SUSTAINABLE DEVELOPMENT OPPORTUNITIES

Appin (Part 2) Precinct Plan

Prepared for
WALKER CORPORATION
October 2024

URBIS

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Urbis acknowledges the important contribution that Aboriginal and Torres Strait Islander people make in creating a strong and vibrant Australian society.

We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

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THE APPIN PROJECT

THE PROPOSAL

The Proponent has prepared the subject submission to rezone 100.10 hectares of land (the Site) within the Appin Precinct from RU2 Rural Landscape to the following zones:

Urban Development Zone

Zone 1 Urban Development (UDZ)

Conservation Zone

Zone C2 Environmental Conservation (C2)

The Site is known as the Appin (Part 2) Precinct. The Site directly adjoins the Appin (Part 1) Precinct – refer to Figure 1.

THE APPIN (PART 1) PRECINCT PLANNING PROPOSAL (PP-2022-3979)

In November 2022, Walker Corporation Pty Ltd and Walker Group Holdings Pty Ltd (the Proponent) lodged a Planning Proposal (PP-2022-3979) to rezone part of the Appin Precinct.

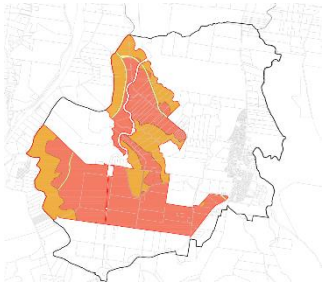
PP-2022-3979 (referred to as the Appin (Part 1) Precinct) proposes to rezone the land from RU2 Rural Landscape to Urban Development Zone (UDZ) and C2 Environmental Conservation via an amendment to State Environmental Planning Policy (Precincts – Western Parkland City) 2021.

The UDZ will facilitate approximately 12,000 dwellings. The C2 zone will facilitate the conservation of 470ha of endangered ecological community and help implement the Office of the NSW Chief Scientist & Engineer (NSW Chief Scientist) recommendations.

The new zones are accompanied by a structure plan outlining the intended land uses. In addