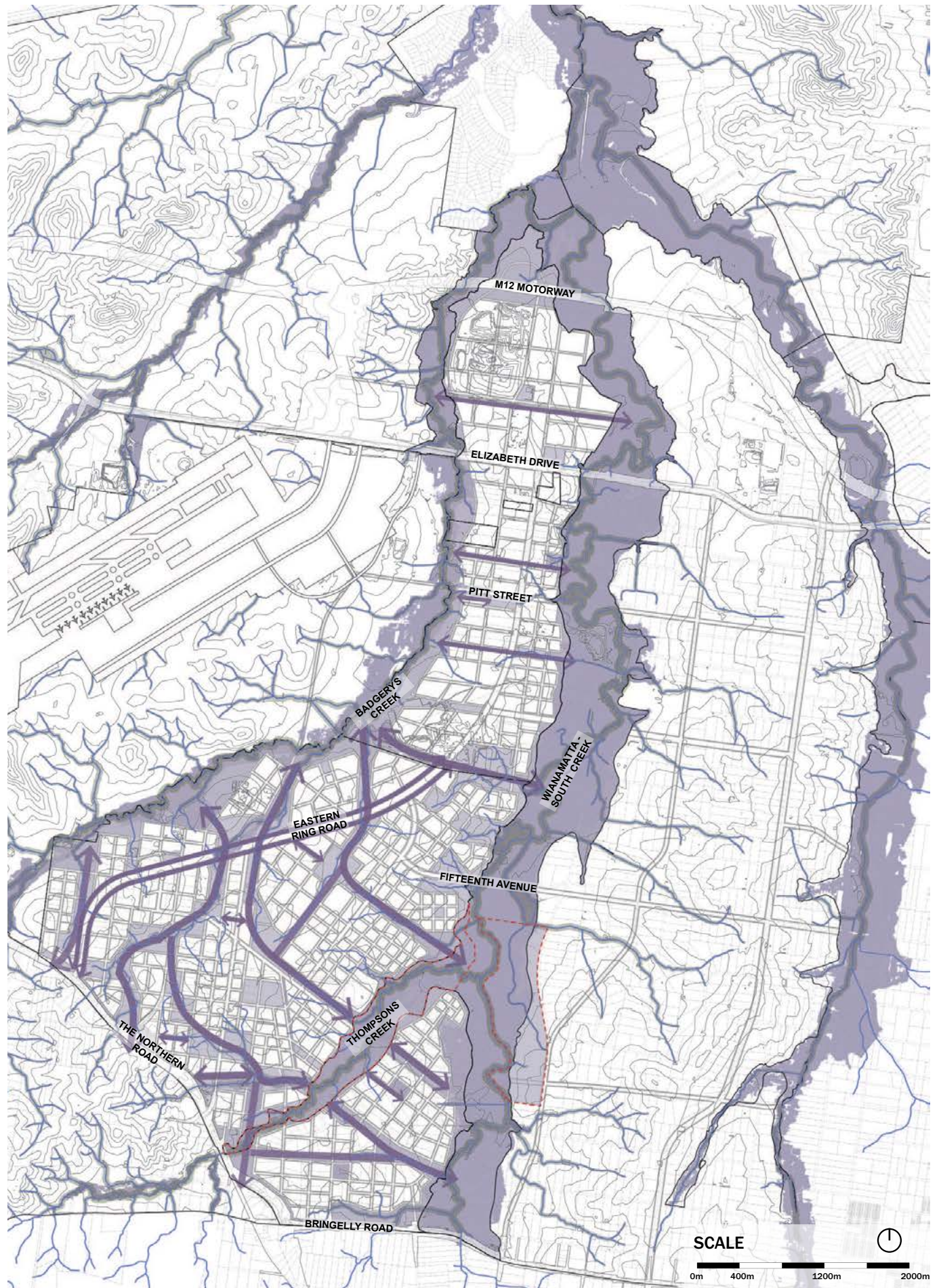
Within the areas of the Undisturbed Soil Network, natural soil profile is to be protected and engineered cut and fill and topographic alterations are to be avoided with the exception of localised earth works associated with WSUD and creek restoration, sportfields, playgrounds, excavations for park amenities footings, shallow sub-bases to paths, tree planting holes and the like.

Creeks and the associated riparian zones are protected and incursion into this zone should be avoided. Works associated with WSUD and creek restoration and small structures like paths, boardwalks, stepping stone creek crossings and the like are permitted providing the impact is minimised and permissible with Office of Water Guidelines. Path and road structures crossings over creeks are elevated on piers to minimise the impact on the riparian zones.

During construction, A and B soil horizons are to be removed and stored separately and replaced in their correct order.

LEGEND

-  Undisturbed soil within creeks riparian corridors and broader landscape parklands
-  Interconnected and undisturbed soil system within the urban fabric



CULTURAL LANDSCAPES AND HERITAGE










Notwithstanding two centuries of European colonisation, agriculture activity and private occupation, the existing Country remains incredibly significant in Indigenous Culture and heritage significance. Many existing sites have been mapped across Aerotropolis Core, Badgerys Creek and Wianamatta - and it is likely many others are unmapped.

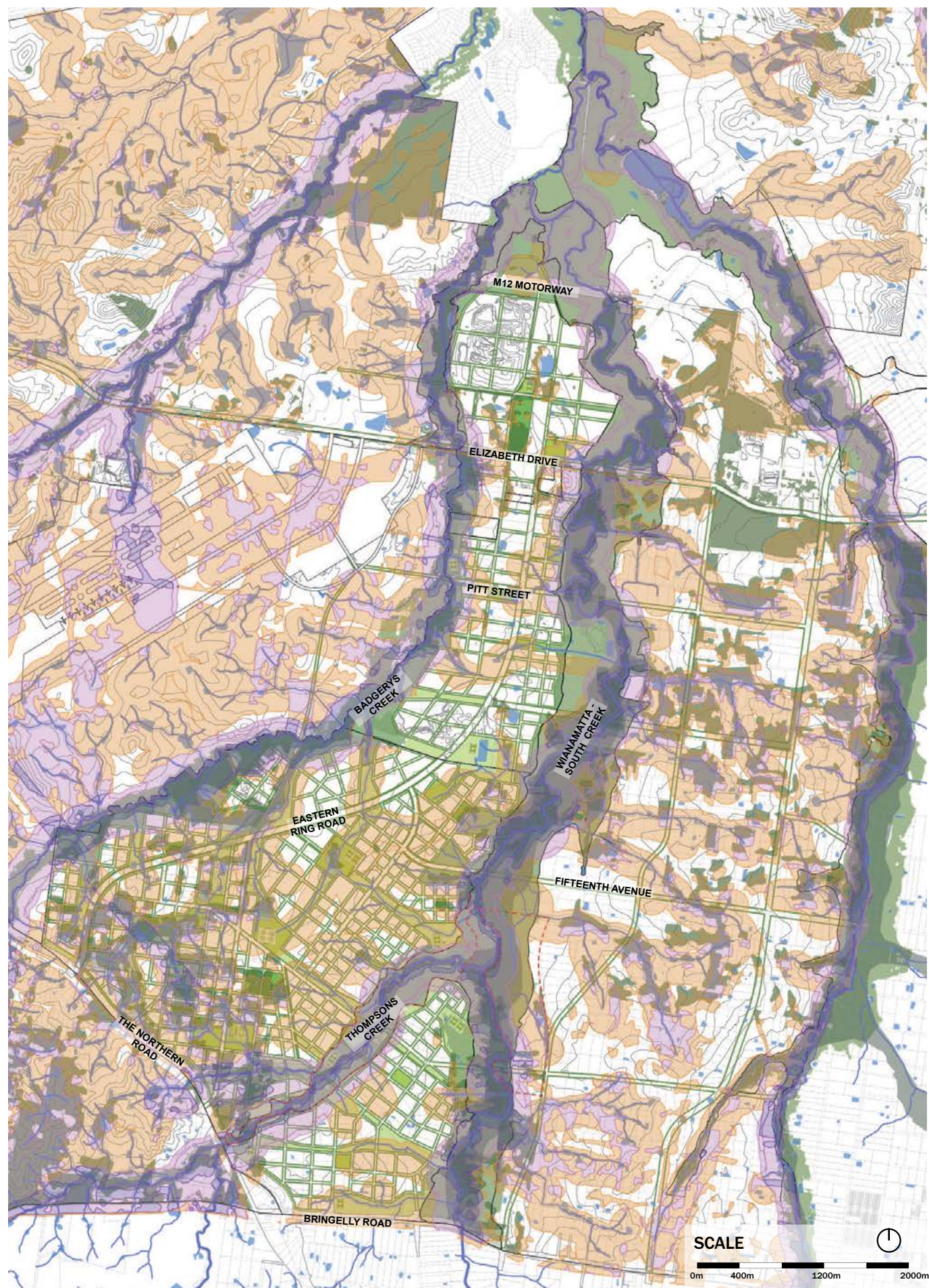
Country being core to Culture - water, creeks, ridgetops, existing vegetation and the like are associated with the mapped sites of significance.

The overarching principle is to as much as possible retain these places in open space. Within the Aerotropolis Core, this means connecting ridgetops via ephemeral creek lines to the Wianamatta-South Creek and Badgerys Creek corridors. These connections are expressed as open space, and contain a range of functions for water, vegetation retention, stormwater, heritage conservation and cultural expression.

In addition, State listed heritage items are to be retained and enhanced through conservation and careful arrangement of new urban form around them. Any development within heritage curtilage must respect conservation management plans, and enable heritage relationships between built form and landscape to be maintained.

LEGEND

-  Creeks
-  Waterbodies
-  High sensitivity
-  Moderate sensitivity
-  Low sensitivity
-  Riparian corridor parklands,
broader landscape
-  Linear parklands
-  Urban parks incl. Ridgeline &
Hilltop parks
-  Nature parks



AEROTROPOLIS CORE PRECINCT

The Aerotropolis Core precinct includes some areas of high and moderate Aboriginal heritage sensitivity, mostly along creek lines. In addition, several known Aboriginal heritage sites have been identified including artefact sites, modified trees (carved or scarred) and potential archaeological deposits. Furthermore, a site has been identified as a potential conservation corridor due to its Aboriginal cultural heritage significance.

The Aerotropolis Core precinct includes the only State listed heritage item within the initial precincts. Kelvin Park Homestead, located along Thompsons creek, is the only surviving example of a large pastoral estate within the Aerotropolis and demonstrates the pastoral development of Bringelly from 1818. Although only a small remnant (7ha) of the original 1200-acre site remains intact, the homestead and farm buildings in their current setting with extensive views over rural land, is still able to demonstrate the principles of 19th century farm estate architecture, planning and design.

Careful consideration has been given to Kelvin Park Homestead in the developing the urban design framework. More information about Kelvin Park Homestead is provided later in this report. The precinct also contains several locally listed and unlisted heritage items, including Mount Pleasant Homestead amongst others.

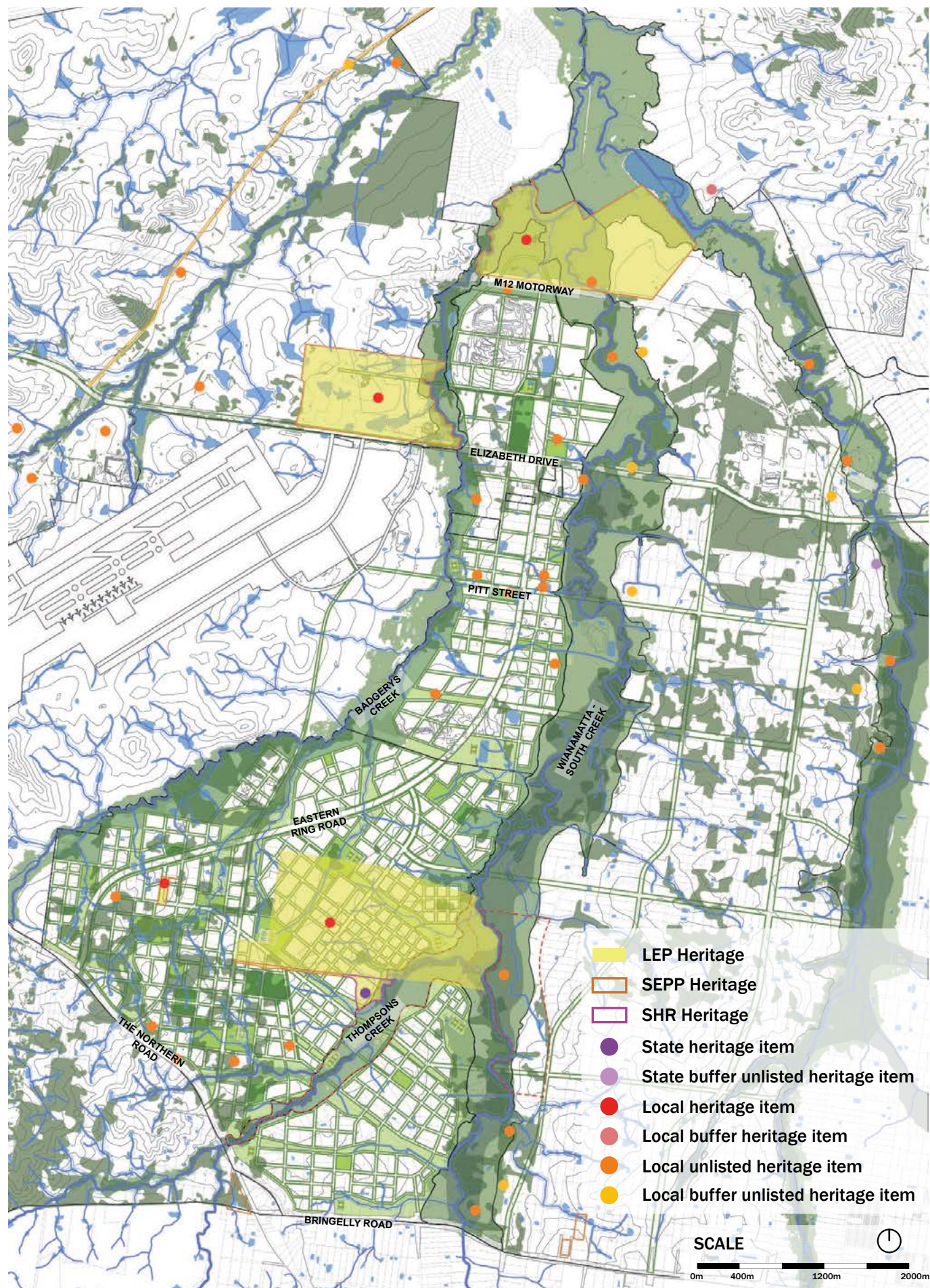
WIANAMATTA-SOUTH CREEK PRECINCT

The Wianamatta-South Creek precinct holds special significance for First Nations people and contains significant areas of high and moderate Aboriginal heritage sensitivity. The precinct includes many known Aboriginal heritage sites including artefact scatters, potential archaeological deposits and a grinding groove site. Views between the precinct and other areas also have cultural significance. The Wianamatta-South Creek precinct also partly includes two listed non-Aboriginal heritage sites – the McGarvie Smith Farm and the Fleurs Radio Telescope site. In addition, the precinct provides an important setting for many other heritage items, including Kelvin Park Homestead, located along Thompsons Creek. Furthermore, several unlisted potential heritage items and archaeological sites have been identified which warrant further investigation, retention and conservation where possible.

BADGERYS CREEK PRECINCT

The Badgerys Creek precinct contains several known Aboriginal heritage sites including artefact scatters and potential archaeological deposits. Much of the land within the precinct has low or very low Aboriginal heritage sensitivity. However, there are some areas of moderate and high sensitivity along the creek lines (Badgerys Creek, Wianamatta-South Creek and the confluence of creeks).

One locally listed heritage item, the Fleurs Radio Telescope site, is partly within the precinct. In addition, 10 unlisted potential heritage items have been identified including several potential archaeological sites, some with extant structures and landscape elements. One of these sites is Exeter Farm, which, although demolished in the late 2000s, has significant archaeological potential and requires further investigations to determine the extent and significance of the archaeological resource, and the appropriate conservation recommendations.







SCENIC VALUES

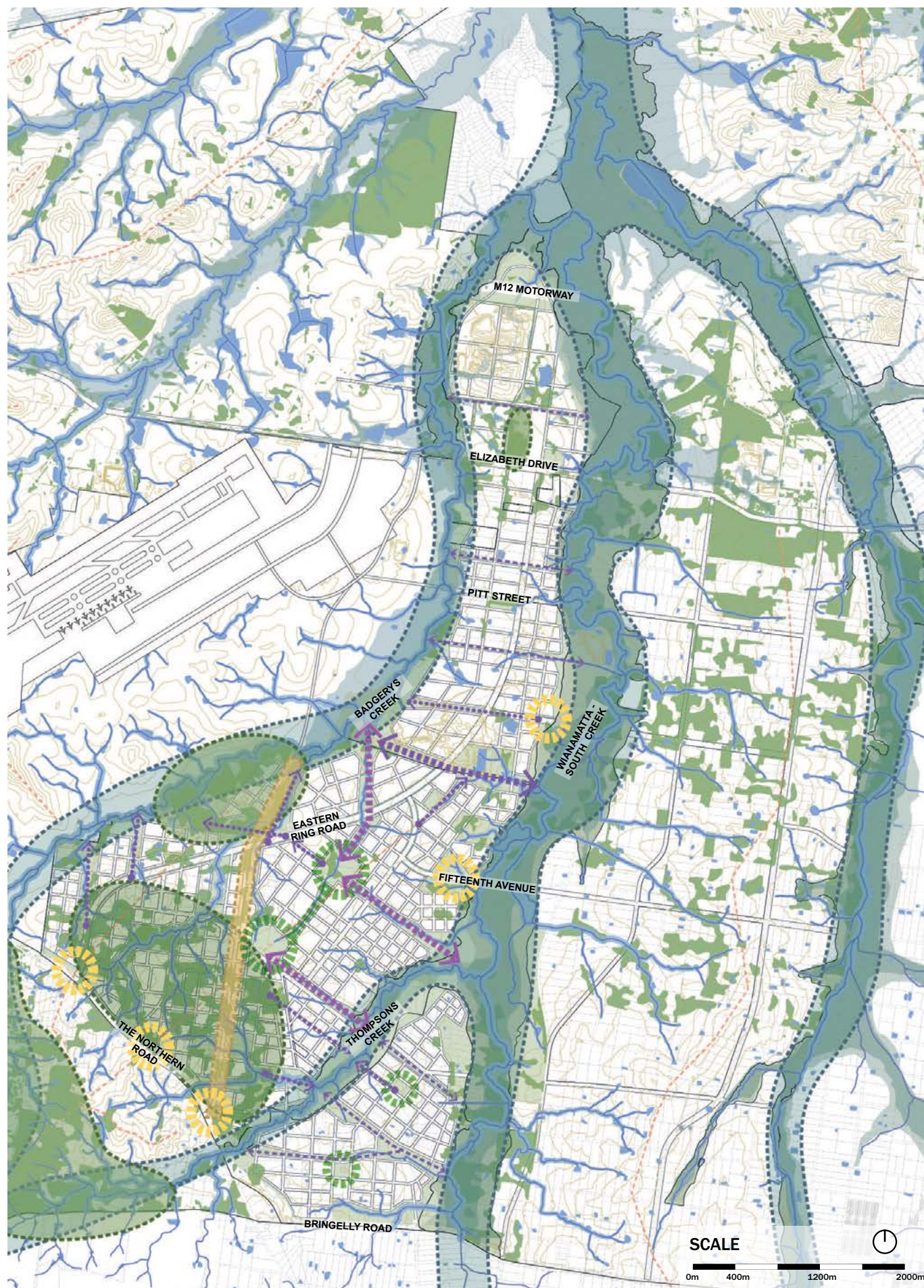
VIEWS AND VISTAS

The existing character of the project area is informed by its landscape, and the urban design framework seeks to retain and enhance views and vistas of these:

- Views from ridgetops to creeks and associated vegetation. Creeks are the areas of most dense vegetation, and it is the trees which place them in the landscape. A relationship between ridge, trees, creek and sky is fundamental to the landscape character.
- Broader vegetated landscapes exist west of Badgerys Creek Road associated with ephemeral creeks. Much of this vegetation as biodiversity value. Retention of this landscape within open space will enable local place character to be retained.
- Badgerys Creek Road is a key gateway to the project area. Its existing rural character is emphasised by mature and informal verge planting, and experiencing the gentle rise and fall of the landscape. Its character will substantially change, but the function of it as a gateway can be enhanced through landscape and built form.
- To reinforce the Western Parkland City, landscape gateways on arrival at key thresholds is important.

LEGEND

- Ridges - currently predominantly open, non vegetated
- Landform - subtly undulating
-  Filigree of creeks and dams
-  Wianamatta, Badgerys Creek and Thomsons Creek riparian corridor with associated vegetation - framing long views
-  Existing remnant vegetation - framing long views
-  Badgerys Creek Road with adjacent rural landscape setting
-  Open space on ridgetops or local high points
-  Creek to ridgetop connection through open space (visual and physical)
-  Creek to creek connection through open space
-  Views from streets towards the creeks and broader landscape (street grid oriented to terminate on a view towards creeks and ridge top)
-  Landscape gateway on arrival



THOMPSONS CREEK

THE REGIONAL PARK

Parklands along Thompsons Creek offer a recreational and leisure destination in the heart of the Aerotropolis Core. At the same time, it provides a critical ecology corridor.

Cultural institutions, educational facilities, community amenities and regional indoor sporting facilities front the park.

Active recreation and major park amenities like a regional play area are located at easily accessible destination nodes.

From these points, one can set off for a walk through the grassy parklands and immerse themselves within the Wianamatta alluvial woodland.

This is a major recreation and leisure destination right in the city core with plenty to offer for future workers, residents and visitors to enjoy.

Annotations

Active recreation:

1. Sportfields & associated amenities - regional | district
2. Playground & associated amenities - regional
3. Youth play - district
4. Indoor sport facility - district
5. Aquatic centre - regional



Passive & non-structured recreation

6. Dogs park - regional
7. Eco tourism
8. Park amenities, community lawn, BBQ & picnic shelters

Community & culture amenities:

9. Cultural & community facility
10. Schools
11. Multiversity & Library

Legend

-  Creek & associated riparian corridor
-  Low flood risk area
-  Medium flood risk area
-  High Flood risk area
-  Existing tree vegetation
-  Proposed parklands
-  Playground - regional | district
-  Sportfields - regional | district
-  Youth play - regional | district
-  Eco tourism
-  Active recreation, areas with recreation focus, park amenities
-  Passive & non-structured recreation
-  Recreation nodes, exercise stations, playgrounds - district | local
-  Cyclepath, walking trails



Various ways of engaging with water



Lawn with shadow



Swimming pool



Informal lunch-time sport



Major community events



THE HILLTOPS DISTRICT PARKS & LINEAR PARKLANDS

Located on the ridgelines, these parks offer a place for active recreation and a subtle vantage point within the urban landscape.

From here, one can follow the journey of the water travelling from the ridgelines down to Wianamatta, Thompsons Creek and Badgerys Creek.

Although water may not always be flowing in these creeks, the trail of riparian vegetation trace the ephemeral creek beds.

The linear parks provide direct physical and visual connection from hilltops back to Wianamatta and Thompsons creek.

Park amenities caters mainly to the work population adjacent to these hilltop parks:

- sportfields for both worker and

larger community use,

- walking, running and bicycle trails, exercise nodes and
- picnic spots shaded by tree canopy to enjoy a lunch break in the middle of the day.

Annotations

1. Ridgeline Park - district and local
2. Linear Parklands along tributary (often ephemeral) creeks - pockets of passive and active recreation of local character

Active recreation:

3. Sportfields & associated amenities - district
4. Indoor sport facility - district









Passive recreation:

5. Passive & non-structured recreation

Community & culture amenities:

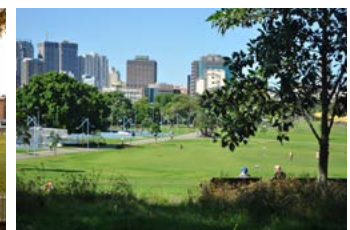
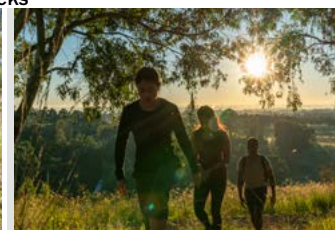
6. Park amenities, community lawn, BBQ & picnic shelters

Legend

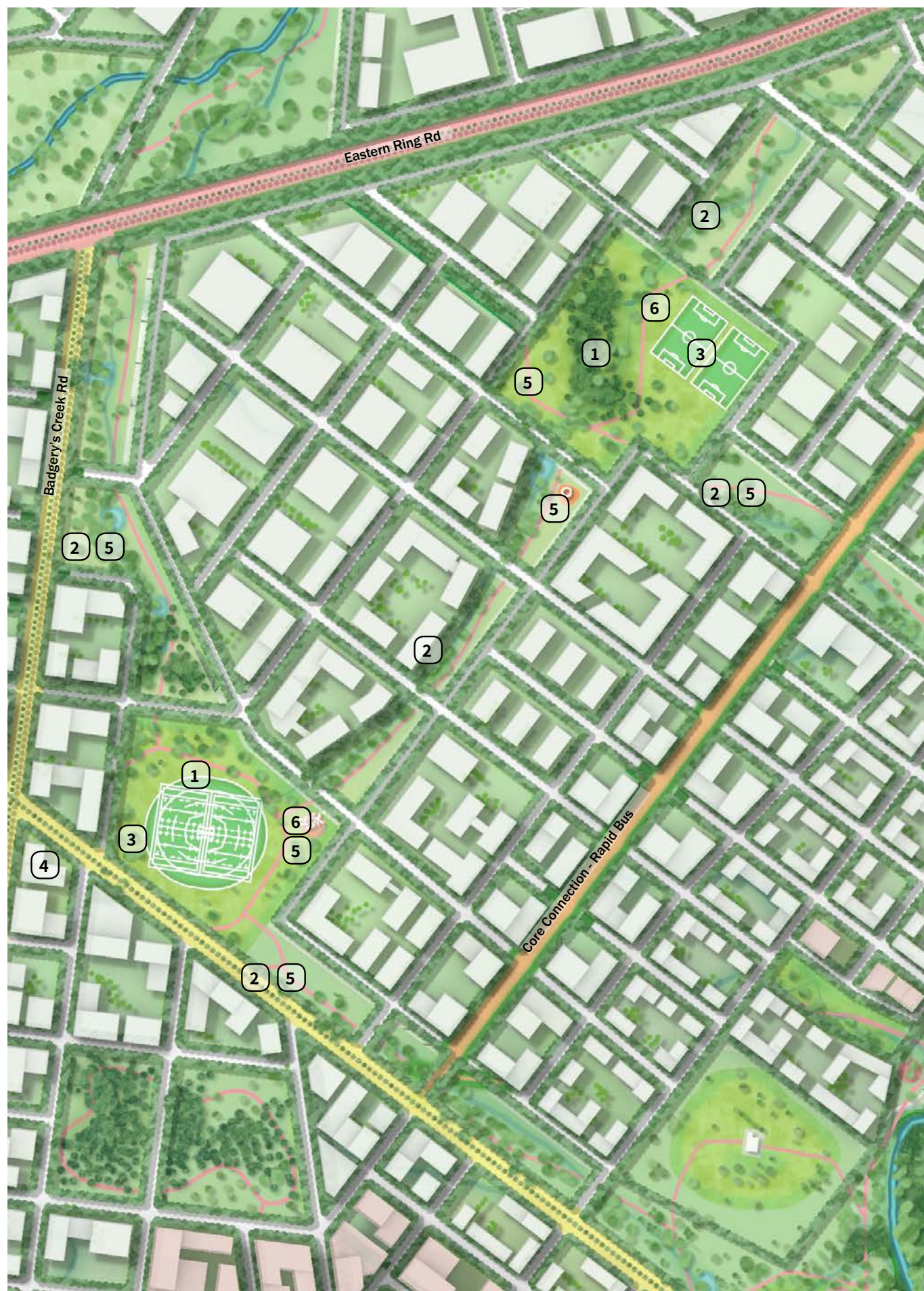
-  Creek & associated riparian corridor
-  Existing tree vegetation
-  Proposed parklands
-  Sportfields - district
-  Active recreation, areas with recreation focus, park amenities
-  Passive & non-structured recreation
-  Cyclepath, walking trails
-  Recreation nodes, exercise stations, playgrounds - local



Linear parklands along tributary creeks



Hilltop parks

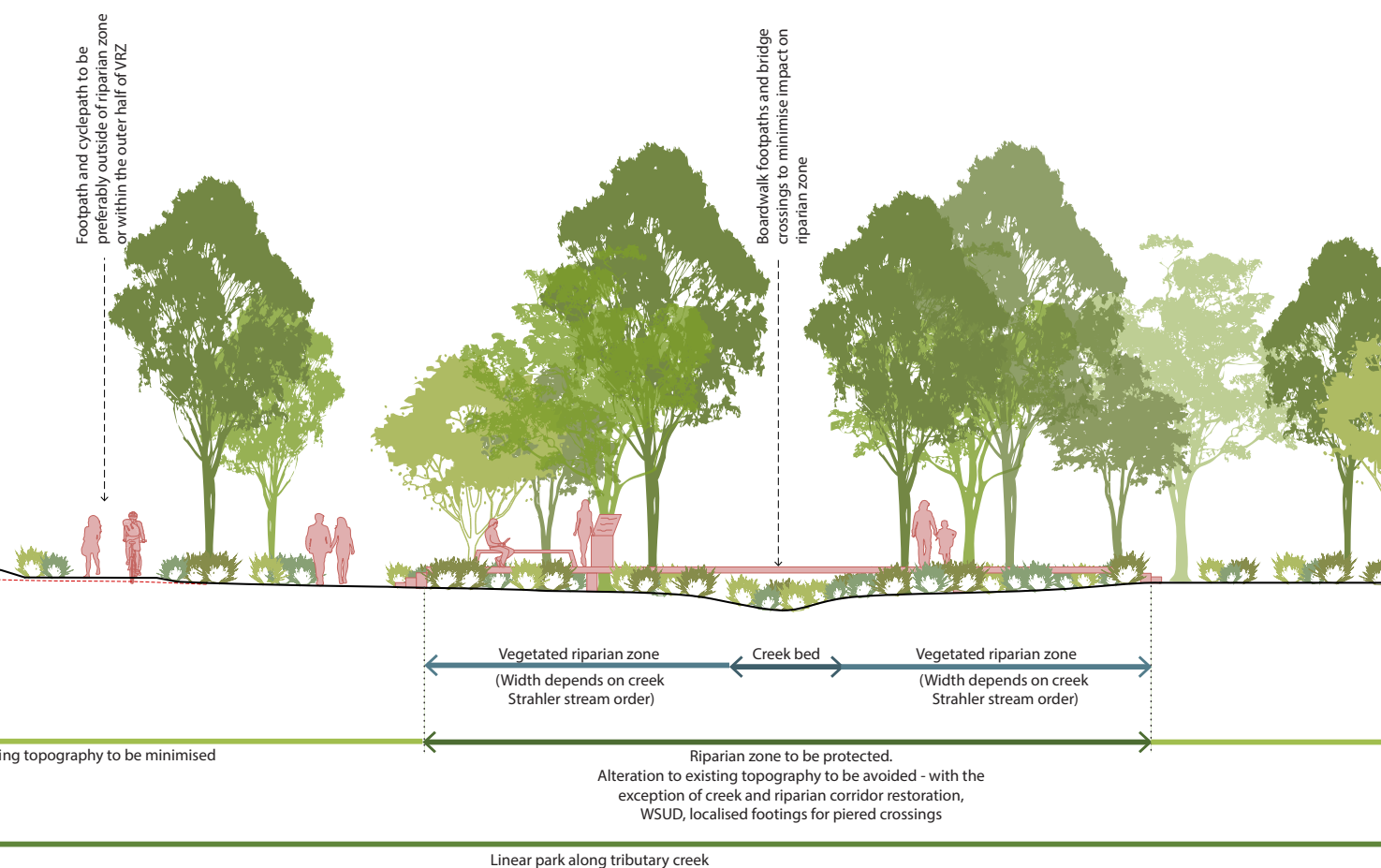


LINEAR PARK TYPICAL SECTION



Linear Park Typical Section

0 1 2 4m
1:100 @ A3 oversize



URBAN PARKS

LOCAL & DISTRICT

Located within the urban fabric, these parks are the "village greens" for the local residents and workers.

The nature of their surrounds give these parks an urban character. libraries, cultural and civic institutions all front the park. There is a civic paved space for markets and community events. Cafes from nearby streets spill around the edges.

There is a kick-about space for informal play and community events. There are also playgrounds, picnic shelters and plenty of seating under the tree canopy.

Water is present both as a formalised feature and as a natural element within WSUD raingardens.

Annotations

1. Urban parks - local and district
2. Linear Parklands along tributary (often ephemeral) creeks - pockets of passive and active recreation - local

Active recreation:

3. Sportfields & associated amenities - district

Passive recreation:

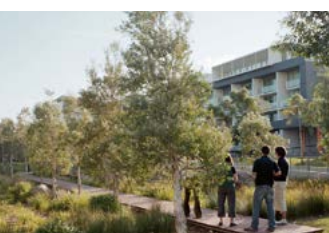
4. Passive & non-structured recreation

Community & culture amenities:

5. Village green with associated park amenities
6. Adjacent education & community facility

Legend

-  Sportfields - district
-  Active recreation, areas with recreation focus, park amenities
-  Passive & non-structured recreation
-  Cyclepath, walking trails
-  Recreation nodes, exercise stations, playgrounds - local
-  Creek & associated riparian corridor
-  Existing tree vegetation
-  Proposed parklands





ACHIEVING THE WIANAMATTA - SOUTH CREEK VISION

Wianamatta - South Creek is the heart of the Western Parkland City, a culturally rich environment providing critical landscape and ecology systems that help sustain Country. An ephemeral place, its water holes and pools provide important habitat for native wildlife. Part of the broader metropolitan water system, Wianamatta-South Creek will be an important local connector, ecological and community space.

The Wianamatta-South Creek Precinct is the backbone of a system of creeks, tributaries, parks, walking trails and areas of conservation as defined in the Region Plan vision. Protection of this water system, retention of significant remnant vegetation and creation of new regional parkland is critical for its health, to create spaces for the community to enjoy, and to deliver on the vision of the Western Parkland City.

Connectivity from Wianamatta-South Creek and its tributaries into the adjacent precincts will be landscaped to create extended green corridors. Cycle and foot paths will allow the community to enjoy the natural setting of the Wianamatta - South Creek. Framed by the urban settings of the Core and Badgerys Creek, the Wianamatta - South Creek will provide the visual, environmental and recreation amenity for the future workforce and resident populations.



Wianamatta–South Creek is the longest freshwater stream in Greater Sydney and a defining element of the Western Parkland City and the Aerotropolis. Its catchment includes most of Western Sydney’s Cumberland Plain.

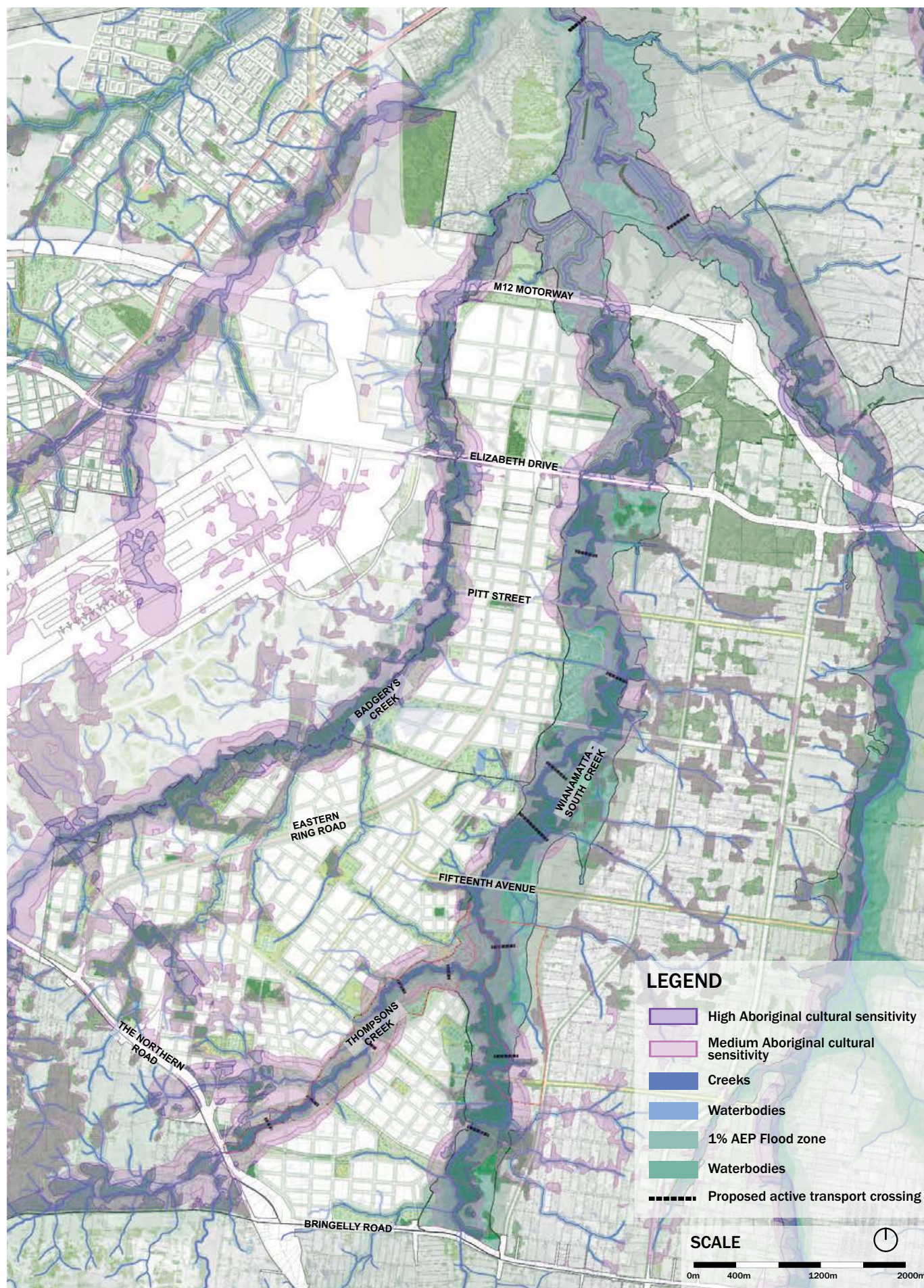
ENVIRONMENT AND RECREATION ZONE

The Wianamatta system is zoned for Environment and Recreation by the Western Sydney Aerotropolis SEPP. The intent of this zone is to provide for conservation, biodiversity and recreation.

A COOLER WESTERN SYDNEY

Analysis undertaken by Sydney Water (Urban Typologies document) demonstrates that creeks can be up to ten degrees cooler than immediately adjacent suburban neighbourhoods. Extending the cooling benefits of the Wianamatta into the adjacent urban neighbourhoods is critical to achieving liveability over the longer term. Actions to enable this include:

- Providing public access to and across the Wianamatta Creek system so that its direct cooling benefits can be enjoyed
- Connecting parkland with existing ephemeral creeks that flow into the Wianamatta
- Complementing ephemeral creek parks with streets designed to accommodate large canopy cover and WSUD raingardens.



OWNERSHIP

Much of the Wianamatta system is in private ownership.

The Aerotropolis SEPP has identified specific land on Thompson Creek to be acquired for regional park and public purposes. Discussions will now begin with the 37 affected properties to accommodate regional open space along Thompsons Creek. This process will be managed by the Office of Strategic Lands in accordance with the process established by Property Acquisition NSW.

Transition of all other Wianamatta land from private to public ownership is outside the scope of this urban design study. The Department of Planning, Industry and Environment is embarking on a review process to recommend the best pathway for achieving the intent of the Environment and Recreation zone, and intended function of Blue Green Infrastructure within the Wianamatta South Creek corridor. This Wianamatta–South Creek Delivery Strategy will be prepared together with councils. This Strategy will investigate and confirm the delivery mechanism to achieve the precinct’s vision and strategic outcomes. This may include potential acquisition, public access easements, negotiations with landowners or public access.

CONNECTIONS

The Wianamatta system forms a major tranche of the active transport network throughout the Aerotropolis. Here, bike and walking paths are co-located with the green and blue amenity of the creek systems. These active transport corridors are located to encourage use of the Wianamatta, as well as providing an attractive and safe route for commuting and recreating.

The overarching principles for connections throughout the Wianamatta system are:

- Active transport and recreation walking paths should be located within the Environment and Recreation Zone, but where possible, outside the high flood risk areas
- Active and walking paths will connect across creek corridors via bridges in the locations shown on the Wianamatta Plan. These provide connections at regular intervals across the creek corridor to centres, schools, recreation and active transport networks.

CULTURE AND COUNTRY

The Wianamatta is a significant place in Indigenous Culture. Sites of significance are contained within the Environment and Recreation Zone. Those outside the Environment and Recreation Zone are connected to the Wianamatta via an interconnected open space and water system. In particular the following should be observed:

- Modified trees located outside the Environment and Recreation Zone should be visually and physically connected to the Wianamatta via open space corridors
- Significant cultural corridors should be preserved in open space and continuous links between Badgerys Creek and the Wianamatta.

RECREATION

The Environment and Recreation Zone is planned to accommodate recreation infrastructure supporting the future local and regional populations. The approach to these recreation areas is:

- Co-locate recreation with community uses such as schools
- Focus active recreation to adjacent the mixed use zone, where resident and employment densities are highest
- Focus activities to support Thompsons Creek and adjacent land as the regional park
- Passive recreation opportunities can be located within the Environment and Recreation Zone to support enterprise employment, especially near to local centres.

For further detail, refer to the Social, Cultural and Heritage Framework later in this report.

BIODIVERSITY AND VEGETATION

Planning Priority W14 of the Western City District Plan is to 'protect and enhance bushland and biodiversity'. The Wianamatta and associated Environment and Recreation Zone is a critical element in achieving this objective across the Western City.

Vegetation with biodiversity values has been mapped across the Environment and Recreation Zone. This vegetation is to be maintained and managed to improve its overall health and longevity.

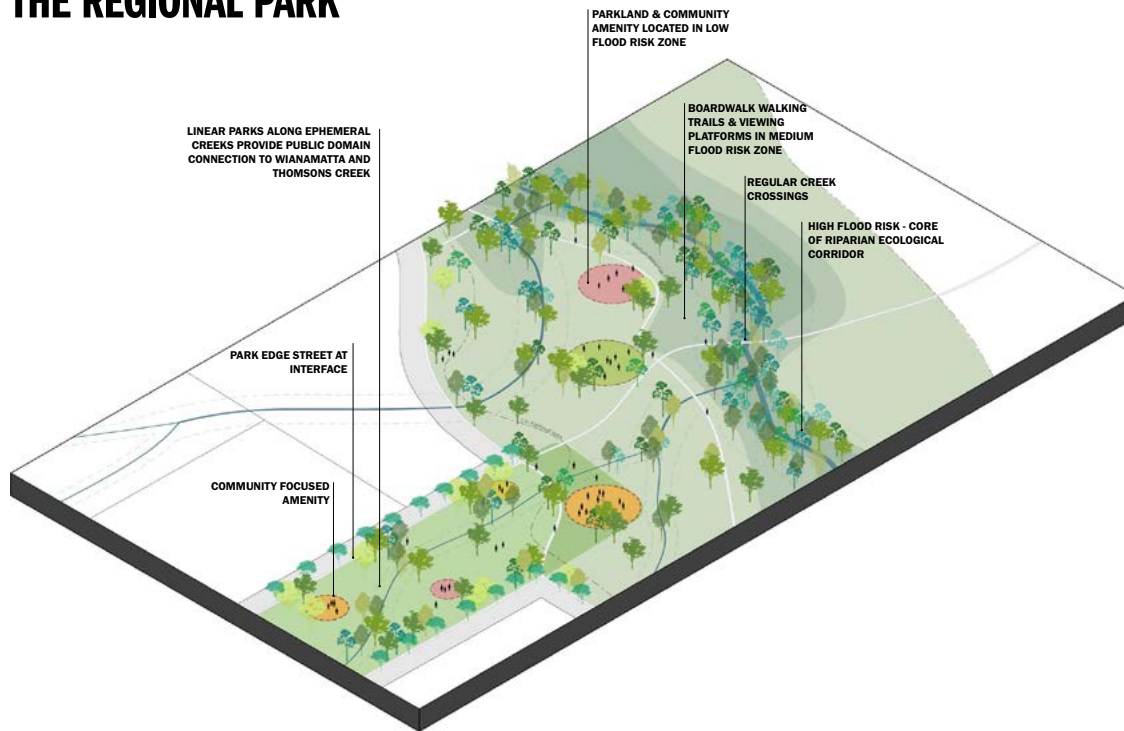
Recreation areas and pathways should be designed to minimise disturbance to vegetation of biodiversity value.

FLOODS AND VEGETATION

The Environment and Recreation Zone performs an important storm water and flood function. In order to maintain the flood flow path and rates, a careful balance between water and new vegetation needs to be considered.

Revegetation of cleared flood prone lands has taken into consideration the effect that increased vegetation can have on flood behaviour. Revegetation of flood prone land will be undertaken where biodiversity improvements can be achieved without significantly increasing flood risk.

WIANAMATTA - SOUTH CREEK & THOMPSONS CREEK PARKLAND - THE REGIONAL PARK



HIGH FLOOD RISK AS DEFINED BY LIVERPOOL CITY COUNCIL:

- Core of riparian ecological corridor

The area of land subject to flooding during the 1% Annual Exceedance Probability (AEP) flood and subject to high hydraulic hazards. The High Flood Risk Zone is often aligned with the floodway corridor.

MEDIUM FLOOD RISK AS DEFINED BY LIVERPOOL CITY COUNCIL:

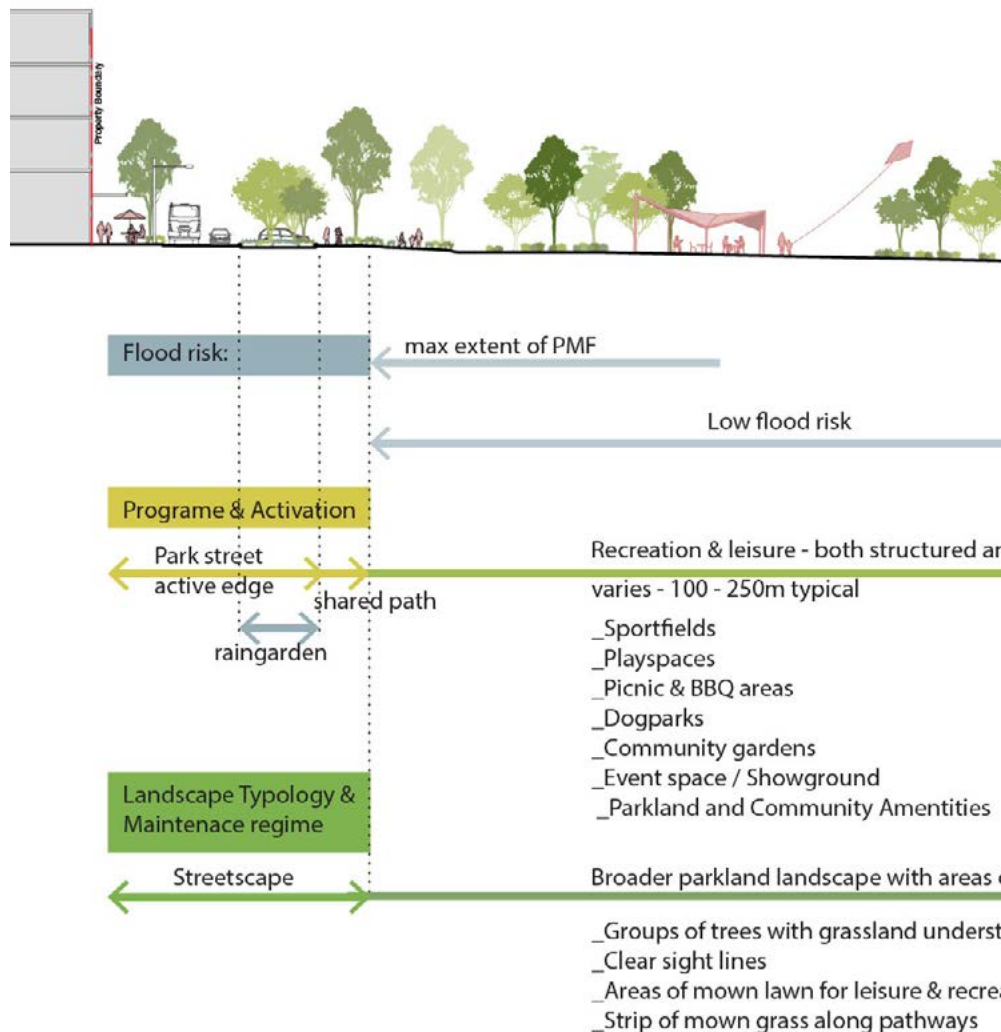
- Low impact recreation - boardwalk walking trails & viewing

The residual area of land subject to flooding during the 1% Annual Exceedance Probability (AEP) flood outside of the High Flood Risk Zone.

LOW FLOOD RISK AS DEFINED BY LIVERPOOL CITY COUNCIL:

- Sportfields, playspace, parkland & community amenities

Area of land outside of the predicted 1% Annual Exceedance Probability (AEP) flood extent but within the Probable Maximum Flood (PMF) extent.



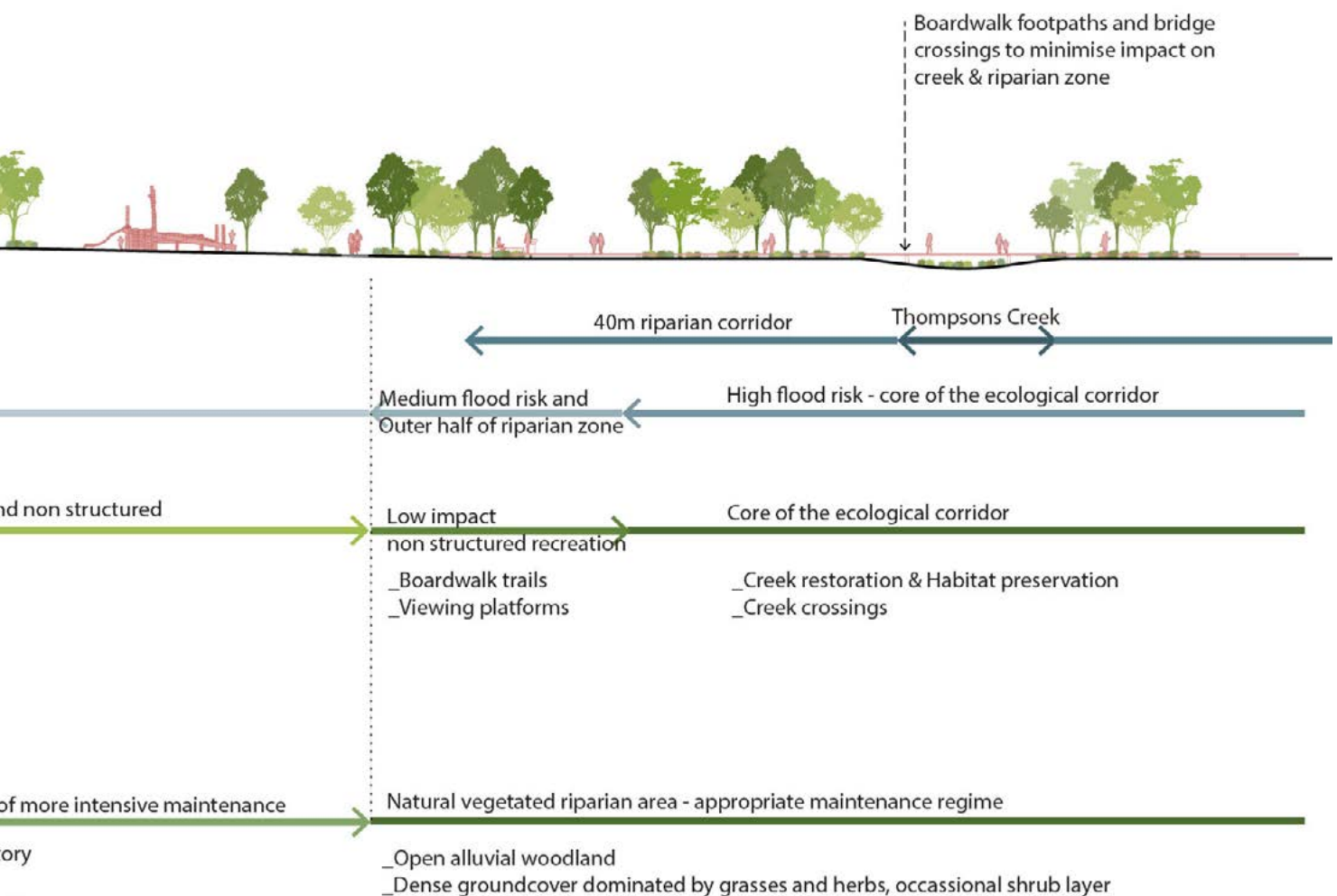
The Thompsons Creek section (below) has been developed on the basis of Liverpool City Council Flood Risk categories and the GIS 1%AEP and PMF mapping.

In this particular instance, the “High flood risk” as mapped does not have the same extent as the 40m Riparian corridor.

Office of Water Guidelines have been used to direct the location of any active transport infrastructure (shared path, cycling path, lookouts) to the outer half of the riparian corridor and outside of the high flood risk zone, unless required for crossing over the creek. These paths would be elevated “boardwalk structures” on piers to reduce impact on the riparian corridor.

In this particular case, the Thompsons Creek acquisition has been zoned for Environment and Recreation, including the PMF – hence the section below shows PMF extending to the edge of Park Edge street.

Through consultation with the Technical Working Groups, the following strategy was developed: Park infrastructure, amenities and sportfields within the low flood risk, low impact recreation such as walking path and trails within the medium flood risk zone and environmental – habitat corridor in the high flood risk.



A RESPONSE TO SUSTAINABILITY AND RESILIENCY

With Dr Frank Thomalla, Climate and Disaster Risk Research and Consulting

The Aerotropolis urban design process aims to address resilience and sustainability principles as much as possible by applying the United Nations 'Ten Essentials for Making Cities Resilient' (UNISDR, 2012). Below we describe which of the ten essentials have been considered in the plan, and how.

To organise for resilience (Essential 1), the project applied a collaborative, design-led approach that aimed to enable the rapid integration of analysis and ideas of stakeholders as the basis for decision-making.

Led by a multi-disciplinary and multi-perspective team consisting of urban designers, planners, landscape architects and architects, as well as a specialist team of experts in Indigenous design, sustainability, circular economy, and climate and disaster resilience, this enquiry by design process engaged a range of stakeholders through a series of consultative workshops that enabled their input and feedback to be incorporated in the plan design.

Stakeholders included the key government agencies (e.g., water, transport) and planning partnership authorities. The ongoing Covid-19 pandemic caused complexities in managing stakeholder interaction.

Identifying, understanding and applying risk scenarios (Essential 2) has been an important component of the WSA urban design. Key risks identified by stakeholders are floods, bushfires, and extreme heat. An assessment of the 1% AEP flood extent has been conducted by Liverpool City Council and Penrith City Council (reference?). Mapping of the areas exposed to flooding has informed decisions on the siting of buildings. In some areas, the precinct boundary has been expanded to ensure there is sufficient flood capacity and useable open spaces.

An Environment and Recreation Zone was created which contains the 1% AEP flood extent of the Wianamatta South Creek corridor. As the precinct is prone to bushfires, an analysis of bushfire risks has been conducted. This has influenced planning for road corridors, setbacks, and emergency vehicle access. Urban heat has also been a key consideration in the planning process.

The Sustainability and Heat study for the WSA (reference) found that adoption of a sustainable regenerative scenario would lead to: A greener more resilient Western Sydney area with up to 7oC of cooling on extreme heat days provided by better design, greening and irrigation, and a reduction in extreme and very strong heat stress days per summer from 47 to 19 days.

The urban design process applies a range of approaches to pursue resilient urban development (Essential 4) and represents a beyond Business As Usual (BAU) approach.

The frameworks have been driven by a water sensitive urban design approach. Applying integrated water management, the plan proposes water sensitive buildings and public domains so as to protect the integrity and health of the Wianamatta-South Creek catchment, which is characterised by ephemeral creeks and water systems. Other pathways for sustainable and resilient urban development proposed in the planning process include low carbon communities that reduce emissions by generating renewable energy, a circular economy through new systems, services and behaviours in households, businesses and public spaces, and cool suburbs that reduce urban heat in a changing climate and enhance human health and comfort through green infrastructure and strong connectivity.

Measures to manage stormwater, decrease urban water runoff, enhance urban comfort, reduce heat stress, and improve liveability and sustainability include tree planting, green street infrastructure, permeable surfaces across neighbourhoods, and landscape areas as part of road planning. Resilient urban development of the WSA is anchored in a number of existing policies and plans:

- Better Placed - Government Architect New South Wales
- Greener Places - Government Architect New South Wales
- Draft Greener Places Design Guide - Government Architect New South Wales
- Better Placed; Aligning Movement and Place - Government Architect New South Wales
- Greater Sydney Outdoors Study - NSW Department of Planning and Environment
- Five Million Trees for Greater Sydney - NSW Department of Planning and Environment

The vision for the WSA is a landscape-led approach to urban design and planning which aims to achieve environmental sustainability, resilience and adaptability. At its centre is the preservation of the network of blue and green systems including waterways, riparian areas, bushland, parks and open spaces, tree canopy (including street trees) and private gardens. Critical to achieving this vision of safeguarding natural buffers and protective functions of ecosystems (Essential 5) is starting with Country.

Taking an Indigenous and heritage lens has been useful in establishing principles for creating and enhancing contiguous, regionally significant open space corridors that connect ridge tops, creeks and conserves, restores and extends environmentally significant vegetation. These corridors provide ecological protection and enhancement, stormwater treatment and regional recreational opportunities. The Wianamatta–South Creek and Kemps Creek north-south blue-green corridors are complemented with east-west linear

parks that provide a connection to the existing Western Sydney Parklands. Preserving ephemeral creeks and existing contours and flow paths maintains the hydrology and functioning of ecosystems (creeks and water bodies) and creates adequate buffers to retain water in the landscape. Biodiversity mapping (reference) and a land capability assessment (reference) that investigated soil salinity and salinity management options have influenced the shape of the plan and were used as a basis for incorporating protected areas, nature reserves and national parks, regional parklands, creeks, rivers, lakes and reservoirs.

The conservation and enhancement of biodiversity is mandated by the Greater Sydney Region Plan. The Draft Cumberland Plain Conservation Plan aims to protect threatened plants and animals in Western Sydney while supporting the delivery of housing, infrastructure, open and green spaces.

Key elements of the urban design process aimed at understanding and strengthening societal capacity for resilience (Essential 7) for the WSA include a collaborative approach to planning and delivery, connecting infrastructure, and liveability. The collaborative approach started with cultural mapping of Indigenous and non-Indigenous heritage and a process of understanding the population types that will be living and working in the area and the needs for supporting infrastructure such as libraries and schools (GHD 2020).

Designing with Country ensured that urban development respects landforms, and responds to all aspects of Country including land, water, and sky. Cultural heritage and education are known to play an important role in building resilience by creating social connectedness, which promotes a culture of mutual help in times of crisis. Streets and neighbourhoods of the WSA have been designed to maximise connectivity and amenity.

Infrastructure links the WSA with the Western Parkland City and the greater Sydney metropolitan region. A connected and permeable urban structure provides quick and easy access to good public transport and quality open spaces from residential areas and work places via comfortable and attractive walking and cycling routes. Liveability targets included diverse, affordable and well-located housing (30-minute city) and the provision of social and cultural infrastructure including affordable rental housing. Residential neighbourhoods have been designed to include centres with specific identities that provide focal points for social activities, are walkable, and are located within a 400m walk of open space. The plan's social infrastructure framework proposes a series of open space types that can be utilised for events, conferencing, education, tourism and recreation, sports, and art.

The urban design process included considerations of how critical infrastructure systems should be designed for resilience (Essential 8). Critical roads identified are the Northern Road in the south of the precinct, Elizabeth Drive in the north, and the Eastern Ring Road. These road corridors provide regional movement function and are designed to be located outside areas exposed to the 1% AEP year flood extent and above the 1% AEP year flood level. The road routes have been chosen to provide more than one escape route from any one area within the WSA in case of an evacuation.

TRANSPORT INFRASTRUCTURE FRAMEWORK

Movement is fundamental to the economy of the Aerotropolis and facilitating its intended jobs growth. An integrated network across all mode types is to be provided, with a focus on sustainable transport options.



Perspective render of the Aerotropolis Core station, showing city scale development and a public plaza. Image courtesy Sydney Metro.

MOVEMENT AND PLACE

By AECOM

The objective of Movement and Place is to achieve roads and streets that:

- Contribute to the network of public space within a location, where people can live healthy, productive lives, meet each other, interact, and go about their daily activities.
- Are enhanced by transport and have the appropriate space allocation to move people and goods safely and efficiently and connect places together. Balancing movement and place recognises that trade-offs may be required to achieve a best fit for the objectives

Classification into four street environments, as identified by the GANSW Movement and Place Strategy, provides an understanding of the function and form of a road corridor, where movement and place interact.

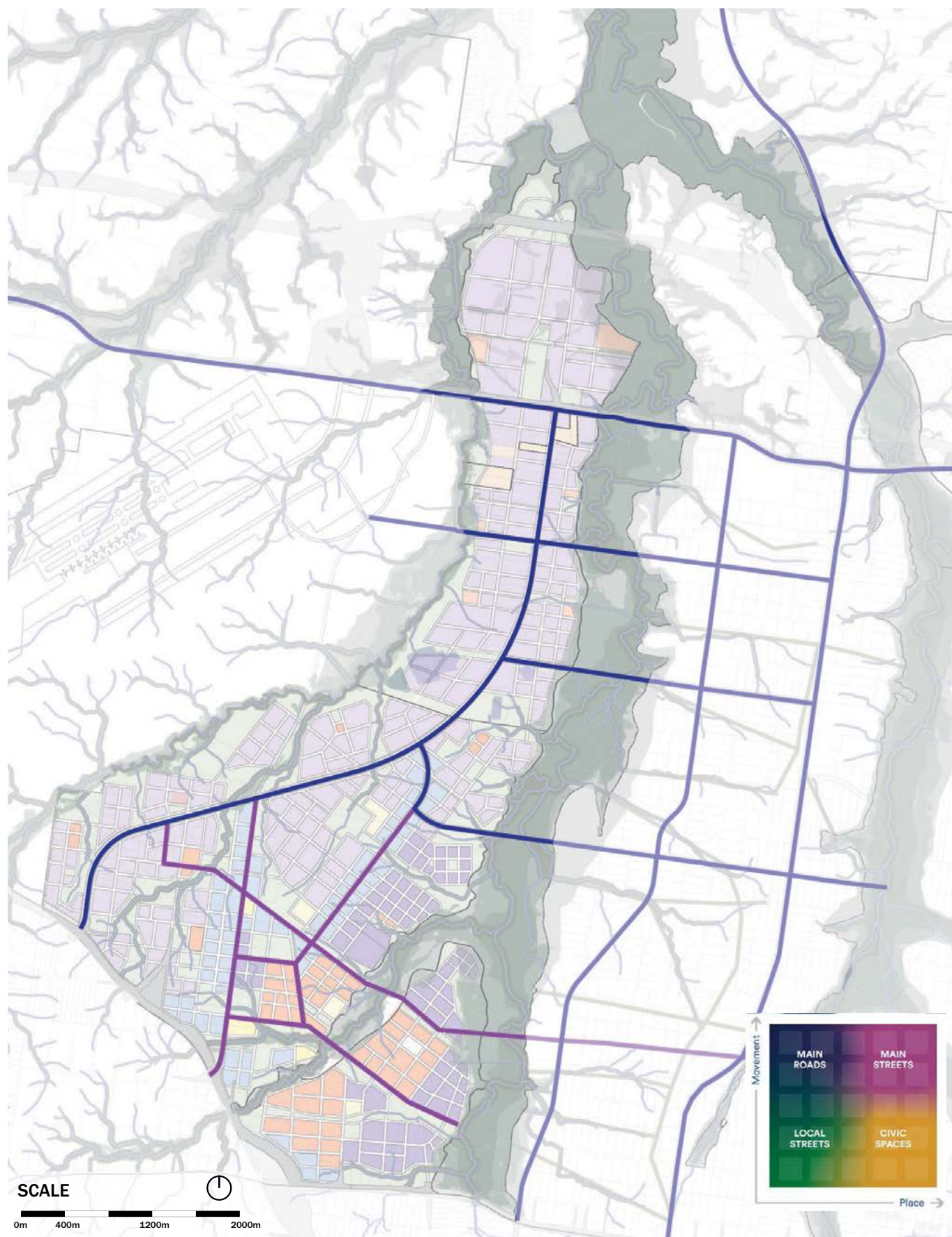
An assessment and definition of the roads and streets within the precincts have been undertaken using the Movement and Place framework, based on the proposed transport plan and land use plan for the Aerotropolis Core, Northern Gateway and Agribusiness precincts.

The Government Architect's Practitioner's Guide to Movement and Place has been utilised for this assessment.

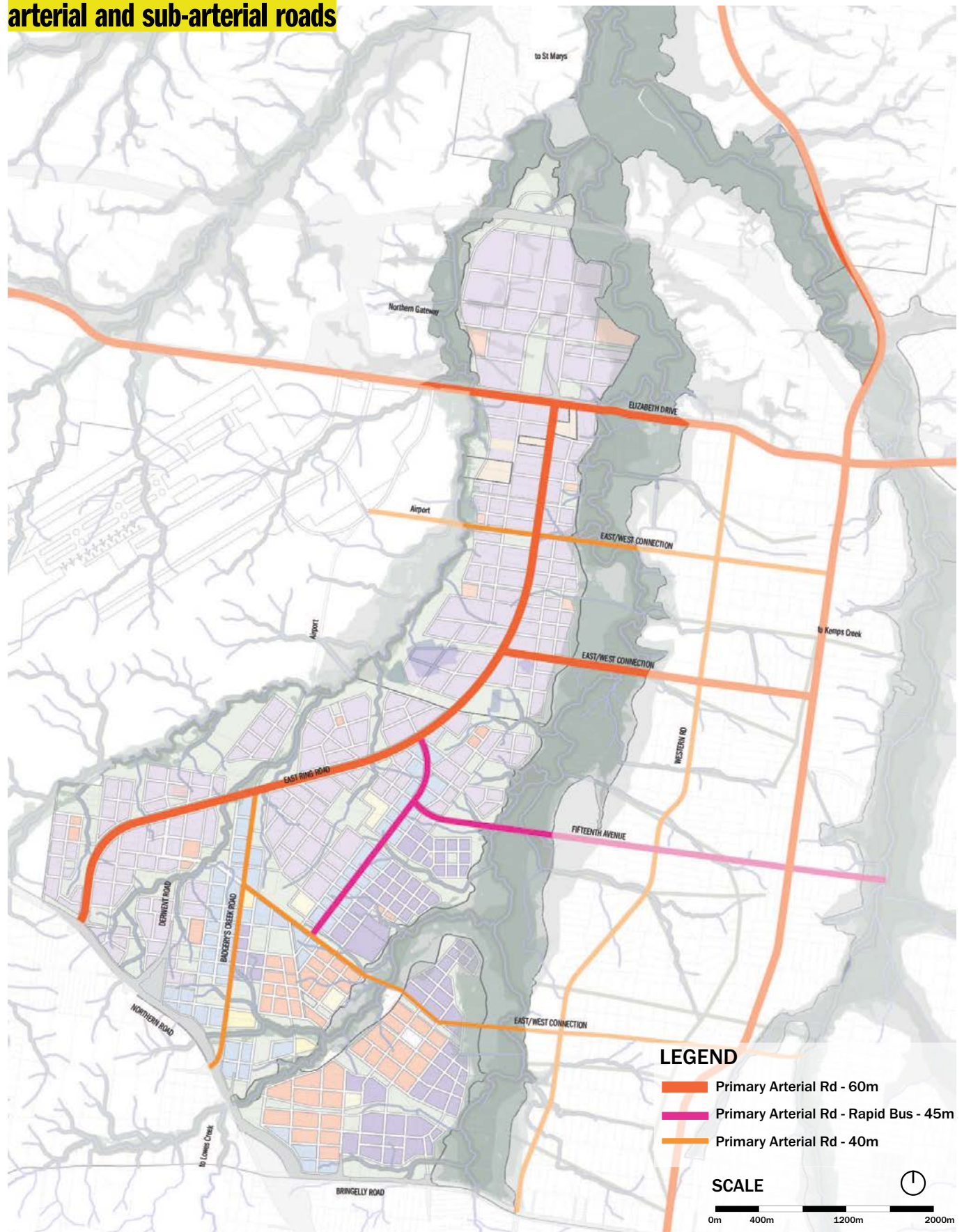
For this stage of the project, an initial classification of the roads and streets within the precincts has been undertaken. This is likely to evolve as key issues and opportunities present for further investigation during the subsequent master planning stages or in the preparation and assessment of detailed development proposals.

The assessment focused on the classification of the Main Roads and Main Streets and Local Streets within Western Sydney Aerotropolis. Motorways sit within Main Roads, however as they do not have activated land use adjacent to them, they have been denoted by grey lines for the purpose of this analysis. In addition, Local Streets are not highlighted on the maps as these make up all the streets not otherwise marked.

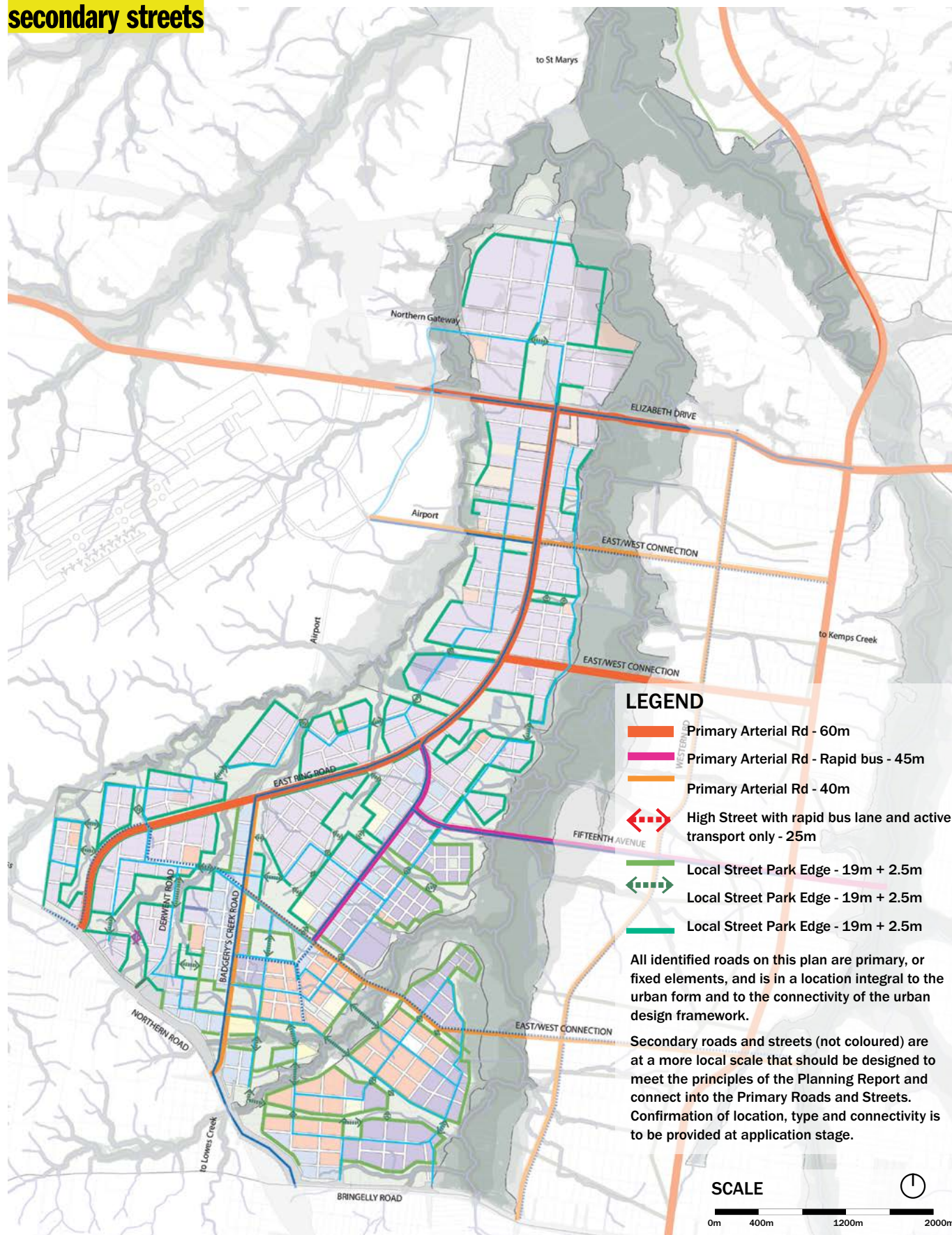
- Civic Spaces have not been defined as detailed master planning of centres is not yet known.
- Local Streets provide for local access both outside of centres and within centres.
- Main Streets traverse through areas with greater land use intensity, at the core of the centres.
- Main Roads provide for the strategic sub-regional, regional or metropolitan movement of people and freight within, and between, the precincts, and major land uses. These are formed of 40-metre-wide sub-arterial roads, 60-metre-wide arterial roads and motorways.



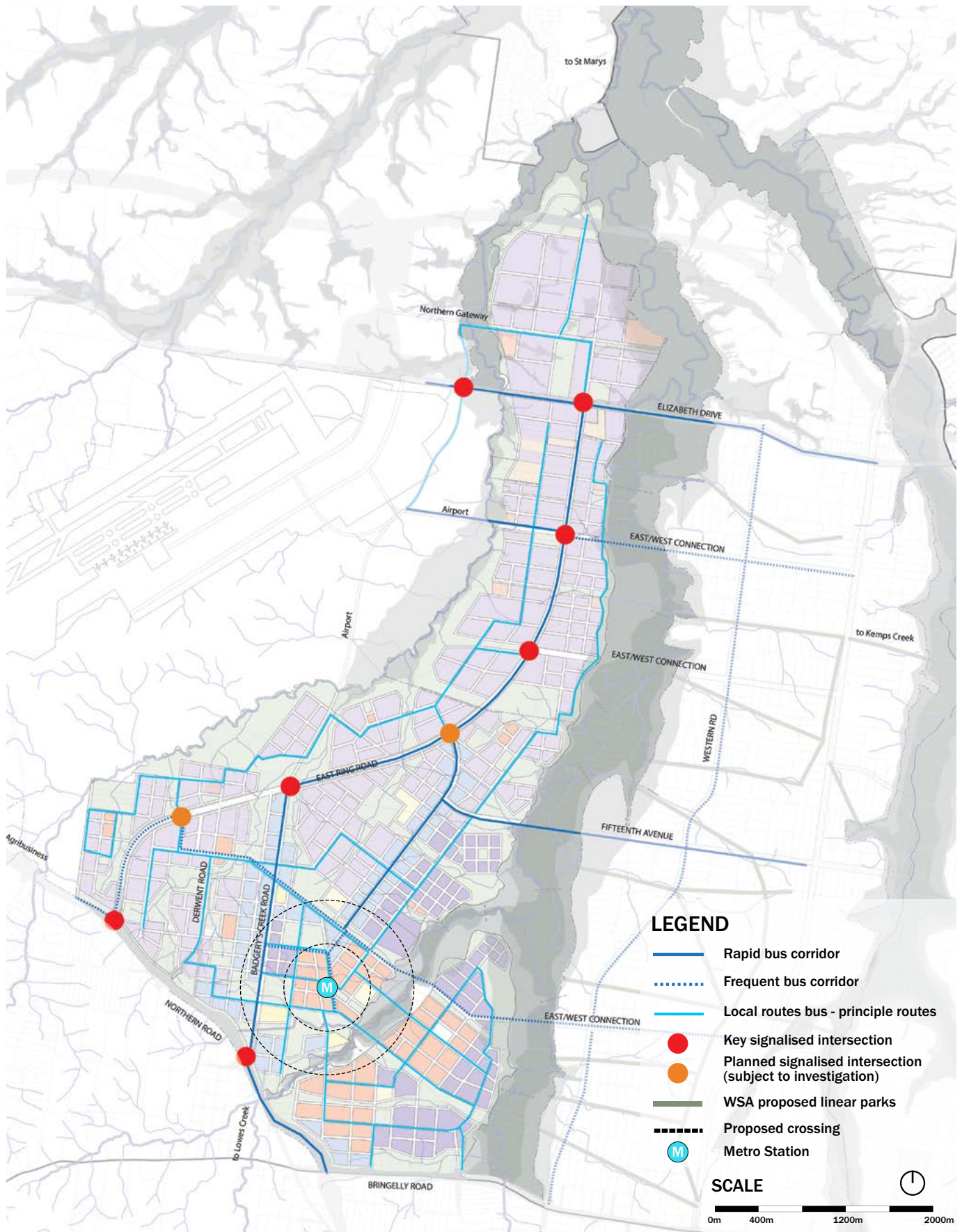
Transport strategy plan - major arterial and sub-arterial roads



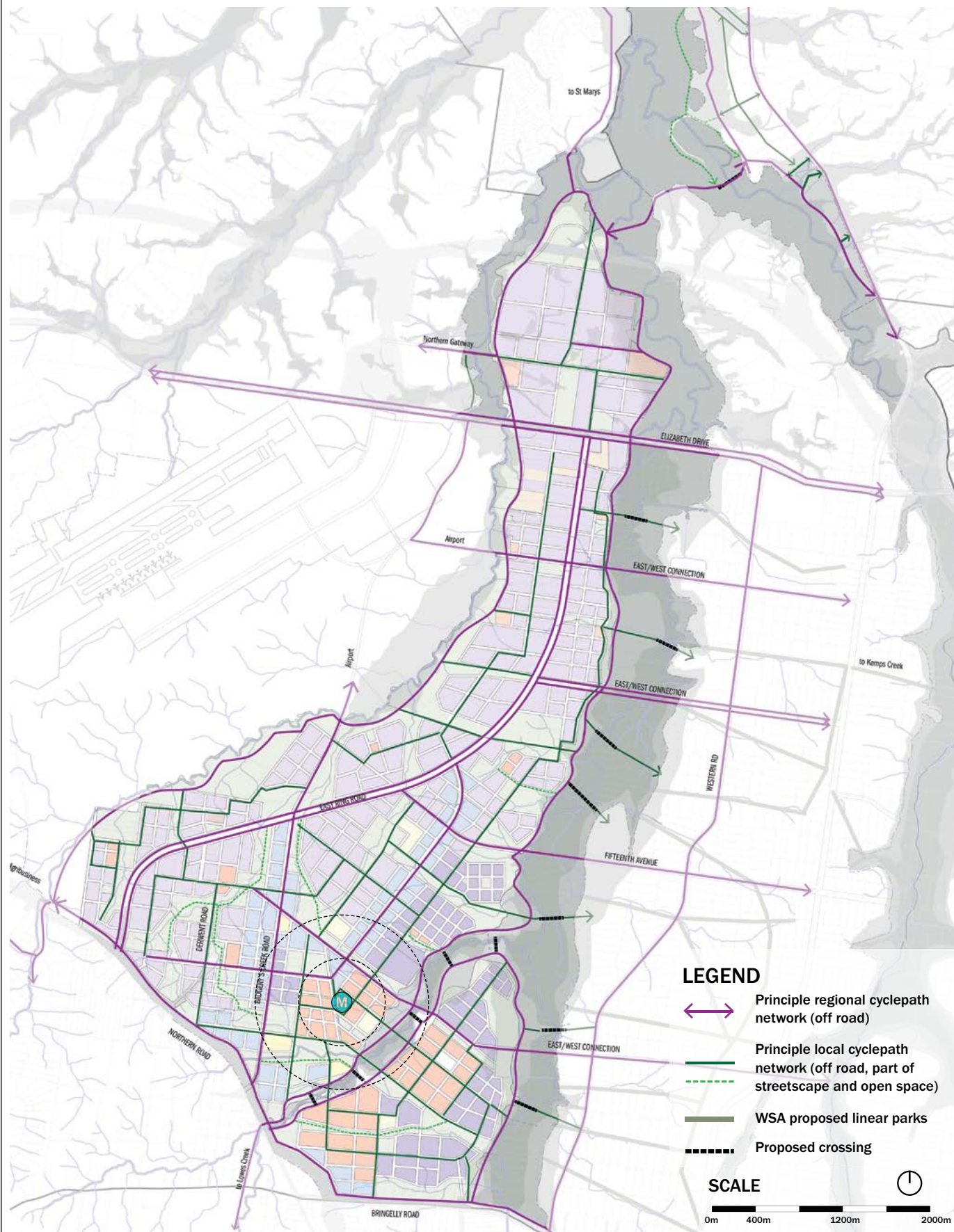
Transport network - Primary and secondary streets



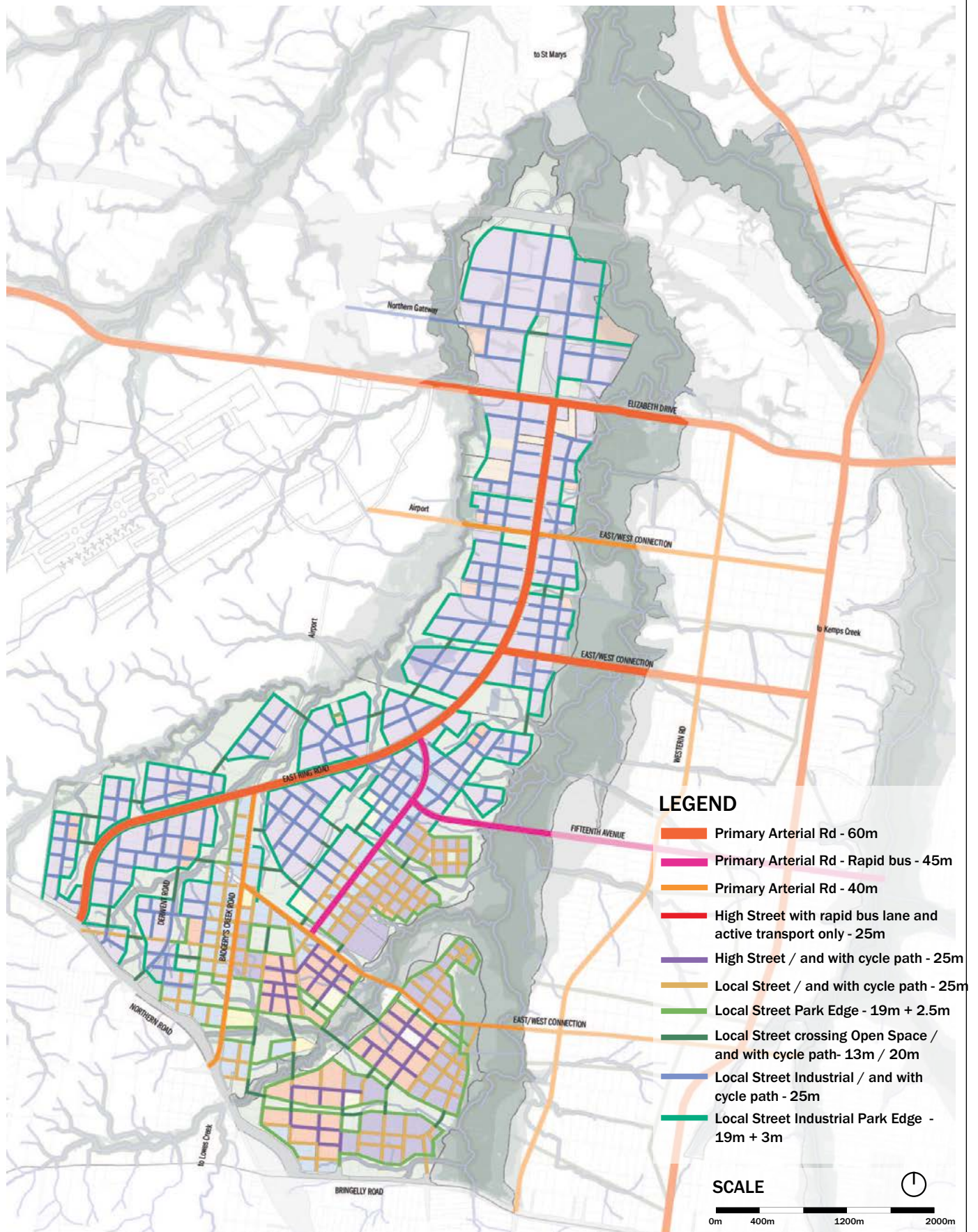
Principal Public Transport network



Principal Active Transport network

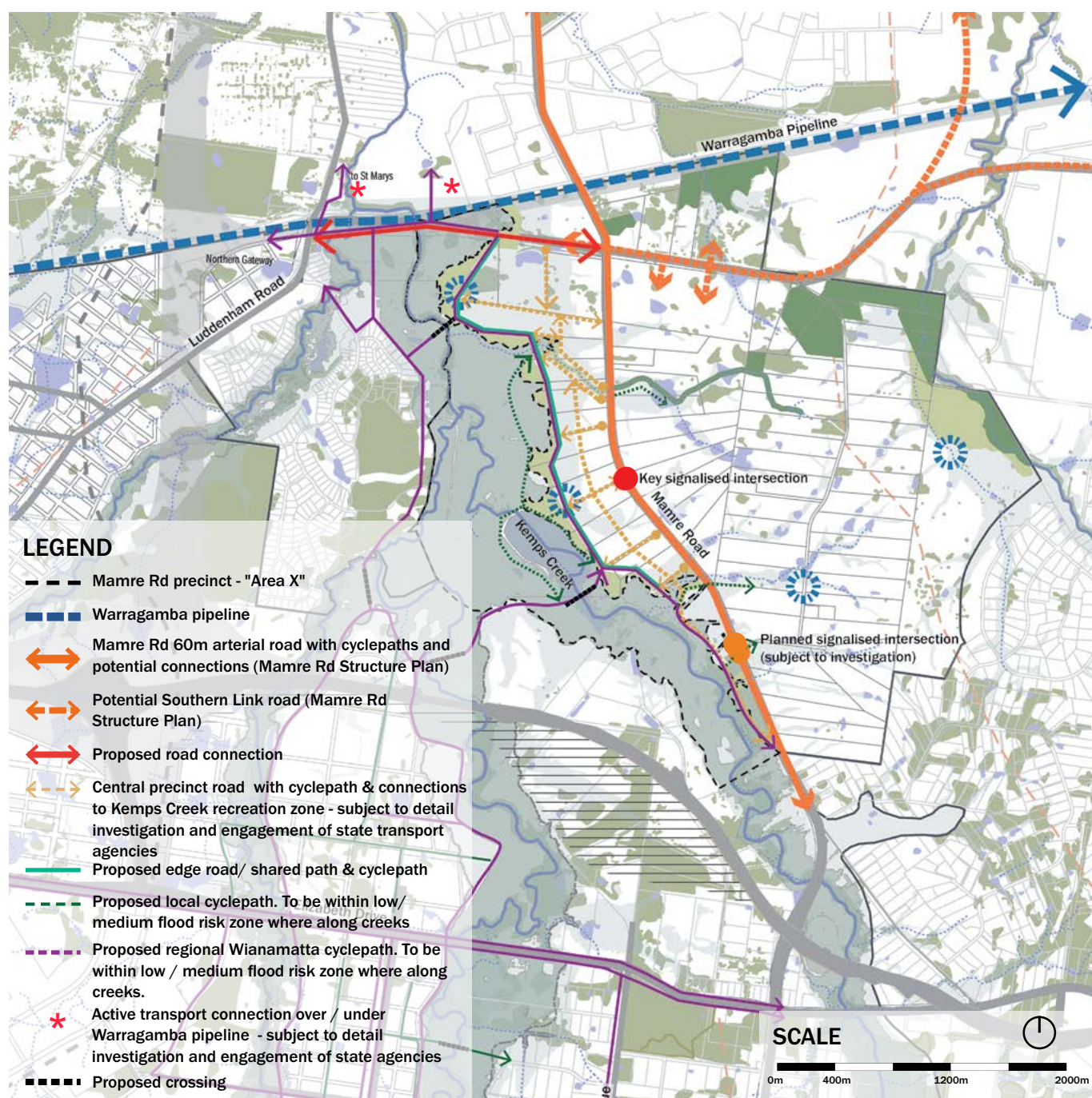


Street Typologies



Mamre Road Precinct

Movement Network Integration



LAND USE AND URBAN FORM

Land use across precincts will capitalise on the opportunities provided by the airport and Wianamatta - South Creek. An integrated parkland city will emerge, with a focus on employment and mixed use activity.



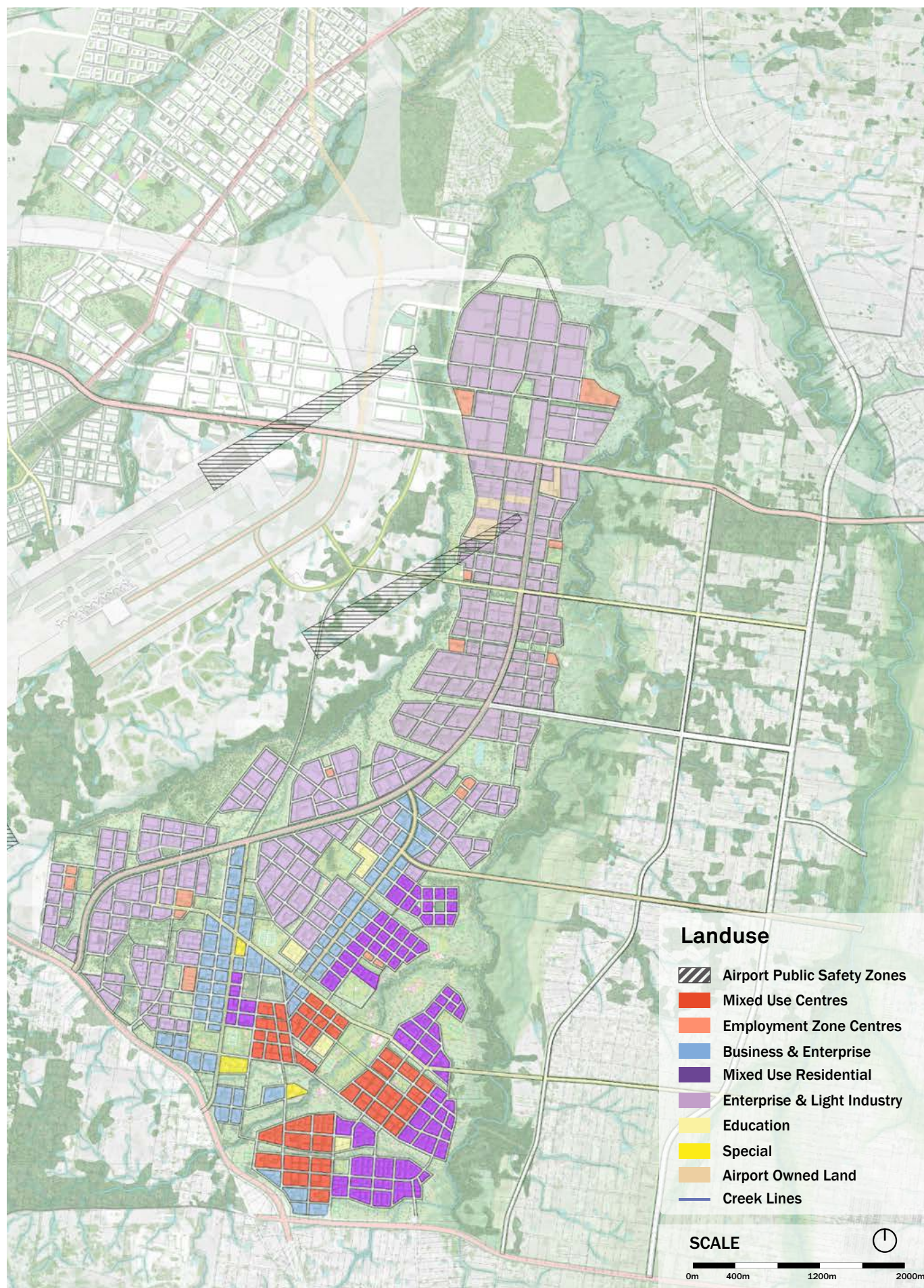
PRECINCT LAND USES

SUPPORTING JOBS AND A MIXED USE CENTRE

The Aerotropolis Core and Badgerys Creek precincts collectively will support up to 71,000 jobs by 2056. In addition, the mixed use zone of the Western Sydney Aerotropolis Plan also plans for up to 24,000 residents.

The land use plan has been derived based on these targets and to also support an urban form that provides legibility, amenity and functionality.

- A mixed use centre focused around the Metro station, Thompsons Creek regional park, and a potential future station associated with future rail links
- Badgerys Creek Road and Fifteenth Avenue are key arrival corridors to the Aerotropolis Core; land uses adjacent have been identified for Business and Enterprise in order to enable urban boulevards to eventuate
- Mixed use residential is provided within the Mixed Use zone of the WSAP, allowing for flexibility in applying residential and commercial land use functions - achieving a mixed use outcome at a neighbourhood, rather than a building scale
- The Kelvin Park Homestead is currently used for private residential purposes and is a State Heritage item. It would be appropriate for this and surrounding land to be used for a public use such as tertiary education (TAFE / university) or similar community uses, however it has been identified for Residential Mixed Use to provide for flexibility in land use outcomes
- Enterprise and Light Industry is applied to provide flexibility for low density industrial uses to be developed initially, and that land to transition over time for more dense employment outcomes
- Indicative employment zone centres are provided throughout the Enterprise and Light Industry areas to support worker amenity; these locations are indicative and may be re-accommodated subject to further detailed justification
- Education uses are provided within the mixed use zone to allow for school provision. Schools need to be appropriately distributed to account for catchments, located adjacent to open space and near to public transport. Two primary schools, and two high schools (one being a special purposes high school) are required within the Aerotropolis Core. The high schools are purposefully located adjacent the district open spaces.
- Special uses for community infrastructure have been identified throughout the Core to support the mixed land uses, and contain important social infrastructure such as aquatic and indoor sports, libraries, community centres and tertiary education
- Open space is provided to be networked, multifunctional and consistent with the Blue-Green grid
- Land uses within the Public Safety area need to be limited to ensure low densities of on site populations



MAJOR INFRASTRUCTURE CORRIDORS

SYDNEY METRO AND TRANSPORT CORRIDORS

The State Environmental Planning Policy (Major Infrastructure Corridors) 2020 (Major Infrastructure Corridors SEPP) establishes Major Infrastructure Corridors and protects land for three future infrastructure corridors that will be critical in supporting the passenger and freight network for a growing Western Sydney. This:

- identifies infrastructure corridors to be protected and the land that is affected
- reserves land within these corridors for infrastructure purposes through the rezoning of land, and identifies it as a future infrastructure corridor
- changes the planning controls that apply to land within the corridors, including identifying development that will be permissible within the corridor
- details the types of development applications that will be referred to Transport for NSW for their concurrence on and around a future infrastructure corridor
- prohibits further subdivision of land within corridors
- maintains the structural integrity of the land for future infrastructure by requiring additional consideration for certain excavation works on adjacent land
- guides development on land surrounding the corridors.

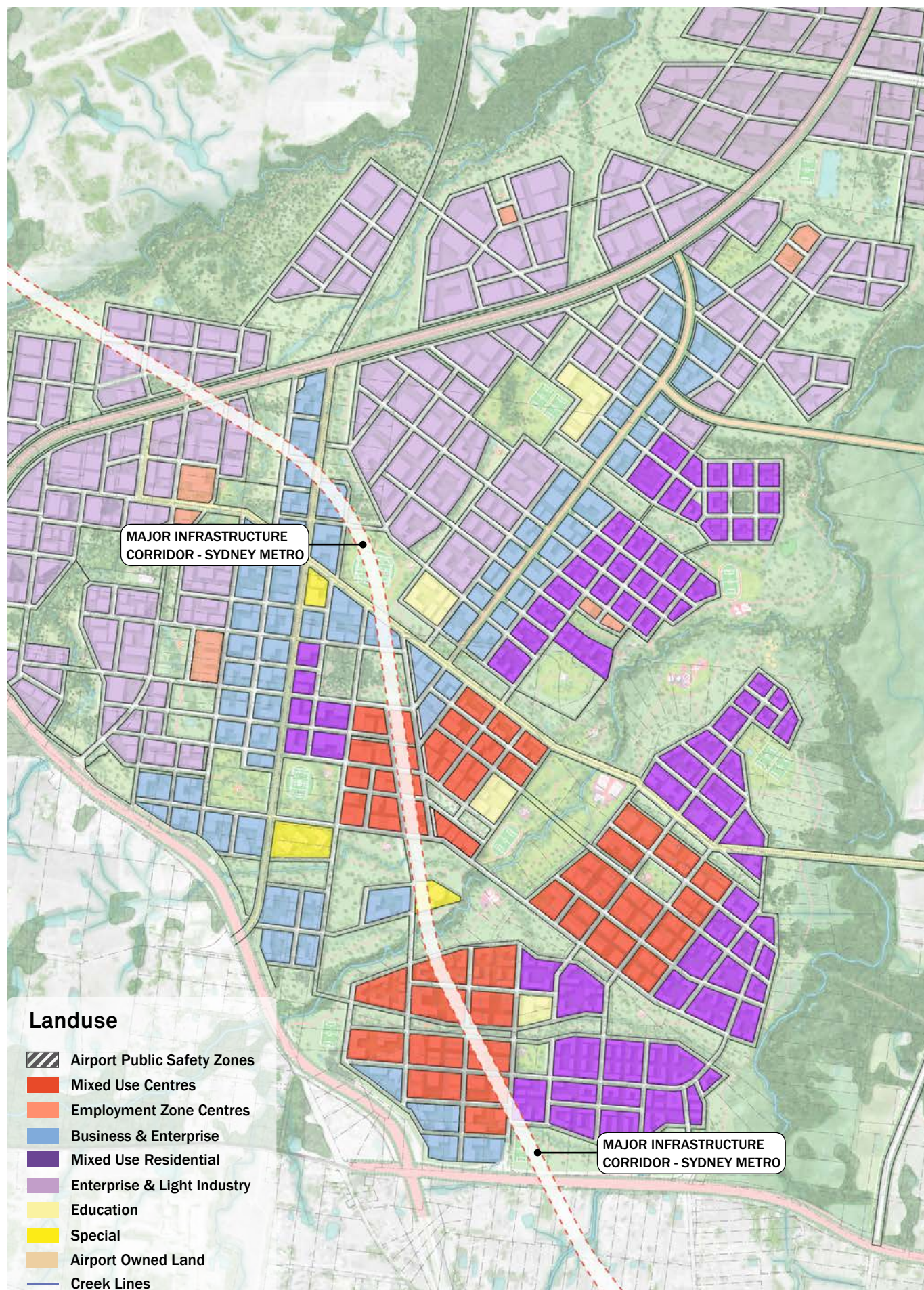
PROTECTING CORRIDORS

Future corridors are protected from certain types of development or encroachment by sensitive uses until their intended use can be realised.

This means that new development cannot compromise the ability to deliver the infrastructure within the protected corridor in the future.

In the case of the Sydney Metro corridors transversing the Aerotropolis Core and Northern Gateway precincts, development will not occur on the affected land. The land will remain as open landscaped area that is maintained by the landowner until the railway corridor is established. Certain building works adjacent to and within 25 metres of the rail corridor will not be approved without the concurrence from Transport for NSW.

The Aerotropolis SEPP expands on the protected Major Infrastructure Corridors by requiring consideration of key components of the transport network in the Aerotropolis, including the Eastern Ring Road and Fifteenth Avenue.



BUILT FORM

AEROTROPOLIS CORE PRECINCT PRINCIPLES

1. Height is greatest within the Mixed Use Centre, where the Sydney Metro Station and Thompsons Creek Regional Park offer amenity and connectivity benefits.
2. Buildings are designed to address streets and open space.
3. Badgerys Creek Road and the Core-Fifteenth Avenue connection are critical boulevards, where buildings must frame a consistent street edge, enabling activation and public transit use.
4. Buildings are designed consistent with passive cooling principles, maximising the potential for cross ventilation and minimising solar heat gain.
5. Building type and scale responds to its intended use.
6. Buildings and associated construction methodologies are designed to maintain adequate clearance for air navigational activity over and around the Aerotropolis.
7. Within identified centres, buildings present to adjacent roads and open space to create people focused and place based outcomes.
8. Within the Mixed Use Zone:
 - a consistent street wall at a human scale (2 to 6 storeys) should be provided to street frontages.
 - Breaks in the street wall may occur for laneways, courtyards or associated landscape elements that allow permeability targets to be met. These should be limited in width to enable street activation.
 - Taller built form is permitted up to the OLS limits, but should be separated to allow a dispersal of towers.
 - Towers may come to ground, without podium setbacks, where wind and microclimate impacts are mediated.
 - Buildings will be of high quality
9. Within the Enterprise Zone:
 - Notwithstanding the larger format of building footprints, buildings should address streets through clarity of entries, articulation and siting of form, levels consistent with the primary street address
 - Level differences between buildings and any adjacent parkland / street should be minimised
 - Industrial and enterprise architecture will be of high quality





Perspective aerial render of the Aerotropolis Core.

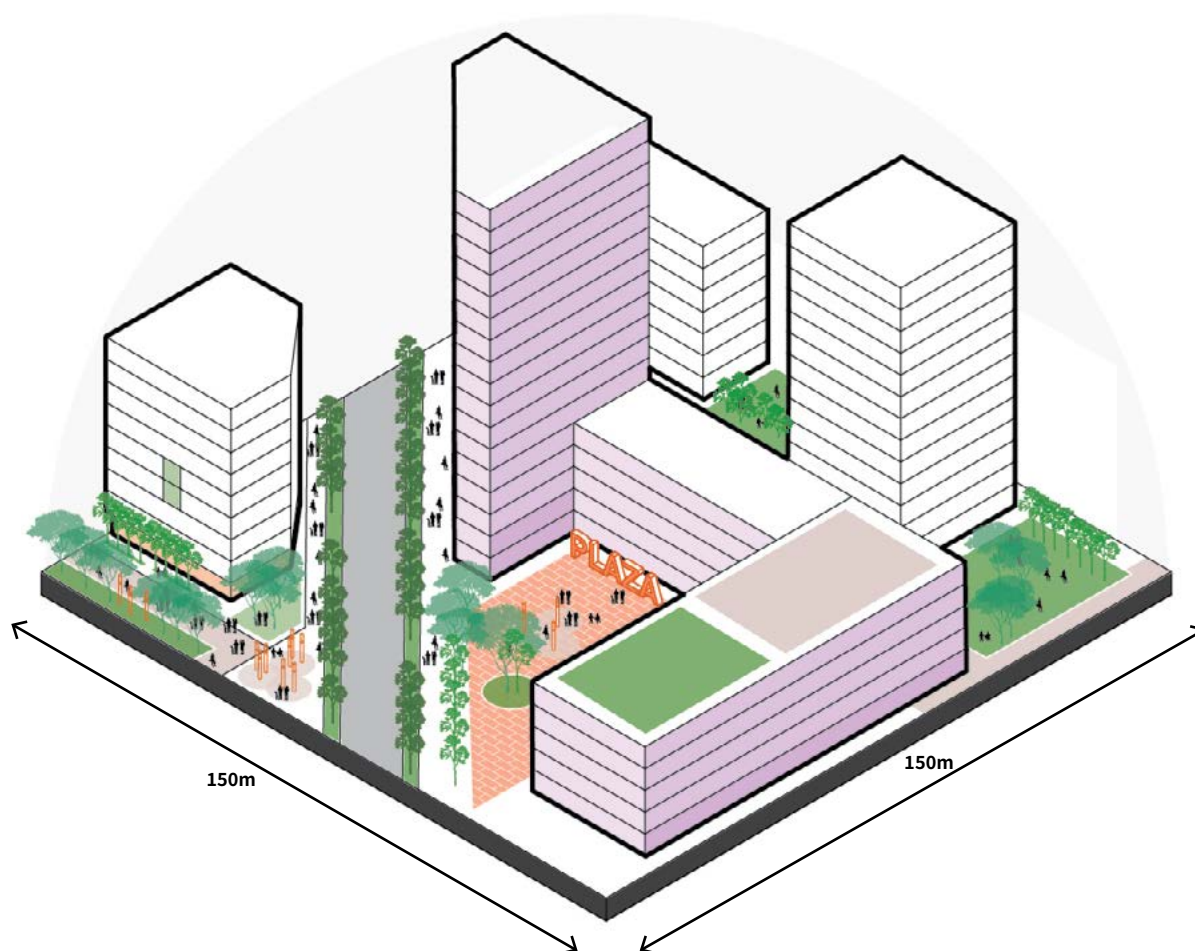
BADGERYS CREEK PRECINCT PRINCIPLES

1. Height and scale of buildings responds to the intended function and typology.
2. Buildings are designed to address streets and open space.
3. Buildings present to arterial roads or associated service roads through clean built form and minimal visual clutter.
4. Buildings are designed consistent with passive cooling principles, maximising the potential for cross ventilation and minimising solar heat gain.
5. Buildings and associated construction methodologies are designed to maintain adequate clearance for air navigational activity over and around the Aerotropolis.
6. Site design enables setbacks to road edges for landscaping and water permeability to the soil.
7. Within identified centres, buildings present to adjacent roads and open space to create people focused and place based outcomes.





Perspective aerial render of Badgerys Creek precinct.



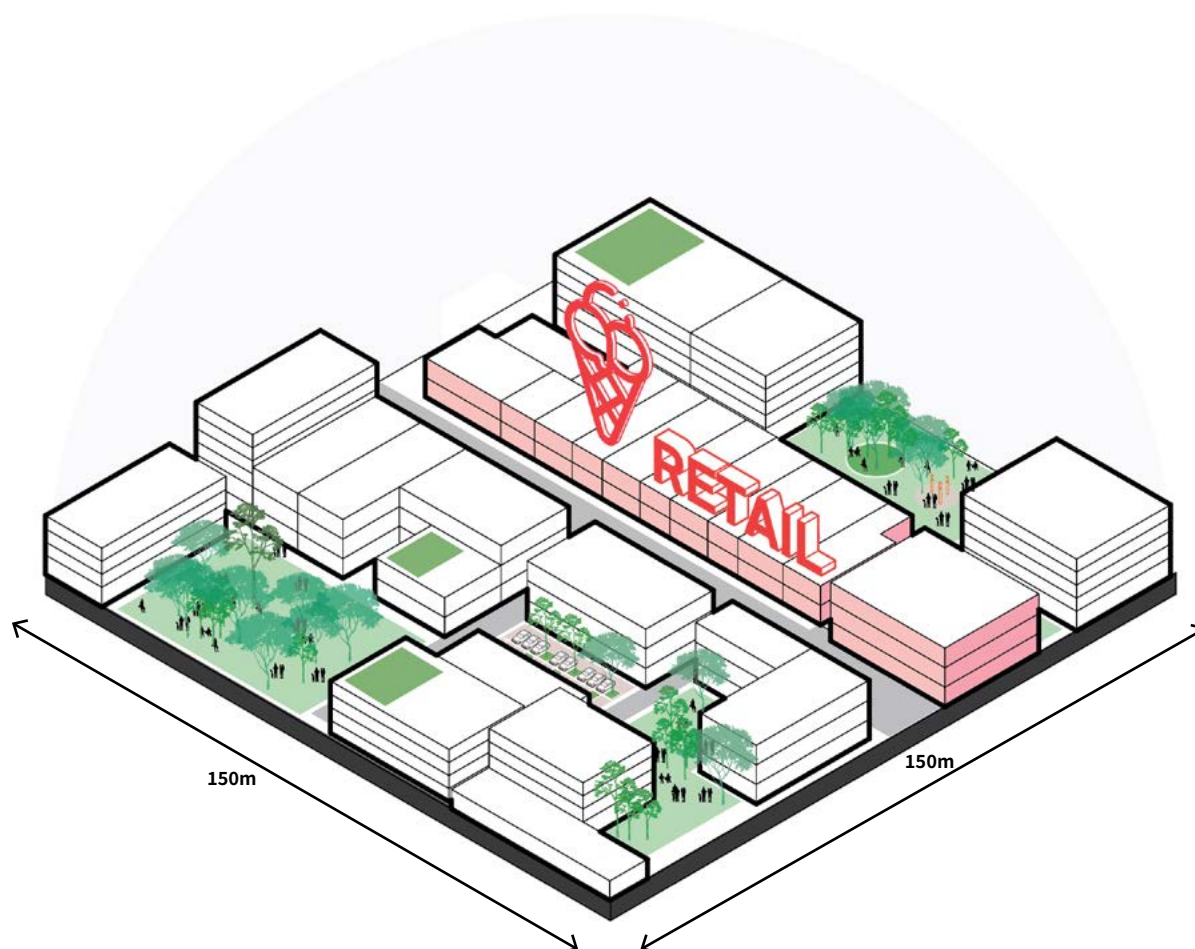
AEROTROPOLIS CORE CITY CENTRE

FSR
OS%
HEIGHT

2.5 - 3:1
25% - 45%
15 - 20 Storeys
(Upper limits subject to OLS)

BASED ON STREET BLOCKS.





EMPLOYMENT ZONE CENTRE

**0S%
HEIGHT**

**15% - 35%
4 - 7 Storeys**

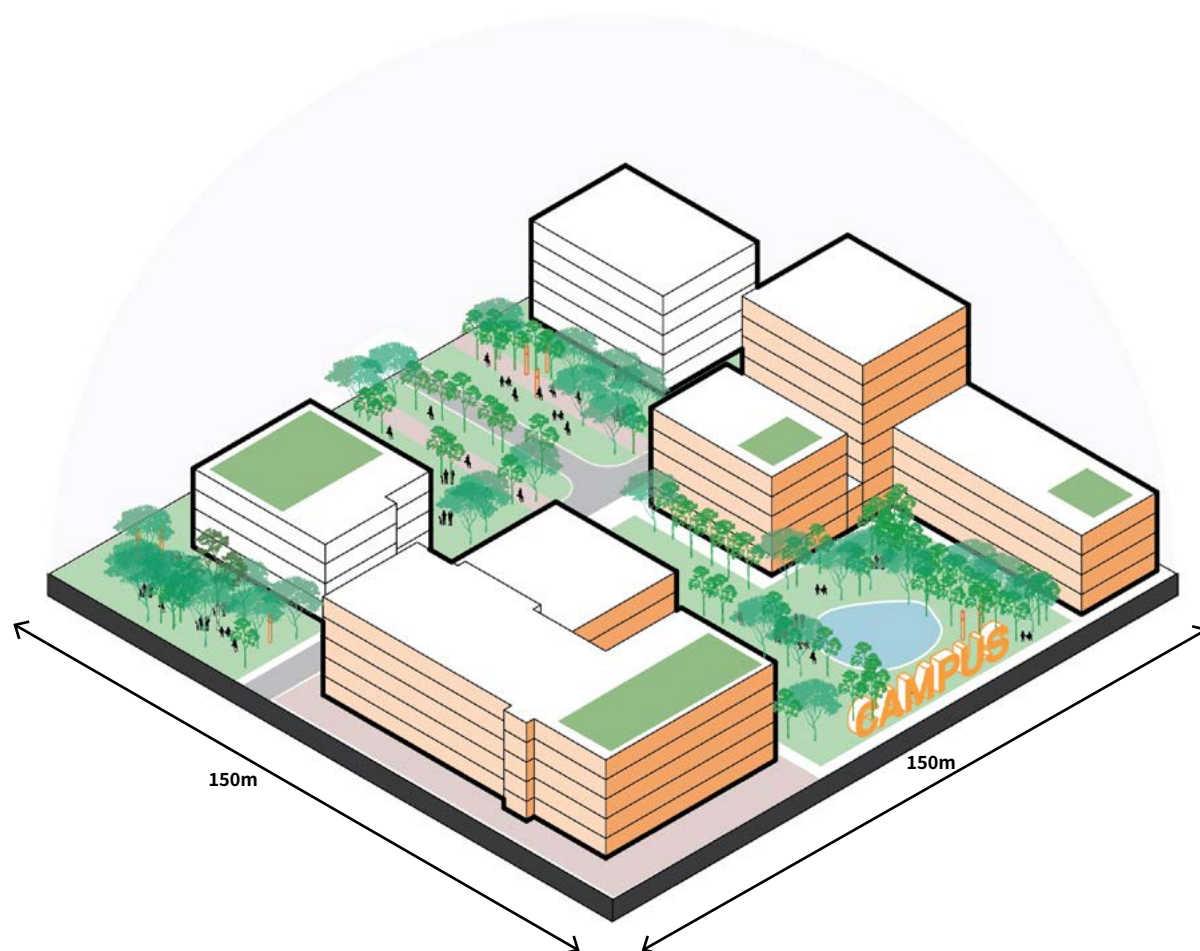
BASED ON STREET BLOCKS.





A perspective render of the Thompsons Creek regional park and active built form framing it.





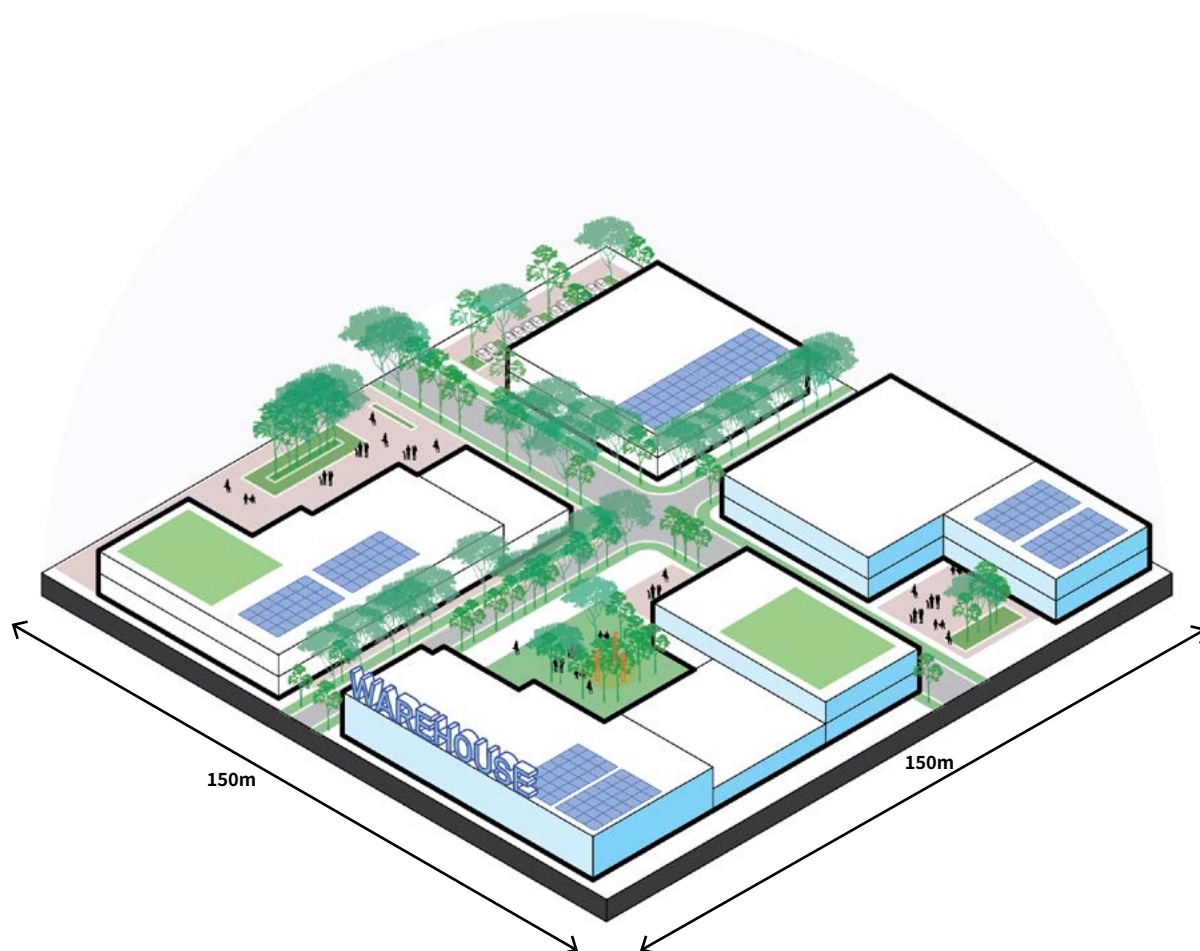
BUSINESS AND ENTERPRISE

**05%
HEIGHT**

**40% - 60%
4-8 Storeys**

BASED ON STREET BLOCKS.





LIGHT INDUSTRY ENTERPRISE

**0S%
HEIGHT**

**15% - 35%
2-6 Storeys**

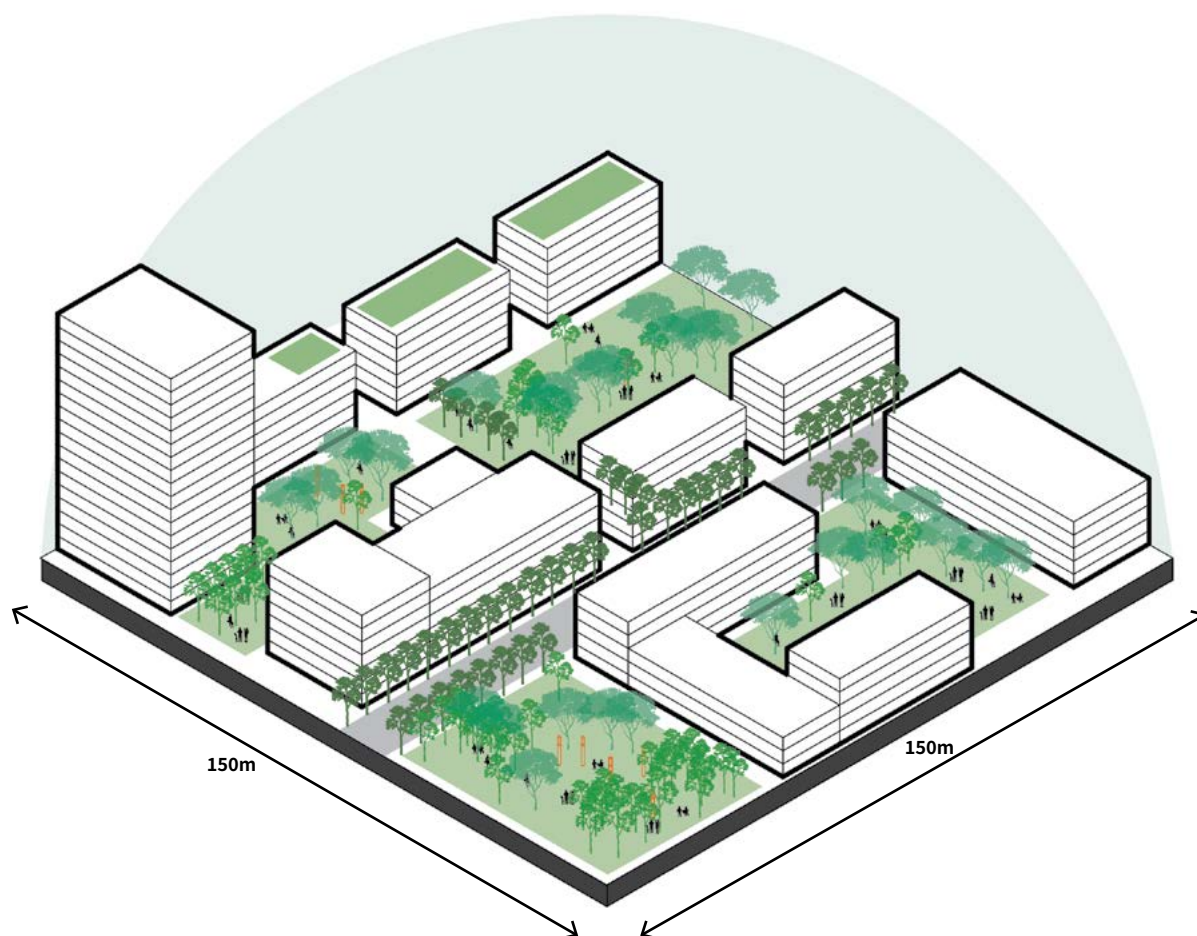
BASED ON STREET BLOCKS.





The Badgerys Creek precinct will include active transport corridors and green streets to complement employment uses.



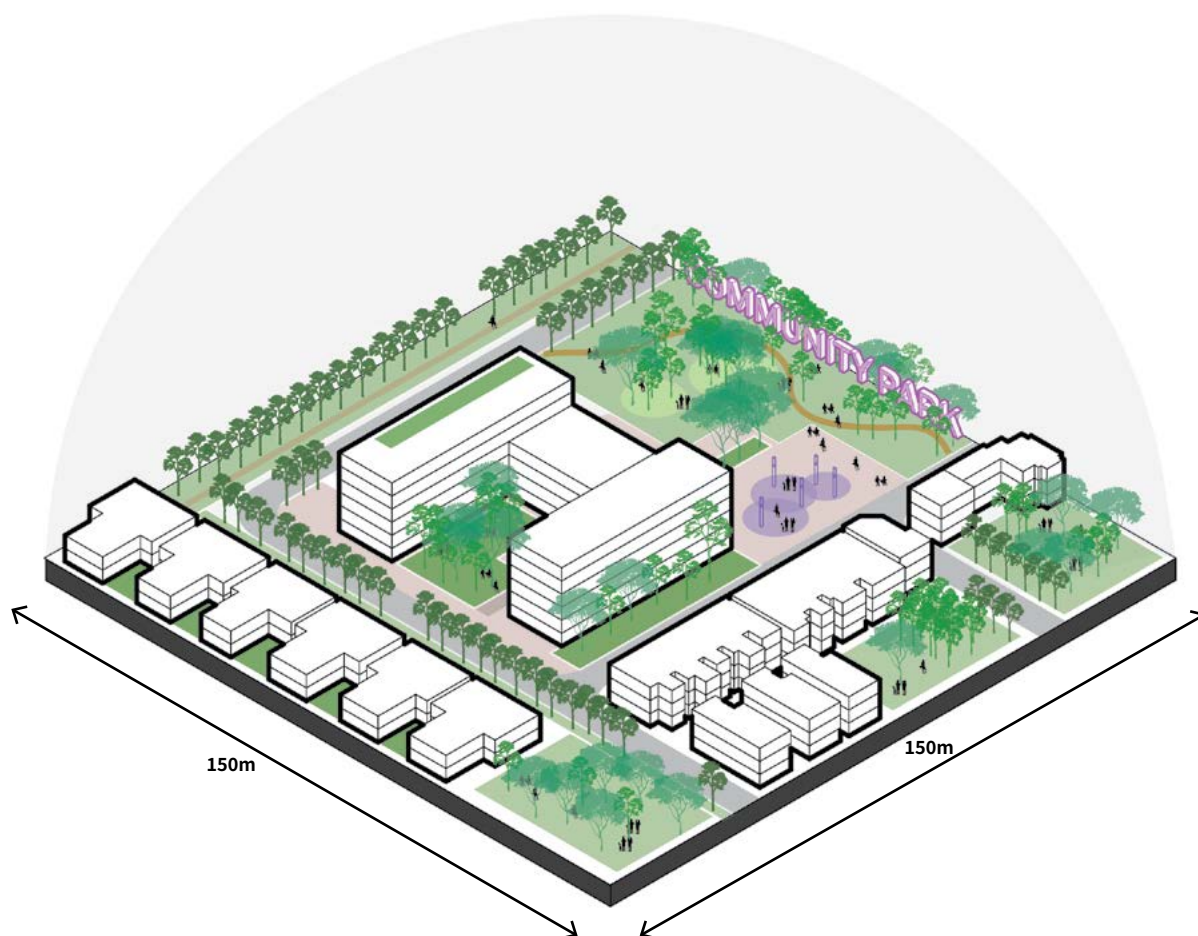


HIGH DENSITY RESIDENTIAL MIXED USE

FSR <small>(Indicative only)</small>	1.6 - 2.5:1
OS%	40% - 60%
HEIGHT	5-15+ Storeys

BASED ON STREET BLOCKS.





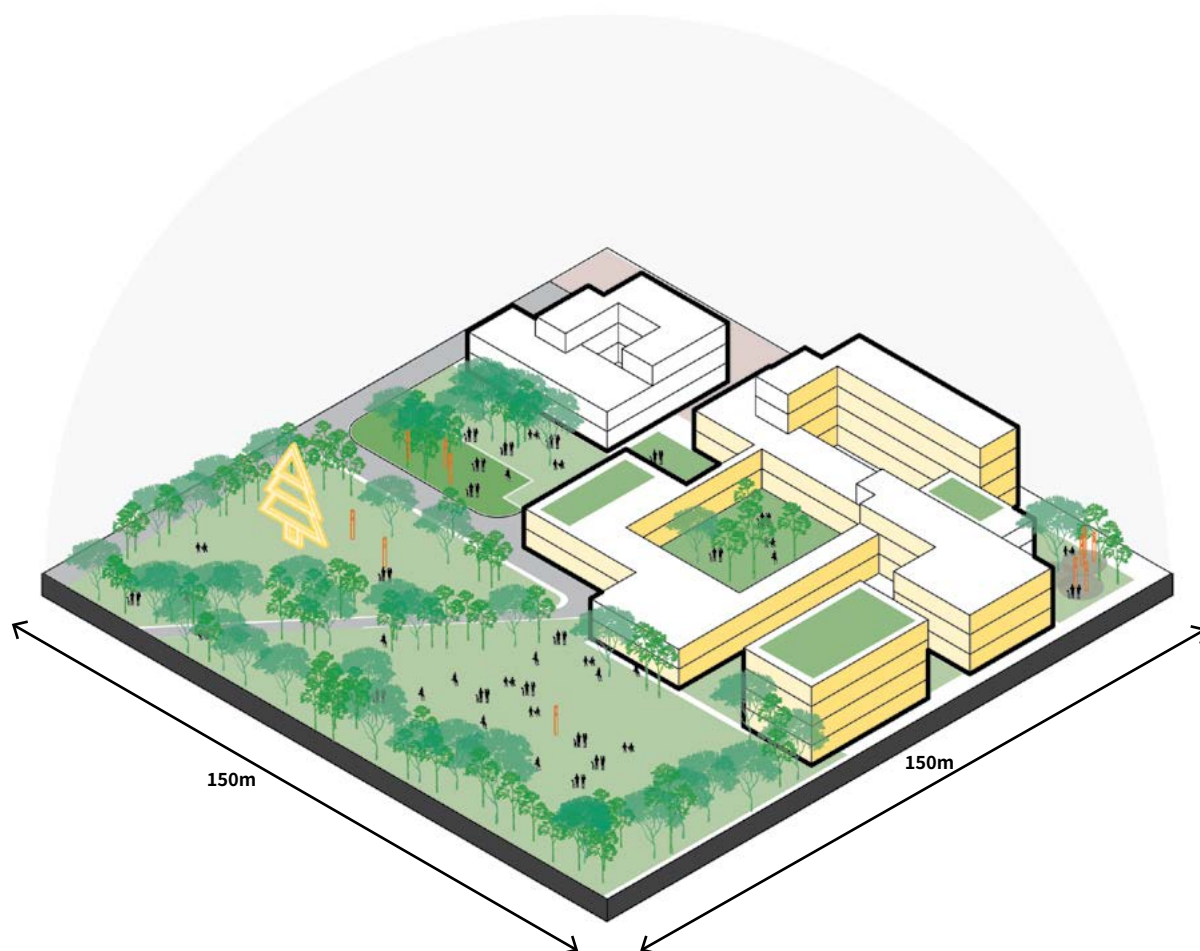
MEDIUM DENSITY RESIDENTIAL MIXED USE

FSR (Indicative only)
OS%
HEIGHT

1 - 1.6:1
40% - 60%
3-6 Storeys

BASED ON STREET BLOCKS.





COMMUNITY AND SCHOOLS

**05%
HEIGHT**

**40% - 60%
2-4 Storeys**



BASED ON STREET BLOCKS.



Employment areas west of Badgerys Creek Road will include high quality architecture, paths and open space.





The Aerotropolis Core, Badgerys Creek and Western Sydney (Nancy Bird Walton) Airport, with Agribusiness precinct in the background

MIXED USE

ACHIEVING A MIXED USE CENTRE

The mixed use zone within the Western Sydney Aerotropolis Plan provides for mixed flexible employment, residential and noise sensitive uses on land not affected by the ANEC/ANEF 20 and above contours in high amenity areas and areas well connected to public transport.

The urban design framework facilitates a flexible approach to the delivery of mixed use outcomes, with certain conditions. Those being:

- Employment densities need to be achieved over time; and
- The mixed use centre needs to be a focus for central city, employment and mixed use activities.

The urban design framework envisages that entirely residential buildings can be accommodated within the mixed use zone, but only in those areas where other non residential uses on the same lot or within the same building are also contained at ground level.

ACTIVATION

The Aerotropolis Core is intended to be a highly activated place that provides significant amenity for the benefit of knowledge focused workers and businesses.

The general principles towards ground level activation across the Aerotropolis Core precinct are:

- The land identified for Mixed Use Core must contain active frontages (shops, cafes, business services, commercial offices, lobbies and similar land uses)
- The land identified for Mixed Use Residential may contain residential at ground level, subject to non residential uses being located at ground level within the same building or lot.



HEIGHT AND FSR FRAMEWORK

BALANCING OLS, CENTRE PRIMACY AND AMENITY

Heights across the Aerotropolis are controlled cognisant of a range of factors:

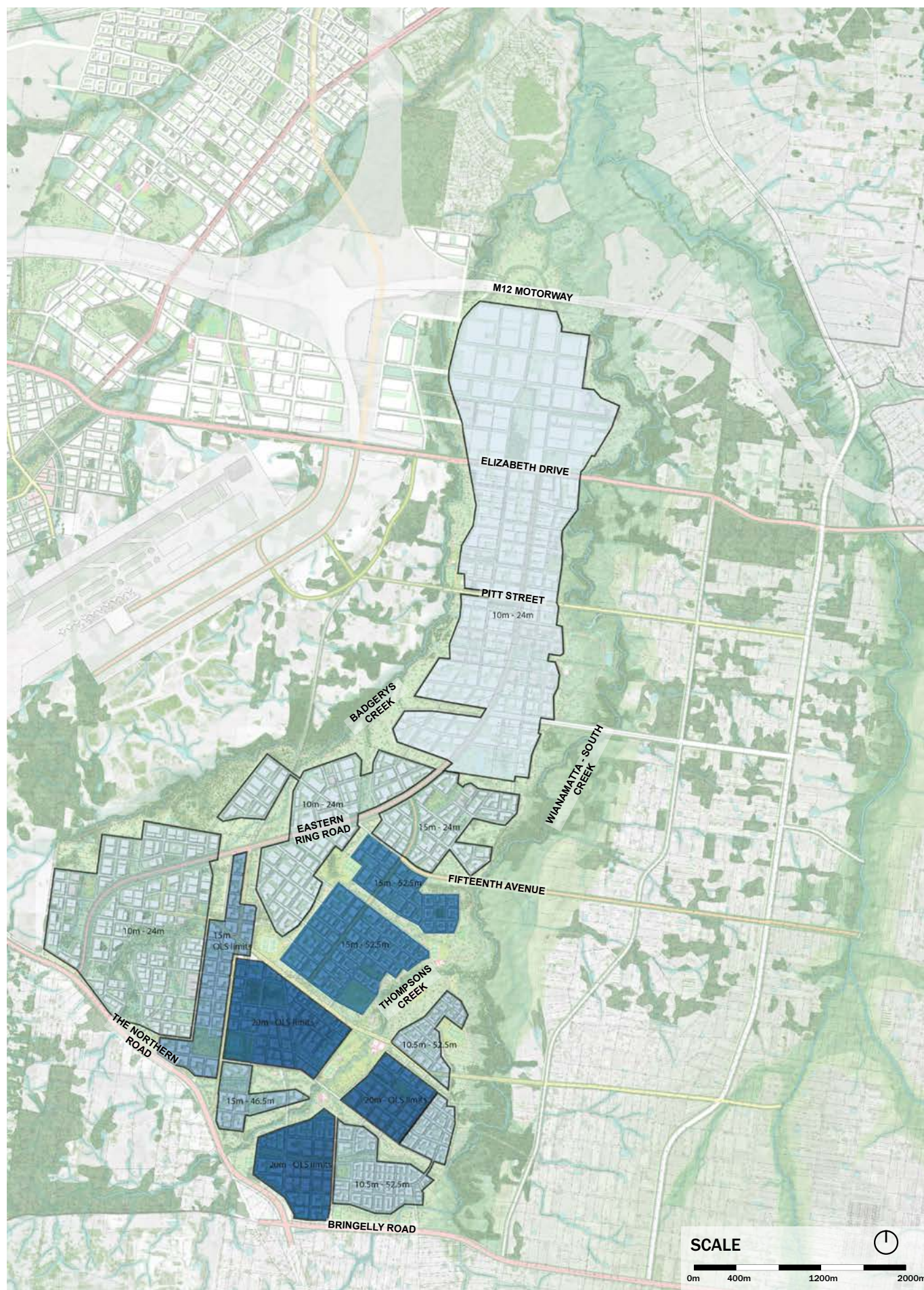
- Achieving the density and population targets established by the WSAP
- Promoting the densest and tallest form within the mixed use centre of the Aerotropolis Core
- Providing for urban density adjacent to the amenity of parks and Wianamatta corridor
- Ensuring buildings and structures do not impede on the Obstacle Limitation Surface (OLS) associated with the airport

The height map adjacent describes the height ranges that may be applied to achieve the desired built form and land use outcomes across the Aerotropolis Core and Badgerys Creek precincts.

Building construction methods, including cranes or associated infrastructure need to be contained within the OLS height limit unless otherwise approved.

			Aerotropolis Core		Badgerys Creek	Northern Gateway		Agribusiness
			Maximum Height (metres above ground level)	Maximum FSR	Maximum Height (metres above ground level)	Maximum Height (metres above ground level)	Maximum FSR	Maximum Height (metres above ground level)
Mixed Use	Centre - Metropolitan	Core	55 - 70	2.5 - 3	-	-	-	-
		Frame	40 - 52.5	2 - 2.5	-	-	-	-
	Centre - Specialised	Core	-	-	-	30 - 45	2.5 - 3	-
		Frame	-	-	-	20 - 27	1 - 1.8	-
Enterprise / Agribusiness	Centre - Local		24	-	24	20 - 27	-	10 - 20
	Centre - Local Employment		24	-	24	20 - 27	-	10 - 20
	Enterprise / General Employment		24	-	24	20 - 27	-	10 - 20

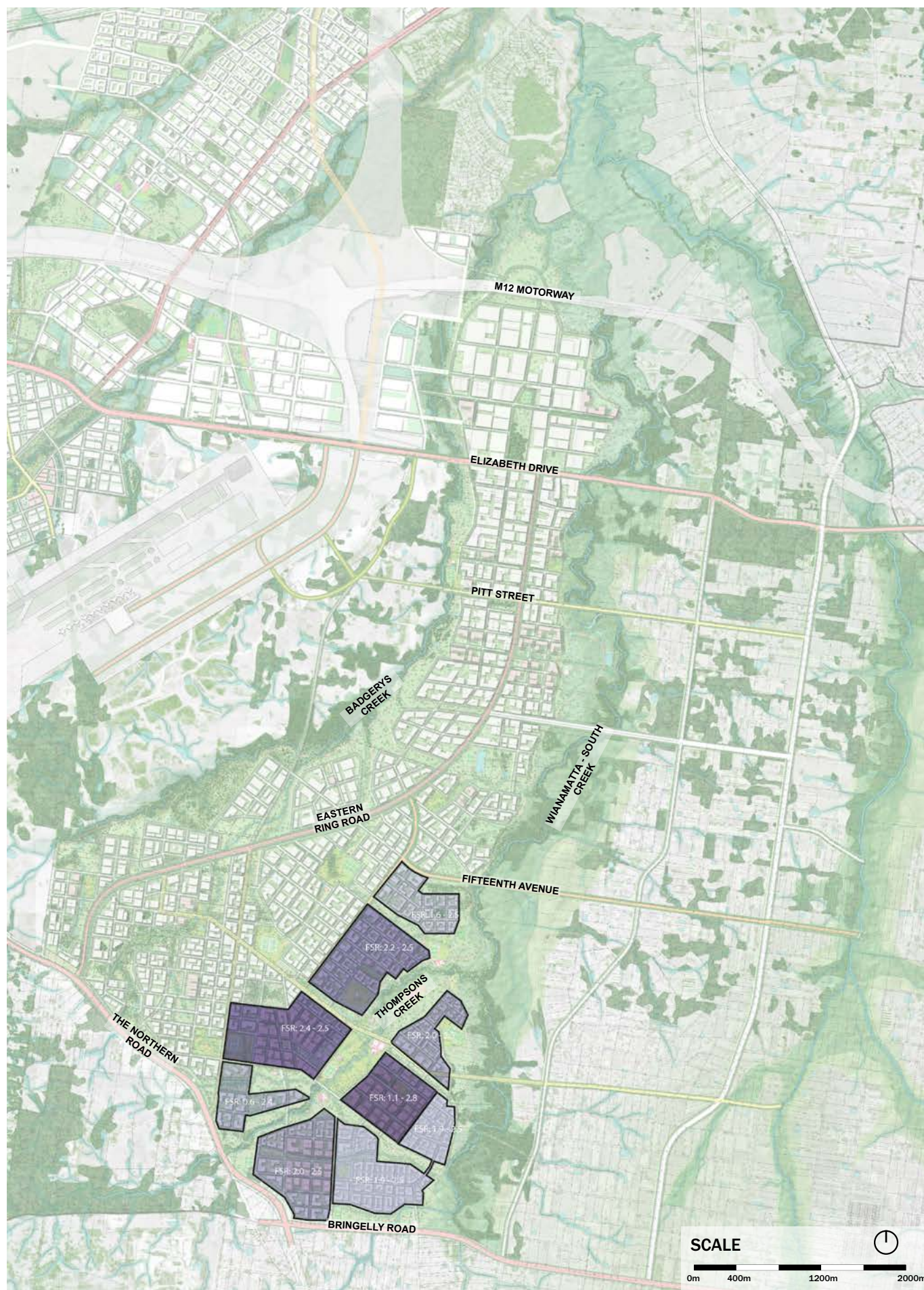
Note: Notwithstanding maximum heights, all buildings and structures, including equipment used during construction (such as cranes) are required to be contained within Obstacle Limitation Surface (OLS) limits established in the Western Sydney Aerotropolis Plan.



MIXED USE ZONE FSR CONTROLS

The floor space ratio map to the right describes the controls applying to development across the mixed use zone (as applied by the Western Sydney Aerotropolis SEPP).

The controls have been derived based on the desired built form outcome, the employment and population targets established in the WSAP, and help to ensure appropriate bulk, massing, articulation and separation of development within the central area of the Aerotropolis. It is an important control to help achieve built form quality.



SOCIAL, CULTURAL AND HERITAGE FRAMEWORK

PRINCIPLES

1. Co-location with open space

- school - sport & recreation facility - open space
- libraries, social & cultural institutions - park frontage

2. Co-location of complementing institutions & services

- libraries, social and cultural institutions
- libraries + tertiary institutions
- local centres + active recreation in enterprise zone

3. Location and distribution throughout the precincts to ensure good accessibility to both workers and residents

- Good Public and active transport accessibility
- proximity to interconnected open space facilitates and encourages active transport

1. Sport and recreational facilities

In the Mixed Use zone of the Aerotropolis Core - sportfields are within low flood risk of Wianamatta & Thompson Creek Regional parklands and co-located with educational facilities.

Within the Enterprise zone of Aerotropolis Core and Badgerys Creek, sportfields are located within ridgeline parks .

Multi purpose sport courts are distributed throughout the precincts to ensure workers and residents have access to active recreation within their local area. In the Enterprise zones, these are located next to local centres.

Indoor sportfields and aquatic and swimming centres are located in urban core areas , oriented towards open space and with good accessibility to public transport - Metro station and rapid bus transport route.

All sport & recreation facilities have good accessibility by public and active transport.

2. Educational facilities

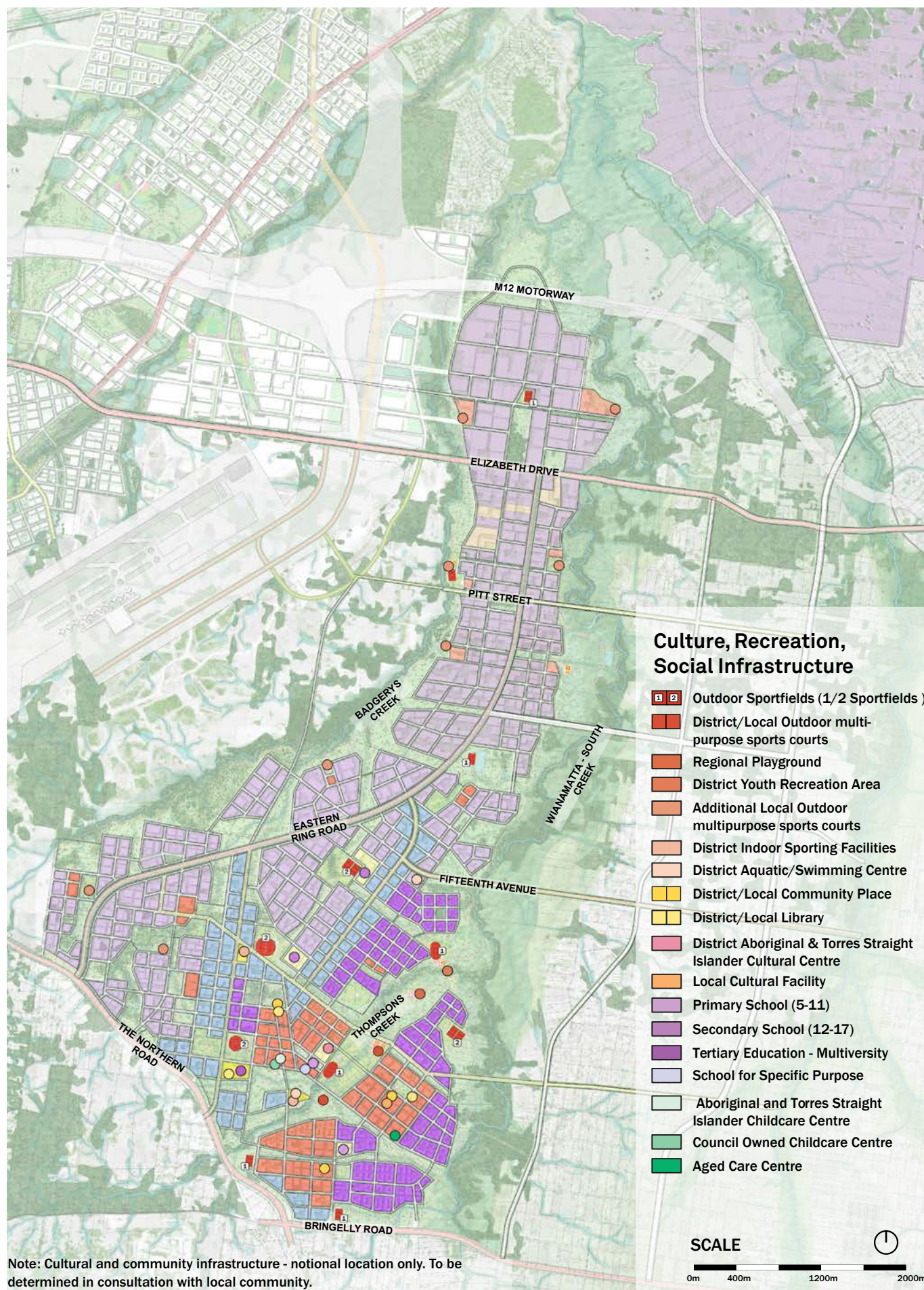
Educational facilities are oriented towards open space - Wianamatta & Thompsons Creek Regional parklands and other large urban parks.

3. Social and cultural infrastructure

Libraries, community centres and cultural institutions are the core of the community life - for residents, workers and visitors alike. Prominent locations with park frontage location at the city core or co-located with tertiary education facility, great public and active transport accessibility.

4. Civic Spaces

Civic spaces should be considered in the mixed use centres of Aerotropolis Core. These should be co-located with civic institutions, libraries and cultural centres.



SUBDIVISION AND AMALGAMATION

AMALGAMATION


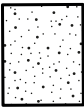
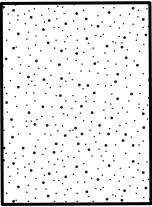

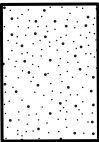
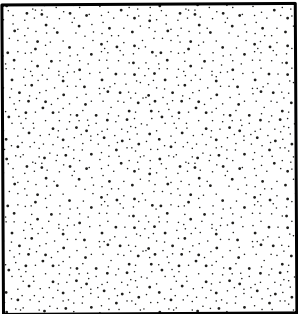
Within parts of the Aerotropolis Core and Badgerys Creek precincts, as identified in the amalgamation plan to the right, coordination of development and collation of appropriately sized development sites is required. This will enable achievement of open space, roads and key infrastructure, whilst enabling development in an equitable manner.

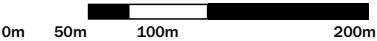
Development must be coordinated, including via amalgamation, into appropriate parcels to ensure the critical infrastructure elements of open space (including vegetation retention and drainage), roads and social infrastructure can be provided.

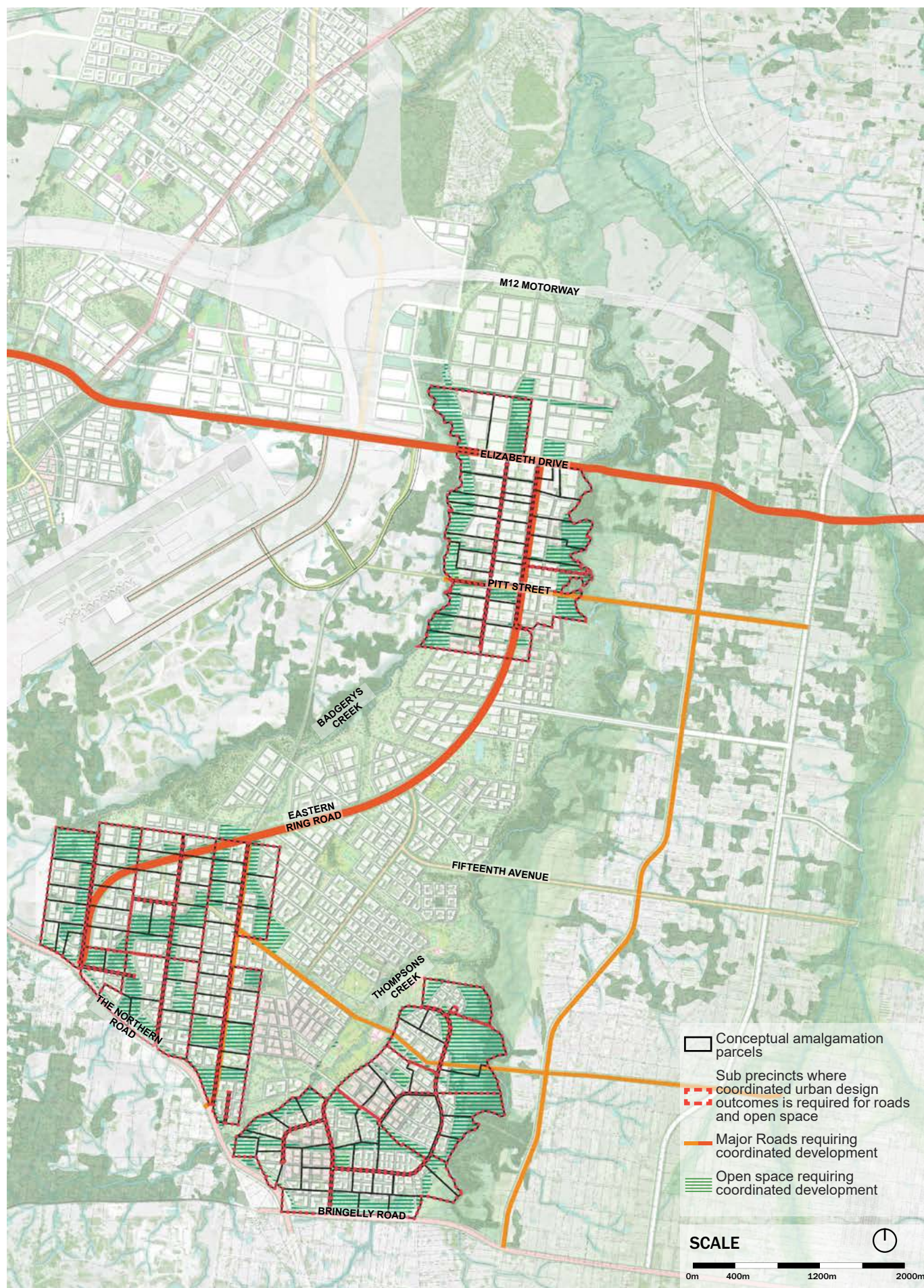
Land is to be set aside for infrastructure notwithstanding development prior to its construction.

STREET BLOCK SIZES

Minimum amalgamation areas are provided within the amalgamation plan, whilst minimum, average and maximum block sizes are provided for mixed use and enterprise zones per the table below. This is to ensure appropriate permeability of the urban grid structure.

	Minimum	Average	Maximum
MIXED USE	75 x 75m 	100 x 125m 	185 x 250m 
ENTERPRISE	80 x 95m 	120 x 170m 	365 x 385m 





KEY PLANS

CITY CENTRE AND METRO

The Metro Station at the Aerotropolis Core is a critical item of infrastructure that will catalyse development and enable the intended spatial, employment, liveability and connectivity outcomes.

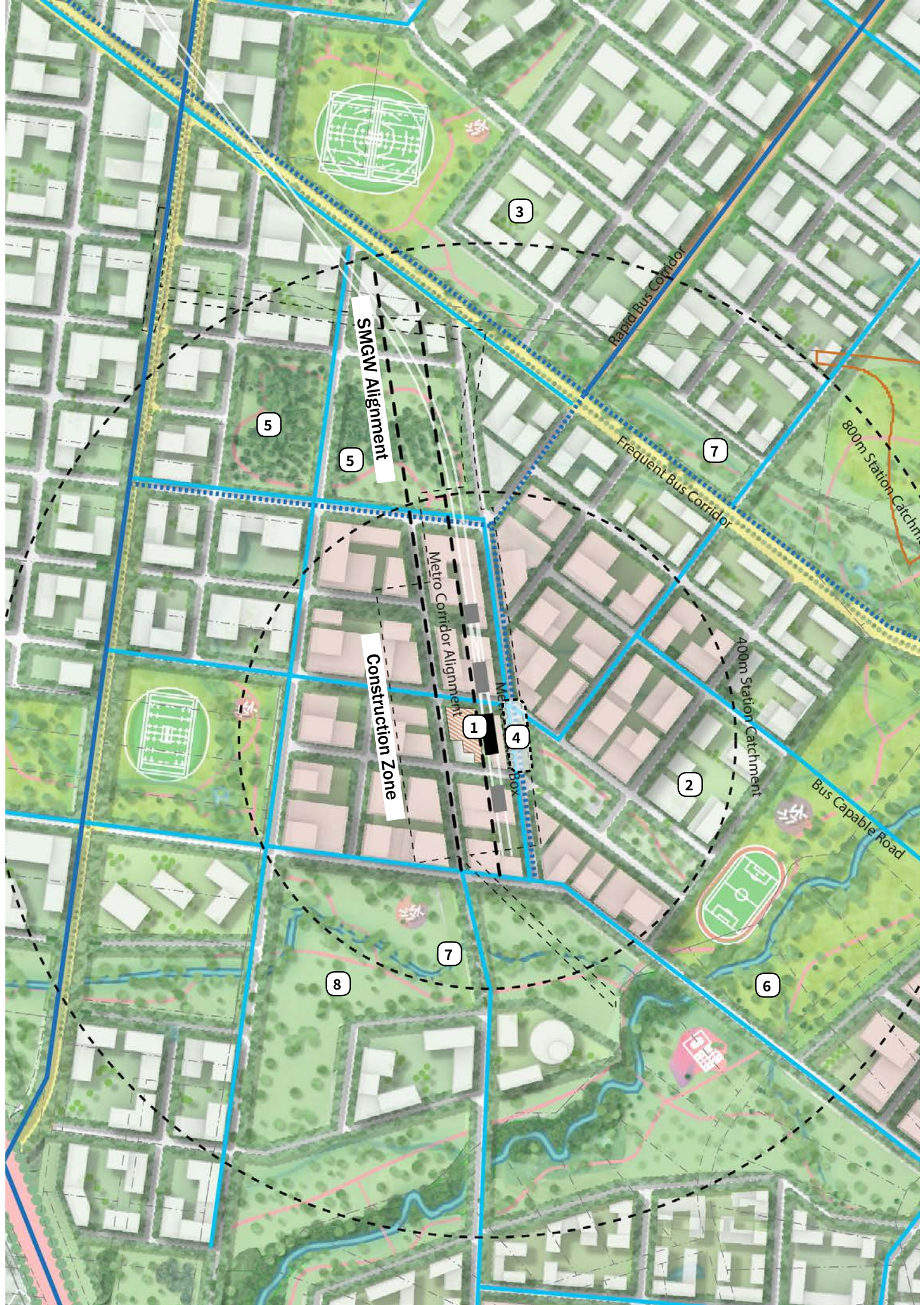
To support the Metro, a dense, mixed use centre is planned. The key principles are:

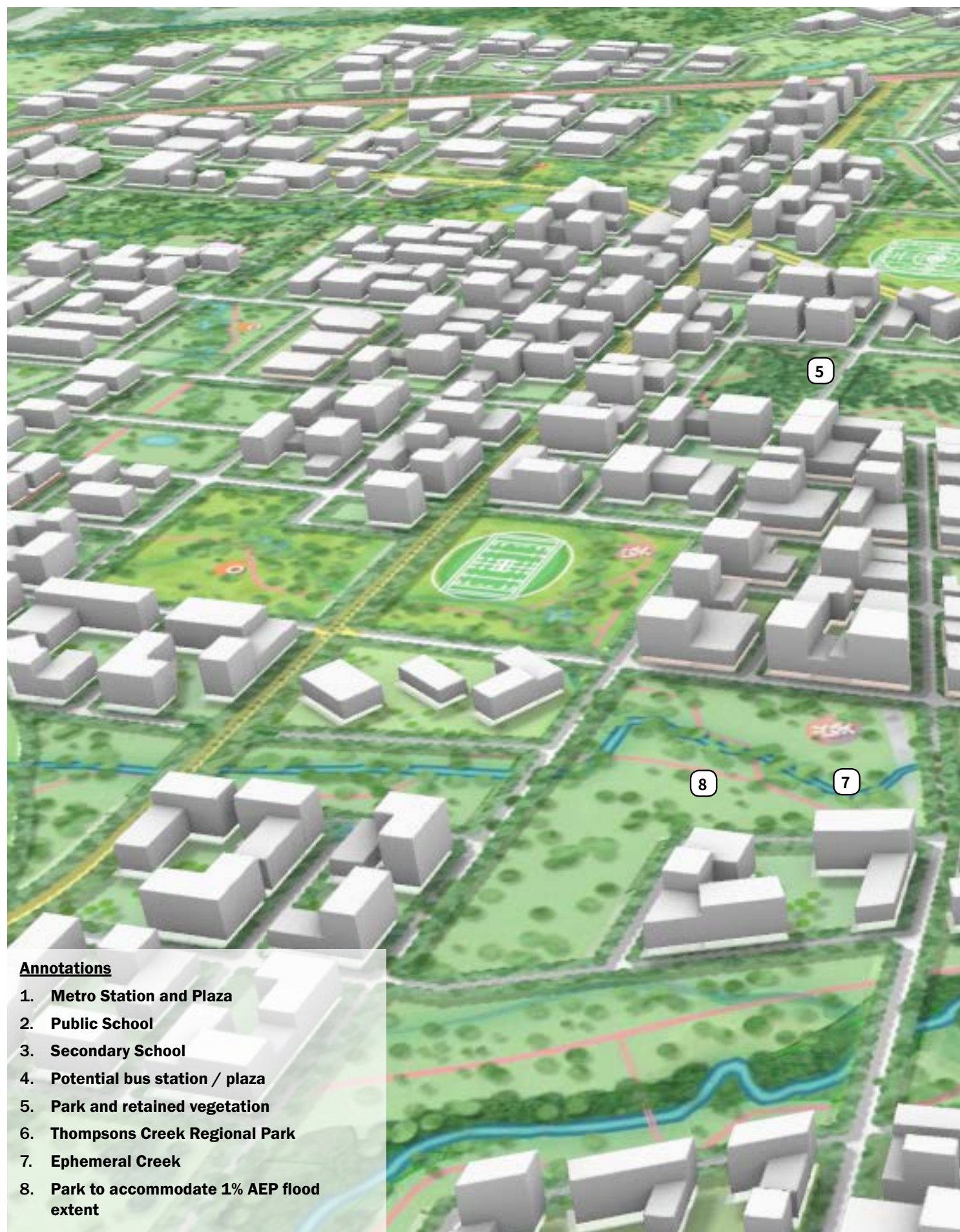
- A connected grid of streets at the core of the Aerotropolis that provides a framework for dense, mixed use development
- Streets provide a direct link between the city core, Metro and creek system, and allow clear sight lines between station and Thompsons Creek
- Investigation of a civic plaza to support Metro arrival experience at the time of master planning
- A high quality public realm, including streets, parks and civic plazas
- Connectivity between bus and Metro transit, with investigation of a bus only plaza to be considered at the time of master planning
- Active streets within an 800 metre walkable catchment of the Metro Station
- Integrated / over-station development is supported, however it is subject to limitations associated to basements and structures. Heights of buildings above the Metro tunnel are subject to engagement with Transport for NSW
- Roads should align to the Metro station buildings, tunnel and corridor

Any additional floor space capacity that may result from the announced Metro stations (Northern Gateway and Aerotropolis) will require a detailed transport study during master planning to demonstrate the movement network can function to standards satisfactory to Transport for NSW the approval authority.

Annotations

1. **Metro Station and Plaza**
2. **Public School**
3. **Secondary School**
4. **Potential bus station / plaza**
5. **Park and retained vegetation**
6. **Thompsons Creek Regional Park**
7. **Ephemeral Creek**
8. **Park to accommodate 1% AEP flood extent**







KELVIN PARK HOMESTEAD

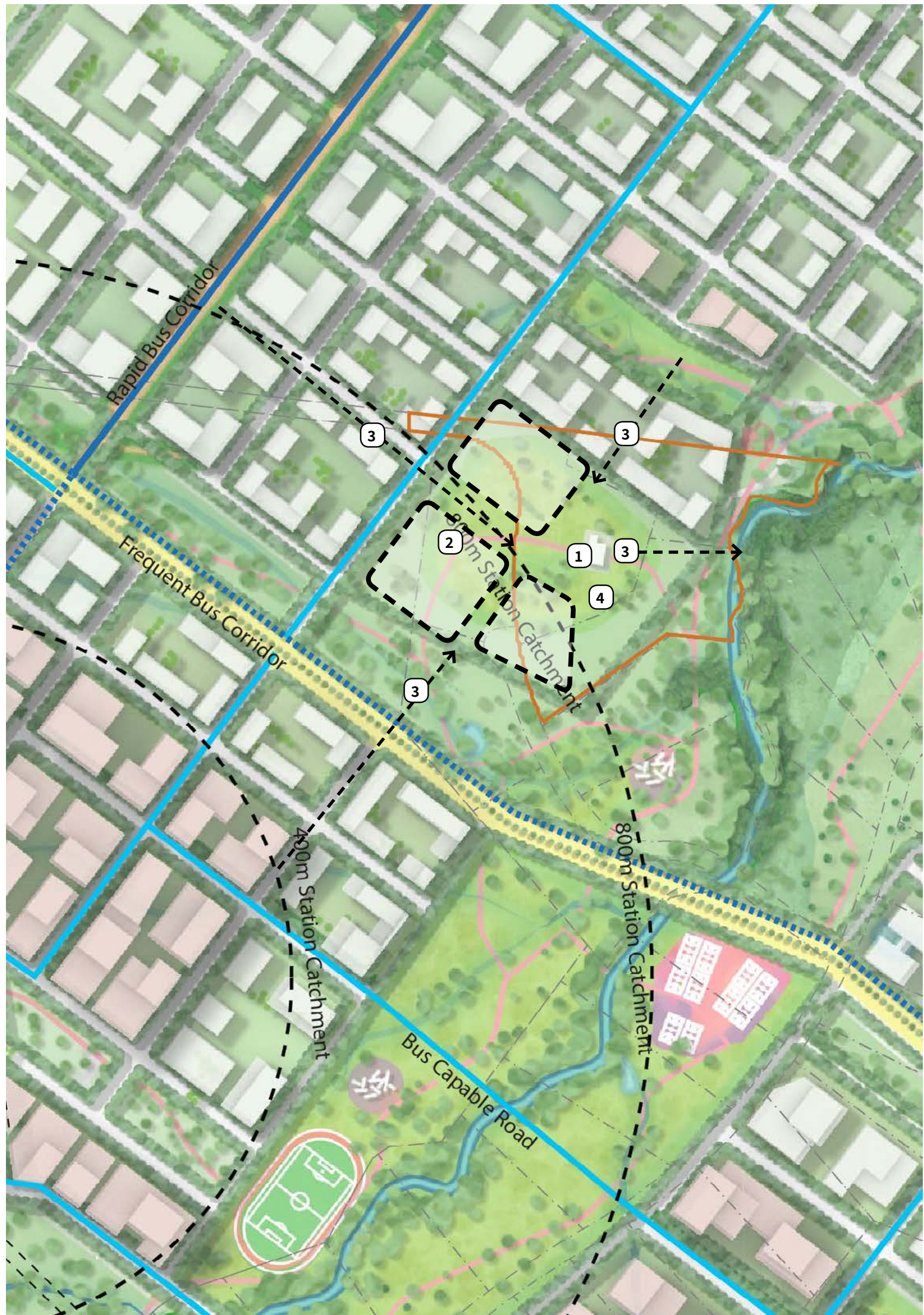
The Kelvin Park homestead is a State Heritage listed item. The urban design framework identifies the land for Residential Mixed Use, offering potential for a range of outcomes.

The key elements are that the homestead retains its relationship with Thompsons Creek, both physically and visually, consistent with the approved Conservation Management Plan.

As the homestead is in private residence, the land use reflects this status. Ultimately, to contribute to the intended knowledge-focused employment outcomes of the Aerotropolis Core, the homestead and the adjacent land could be used for a more public use, such as education, civic uses, hospitality or similar. Notwithstanding the potential 'public' use, retention of the homestead in private ownership is recommended.

The urban design framework purposefully retains a flexible arrangement of built form around the homestead, subject to retention of conservation management plan principles.

1. Existing Kelvin Park homestead building
2. Development area to be consistent with any approved conservation management plan
3. Visual connections between homestead and Thompsons Creek and from the surrounding precinct to the homestead
4. Open landscape areas enabling clear visual connectivity



MAMRE ROAD PRECINCT INTEGRATION

An area of unzoned land between Mamre Road and Kemps Creek has previously not been addressed as part of the Mamre Road Structure Plan. The subject land is within the Wianamatta South Creek Precinct.

Much of the land is within the 1% AEP Flood risk area, and so has been identified for Environment and Recreation Zone, consistent with the strategy across the Aerotropolis.

A comparatively small but still developable strip of land lies between the 1% AEP flood risk area and Mamre Road. This land is currently used for rural activities.













Two ephemeral creeks cross the affected land, and have been identified for retention in open space. This allows the landscape led urban design principles of the Aerotropolis to be carried through.

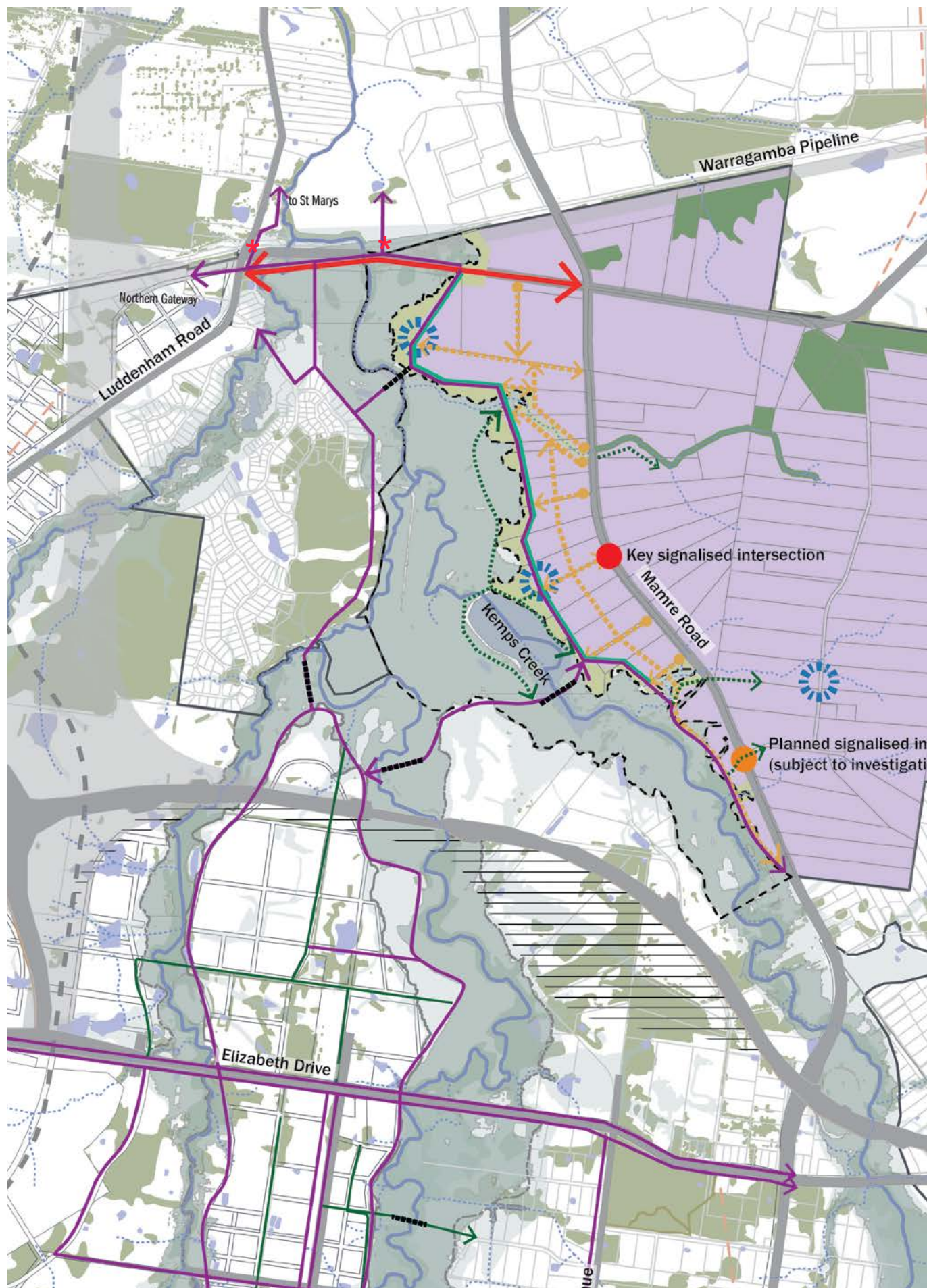
The remaining land has been identified for Industrial uses, consistent with the surrounding land in the Mamre Road precinct.

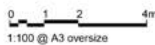
As Mamre Road is intended to function as an arterial corridor, access to the land is to be controlled. The Mamre Road Structure Plan identifies a controlled intersection in the area identified. This urban design framework considers a potential intersection at Mamre Road with Abbots Road, subject to investigation by Transport for NSW. Internal access required to service the land and must be coordinated across property boundaries.

The interface to the Wianamatta precinct (and Kemps Creek) is to be via a continual bicycle path. Development and buildings are to address the interface in a positive manner consistent with crime prevention through environmental design principles.

LEGEND

-  Ephemeral creek / stream
-  Environment and Recreation
-  Industrial
-  Mamre Road precinct
-  Mamre Rd 60m arterial road with cyclepaths and potential connections (Mamre Rd Structure Plan)
-  Proposed road connection
-  Central precinct road with cyclepath & connections to Kemps Creek recreation zone - subject to detail investigation and engagement of state transport agencies
-  Proposed edge road/ shared path & cyclepath
-  Proposed local cyclepath. To be within low/ medium flood risk zone where along creeks
-  Proposed regional Wianamatta cyclepath. To be within low / medium flood risk zone where along creeks.
-  Active transport connection over / under Warragamba pipeline - subject to detail investigation and engagement of state agencies
-  Proposed crossing

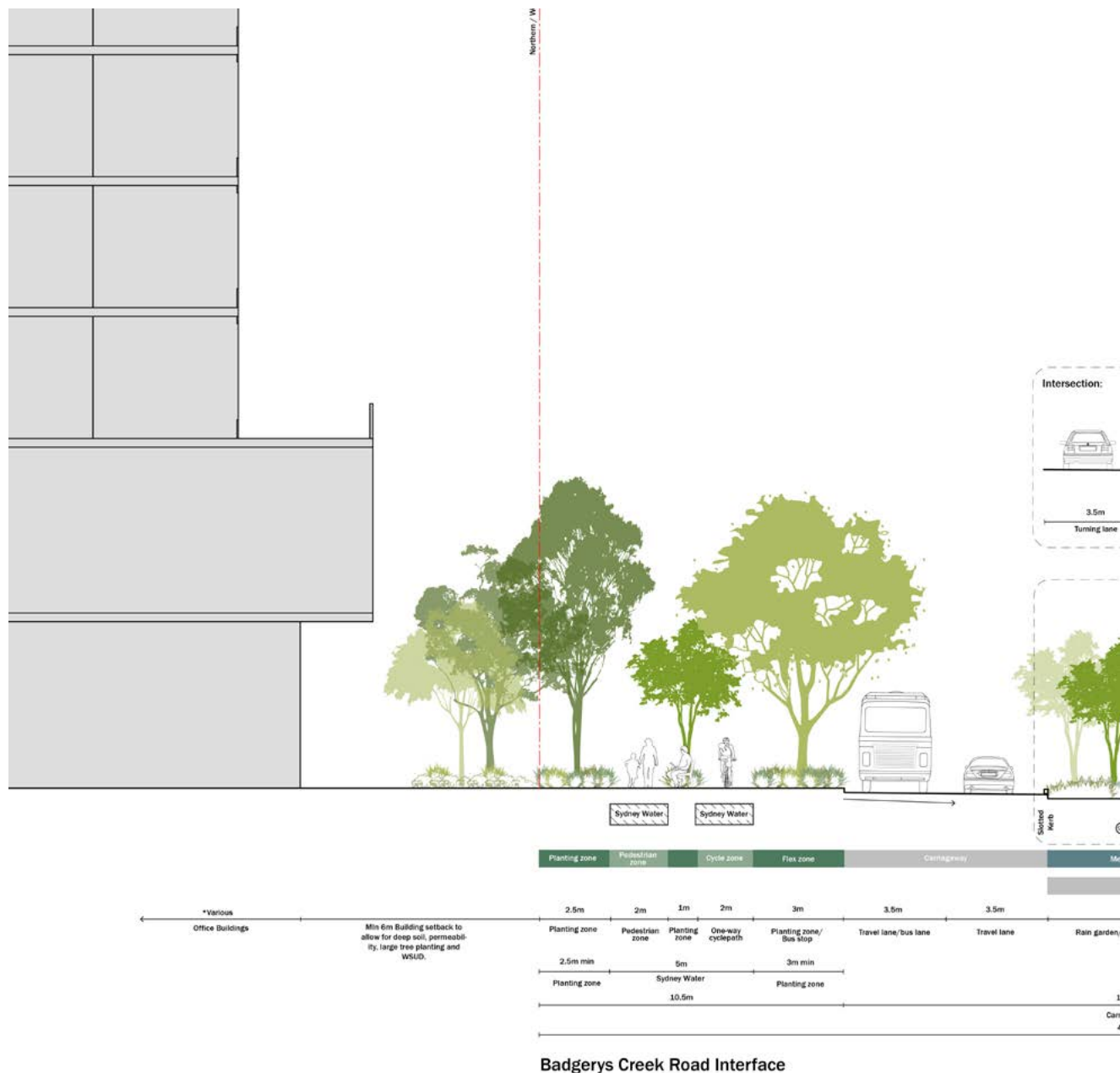




Elizabeth Drive will be a busy arterial road with controlled intersection and access. However, buildings should not address Elizabeth Drive as a 'back interface'. The development interface needs to provide an attractive and landscaped interface that complements the intent of the Western Parkland City. Development should be set back to allow deep soil planting of trees and understorey. Buildings should limit visual clutter and provide an attractive and clean edge.



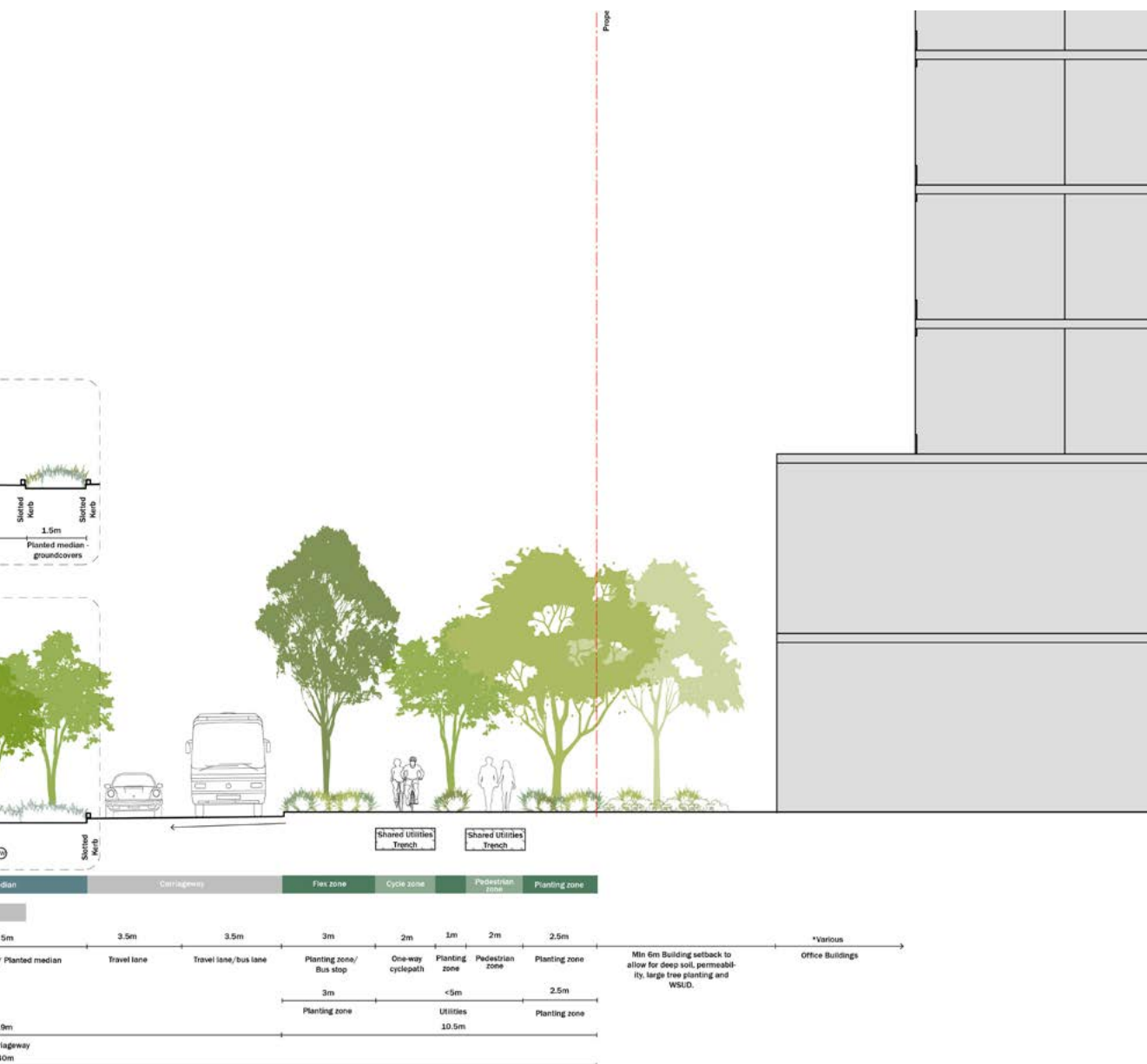
INTERFACES - BADGERYS CREEK ROAD



OBJECTIVES

Badgerys Creek Drive is an important boulevard within the Aerotropolis Core, providing entry sequence, activation and employment roles. Development on both sides of Badgerys Creek Road needs to be coordinated in order to provide a cohesive avenue of knowledge-based employment activity.

The development interface needs to provide an interface that enables pedestrian amenity, activity at ground level and the front doors of buildings to present to the road. Development should provide a setback area for deep soil planting of trees and understorey. Buildings should limit visual clutter and provide an attractive and clean edge.



GLOSSARY

Term	Definition
1 in 100-year flood	A flood that has a 1% chance of occurring in any given year within a 100-year cycle.
5G	Fifth-generation cellular network technology.
Acid sulfate soils	Naturally occurring sediments and soils containing iron sulfides (principally pyrite) or their precursors or oxidation products, whose exposure to oxygen leads to the generation of sulfuric acid (for example, by drainage or excavation).
Active street frontage	<p>A ground floor business or retail building street frontage that has direct and level entry and openings allowing physical and visual access that encourages interaction between the inside of the building and the adjoining external areas, including footpaths, road reserves or public spaces.</p> <p>Active street frontages support pedestrian safety and amenity and provide an interface between the public and private domain.</p>
Aerospace	The branch of technology and industry concerned with the research, design, manufacture, operation and maintenance of aircraft, space craft, and their components and supporting services.
Aerotropolis	A metropolitan area where infrastructure, land uses and economy are centred on an airport and includes the outlying corridors, and aviation orientated business and residential development that benefit from each other and their accessibility to the airport.
Aerotropolis Core	This is the central city at the core of the Aerotropolis activity associated with the Airport. The combination of uses, activities, development and places are reliant on and complementary to the operation of a global airport.
Agribusiness	Businesses associated with the production, processing, marketing and distribution of agricultural products, especially at a large and integrated scale.
Agriculture	Generally associated with traditional primary production. It includes the cultivation of land for the growing of crops and breeding of animals.
Agriport	A high-tech food production facility that enables industry collaboration at scale to intensively and sustainably produce fresh value-added high-quality produce and pre-prepared food.
Airside	All parts of an airport around aircraft and buildings only accessible to authorised personnel.
Amenity	The 'liveability' of a place that makes it pleasant and agreeable for individuals and the community. Amenity includes, but is not limited to, the enjoyment of sunlight, views, privacy and quiet.
Ancillary development	Development that is subordinate or subservient to the dominant purpose for which a site is used or proposed to be used.
Australian Noise Exposure Contours (ANEC)	Anticipated forecasts of future noise exposure patterns based on indicative flight paths around an airport that constitute the contours.
Australian Noise Exposure Forecast (ANEF)	Approved forecasts of future noise exposure patterns around an airport that constitute the contours on which land use planning authorities base their controls.
Articulation	The architectural treatment of the exterior of a building using the different building elements that make up that part of the building. It involves how the building's exterior surfaces, edges, corners and materials unite to give the building its form.

Term	Definition
Asset Protection Zone	A fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bush fire hazard and an asset. The APZ includes a defensible space within which firefighting operations can be carried out. The size of the required asset protection zone varies with slope, vegetation and Fire Danger Index (FDI).
Benchmark solutions	The means by which a development may achieve the intent of a planning objective or performance outcome.
Better Placed	An integrated design policy prepared by the NSW Government Architect.
Biodiversity offsets	Measures that compensate elsewhere for the adverse impacts of an action, such as clearing for development. Biodiversity offsets protect and manage biodiversity values in one area in exchange for impacts on biodiversity values in another.
Blue-Green Infrastructure Framework	An interconnected network of natural and semi-natural landscape elements (sometimes referred to as blue or green infrastructure), including water bodies, urban canopy and open spaces.
Business incubator	A company that helps new and start-up companies to develop by providing services such as management training or office space.
Circular economy	A whole-of-system approach that accounts for the full cost and lifecycle of materials and retains the value of materials in the economy for as long as possible, reducing the unsustainable depletion of natural resources and impacts on the environment.
Climate change	A change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere in addition to natural climate variability.
Communications, navigation and surveillance facilities	Facilities that allow: → pilots to navigate when en-route between airports; → pilots to utilise terminal area navigation aids to conduct instrument approach procedures; → dialogue between pilots and Air Traffic Control; and → Air Traffic Control to monitor and confirm an aircraft location.
Country	For Aboriginal peoples, Country relates not only to the cultural group and land to which they belong, it is also their place of origin in cultural, spiritual and literal terms. Country includes not only the land but also waters and skies, and incorporates the tangible and intangible, knowledges and cultural practices, identity and reciprocal relationships, belonging and wellbeing.
Consent Authority	The same meaning as in Section 4.5 of the Environmental Planning and Assessment Act 1979.
Conservation (heritage)	Includes all the processes of looking after a place so as to retain its cultural significance. This includes preservation, protection, maintenance, restoration, reconstruction and adaptation.
Conservation (vegetation management)	All the processes and actions of looking after a place so as to retain its natural significance and includes protection, maintenance and monitoring. Conservation may also include regeneration, restoration, enhancement, reinstatement, preservation or modification, or a combination of more than one of these. Conservation includes conserving natural processes of change (as opposed to artificially accelerated changes).

Term	Definition
Contaminated land	Land in, on or under which a substance is present at a concentration above that normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.
Controlled activities	Any activity that infringes an airport's protected operational airspace and requires approval before it can be carried out. Controlled activities include: <ul style="list-style-type: none"> a) permanent structures, such as building; b) temporary structures, such as cranes; and any activities causing intrusions into the protected operational airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter
Crime prevention through environmental design (CPTED)	A multi-disciplinary approach to deterring criminal behaviour through environmental design. Crime prevention through environmental design strategies rely upon the ability to influence offender decisions that precede criminal acts. The four principles of the approach are: <ul style="list-style-type: none"> → surveillance; → access control; → territorial reinforcement; and → space management.
Draft Cumberland Plain Conservation Plan (CPCP)	Will address impacts on biodiversity from urban growth through a conservation program that includes commitments and actions designed to improve ecological resilience and function over the long-term. The CPCP will enable land to be certified for development and areas avoided from development conserved. The CPCP will enhance a network of green spaces, natural and semi-natural systems in Western Sydney.
Defence	The branch of industry concerned with the research, design, manufacture, operation and maintenance of military equipment, supplies and services.
Design excellence	the highest level of architectural, urban and landscape design. Design excellence processes can include review panels, competitive design competitions. All processes require a form of design excellence assessment.
Development	As per the EP&A Act, development includes any of the following: the use of land; the subdivision of land; the erection of a building; the carrying out of a work; the demolition of a building or work; or any other act, matter or thing that may be controlled by an environmental planning instrument.
Development application	An application for consent under Part 4 of the EP&A Act to carry out development (not including an application for complying development) such as change of use of land, subdivide land, or building, landscaping and other work.
Development Control Plan (DCP)	Provides detailed planning and design guidelines to support established planning controls.

Term	Definition
Ecologically sustainable development	<p>Same meaning as in Section 6 (2) of the Protection of the Environment Administration Act 1991.</p> <p>ecologically sustainable development requires the effective integration of social, economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:</p> <ul style="list-style-type: none"> a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by: <ul style="list-style-type: none"> i. careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and ii. an assessment of the risk-weighted consequences of various options, b) inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations; c) conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration; d) improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services, such as: <ul style="list-style-type: none"> i. polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement; ii. the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and <p>environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.</p>
End of trip facilities	<p>Designated places that support cyclists, joggers and walkers in using alternative ways to travel to work rather than driving or taking public transport. These types of facilities also benefit people who exercise during their lunch break.</p> <p>End of trip facilities include:</p> <ul style="list-style-type: none"> → secure bicycle parking; → locker facilities; and → change rooms.
Environmental planning instrument	<p>An environmental planning instrument (including a state environmental planning policy or local environmental plan but not including a Development Control Plan) made, or taken to have been made, under Part 3 of the Environmental Planning and Assessment Act 1979 and in force.</p>

Term	Definition
Floodplain	An area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is, flood prone land.
Greater Sydney	The local government areas within the boundary shown on the map in the Greater Sydney Region Plan and Schedule 1 of the Greater Sydney Commission Act 2015.
Green Grid	The network of high-quality green spaces and tree lined streets that supports walking, cycling and community access to open spaces. It will provide cool, green links throughout the Aerotropolis and connect more broadly to the Western City District and Greater Sydney.
Green infrastructure	the network of green and blue spaces which includes waterways, bushland, parks, open spaces and tree canopy that are strategically planned, designed and managed to support a good quality of life in an urban environment.
Growth Area	Identified by the NSW Government as major greenfield development or urban renewal areas.
Habitat	Includes: → an area periodically or occasionally occupied by a species or ecological community, and → the biotic and abiotic components of an area.
Hazardous material	Materials that have the potential to pose a significant risk to human health, life or property, or to the biophysical environment. These may include materials that are radioactive, flammable, explosive, corrosive, oxidising, asphyxiating, bio-hazardous, toxic, pathogenic, or allergenic. Compressed gases and liquids or hot materials that may be hazardous in specific circumstances may also be included.
Integrated water cycle management	An approach to the management of water that considers aspects of water including rainwater, stormwater, groundwater, water supply and use, reuse and treatment.
Irrigation	The supply of water to land or crops to help growth, typically by means of channels.
Local Centre	Smaller-scale places that vary from a few shops on a corner to a vibrant main street and generally serve a local population.
Local Environmental Plan (LEP)	Defined in the EP&A Act. Guides planning decisions in local government areas through zoning and development controls.
Master Plan	An optional plan created under the Aerotropolis SEPP for large sites or landholdings of 100 hectares or more.
National Airports Safeguarding Framework (NASF)	National land use planning framework to improve community amenity by minimising aircraft noise- sensitive developments near airports and improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions on various safety related issues.
Obstacle Limitation Surface (OLS)	Designed to protect aircraft flying in visual conditions close to an airport by defining a volume of airspace to be protected from development, primarily modelled on the layout and configuration of proposed runways.
Performance outcome	A general statement of the means of achieving the intent of the applicable objectives of this development control plan.
Peri-urban lands	Land for agriculture undertaken in places on the fringes of urban areas.
Permeable surface	A surface that permits or facilitates the infiltration or penetration of water such as grass, landscaping or porous paving.

Term	Definition
Precinct planning	Identifies the development intent and development capacity across a precinct by allocating land uses, densities, housing types, built form, infrastructure and environmental and open space.
Private open space	same meaning as in the Standard Instrument - Principal Local Environmental Plan. an area external to a building (including an area of land, terrace, balcony or deck) that is used for private outdoor purposes ancillary to the use of the building.
Procedures for Air Navigation Services – Aircraft Operations Surfaces (PANS-OPS)	The primary surface for protecting aircraft operating under non-visual (instrument guided) conditions generally located above the OLS. Separate procedures for each runway and for the type of navigation system being used and the multiple surfaces are combined to form the PANS OPS.
Public domain	Any publicly or privately owned space that can be accessed and used by the public and/or is publicly visible.
Public safety area	a designated area at the end of an airport runway within which development may be restricted in order to control the number of people on the ground at risk of injury or death in the event of an aircraft accident on take-off or landing.
Public space	Includes parks, green spaces, plazas, libraries, streets, landscapes, museums, and public transport.
Remediation	removing, dispersing, destroying, reducing, mitigating or containing the contamination of any land; or eliminating or reducing any hazard arising from the contamination of any land (including by preventing the entry of persons or animals on the land).
Ride and car sharing	An arrangement in which a passenger travels in a private vehicle driven by its owner, for free or for a fee.
Riparian corridor	The channel which comprises the bed and banks of a watercourse (to the highest bank) and the vegetated riparian zone adjoining the channel.
Road reserve	Includes the following components: → footway; → kerb and gutter; → road carriageway; and → ancillary items to any of the above - any stormwater drainage asset, road/street furniture, edging, lighting, poles, services, signage etc.
Salinity	The salt content in water or soil.
Signage	Any sign, notice, device, representation or advertisement that advertises or promotes any goods, services or events and any structure or vessel that is principally designed for, or that is used for, the display of signage, and includes any of the following: a) an advertising structure; b) a building identification sign; and c) a business identification sign; but does not include a traffic sign or traffic control facilities.
Solar access	The ability of a building, part of a building or open space to continue to receive direct sunlight without obstruction from other surrounding buildings or impediments, not including trees.

Term	Definition
State Environmental Planning Policy (SEPP)	Environmental planning instruments that address planning issues of State significance.
State Environmental Planning Policy (Sydney Region Growth Centres) 2006	The environmental planning instrument which sets controls for the North West and South West Growth Areas of Sydney.
STEM (science, technology, engineering and mathematics)	An approach to learning and development that integrates the areas of science, technology, engineering and mathematics.
Stormwater	Untreated water that originates from rainfall or snow/ice melt and soaks into the ground (infiltrate), is held on the surface and evaporates, or runs off to streams, rivers or other water bodies (surface water).
Strategic centre	Characterised by a high proportion of knowledge- intensive jobs, existing or proposed major transport gateways and increased economic activity.
Streetscape	The character of a street and its close surrounds defined by the spatial arrangement and visual appearance of built and landscape features when viewed from the street.
Threatened species	a) a critically endangered species, an endangered species or a vulnerable species listed in Schedule 1 of the Biodiversity Conservation Act 2016; or b) a listed threatened species within the meaning of the Environment Protection and Biodiversity Conservation Act 1999.
Tributary	A river or stream flowing into a larger river or lake.
Upper South Creek Advanced Water Recycling Centre	A new Sydney Water facility that will collect and treat wastewater from the Aerotropolis and South West Growth Area. It will produce advanced quality treated water and provide for a wide range of re-use and substitution opportunities including supplying water for agriculture and environmental flows. It will also support the Circular Economy via the production of renewable energy and bioresources.
Urban heat island effect	An agglomeration of hard and dark-coloured surfaces such as roads and roofs which cause excessive localised warming.
Urban typologies	Precinct-scale snapshots of various forms of urban development incorporating built form, roads and subdivision pattern and open space.
Variation statement	A written statement accompanying a DA demonstrating how the objectives and relevant control and/or performance outcome will be achieved if an alternative to the 'benchmark solutions' is proposed.
Waterway	the whole or any part of a watercourse, wetland, waterbody (artificial) or waterbody (natural).
Western Economic Corridor	New economic agglomerations around the Western Sydney International (Nancy-Bird Walton) Airport, including the Aerotropolis.
Western Parkland City	Broadly, Penrith, Liverpool, Campbelltown, Hawkesbury, Wollondilly, Camden, Fairfield and Blue Mountains LGAs, anchored around Liverpool, Greater Penrith and Campbelltown–Macarthur, with the new Airport and Aerotropolis geographically at its centre.
Western Parkland City Authority (WPCA)	A NSW Government body (formerly the Western City & Aerotropolis Authority) established to facilitate the delivery of the Western Parkland City. The WPCA works across all three levels of Government to jointly plan, design and deliver the best possible outcomes in infrastructure, liveability, investment attraction, job growth and sustainability.

Term	Definition
Western Parkland City Metropolitan Cluster	Comprises the Aerotropolis, Liverpool, Greater Penrith and Campbelltown–Macarthur.
Western Sydney Aerotropolis	Encompasses 11,200 hectares of land roughly bounded by the Warragamba pipeline to the north, Kemps Creek to the east, Bringelly Road to the south and the future Outer Sydney Orbital Road to the west.
Western Sydney Aerotropolis Plan (WSAP)	A strategic plan that provides the vision, principles and planning framework for the Western Sydney Aerotropolis.
Western Sydney Airport	A Commonwealth business enterprise established in August 2017 to build the new Airport.
Western Sydney International (Nancy-Bird Walton) Airport	The declared airport site located on approximately 1,780 hectares of land at Badgerys Creek. The airport will be developed in stages and will ultimately comprise two parallel runways serving approximately 82 million passengers annually. The Airport will operate 24/7 without a curfew.
Western Sydney Planning Partnership	A local government-led initiative comprising of representatives of all eight Western Parkland City councils as well as Blacktown Council, and representatives from the NSW Department of Planning, Industry and Environment, Transport for NSW, Sydney Water and the Greater Sydney Commission.
Wianamatta-South Creek Catchment	Includes most of the Cumberland Plain of Western Sydney and is a defining central element of the Western Parkland City and the Aerotropolis.

An aerial photograph of a city area, likely in the Netherlands, showing a complex network of roads, green spaces, and water bodies. Overlaid on the map are various urban design elements: a grid of white rectangular blocks representing building footprints, a network of red and orange lines indicating roads or transit routes, and green areas representing parks or green infrastructure. The map is framed by a light blue border. The title 'METROPOLIS URBAN DESIGN FRAMEWORKS' is centered over the map in a large, bold, sans-serif font. The word 'METROPOLIS' is in a lighter shade of blue, while 'URBAN DESIGN FRAMEWORKS' is in a darker shade of blue. The text is slightly transparent, allowing the map details to be visible underneath.

METROPOLIS URBAN DESIGN FRAMEWORKS

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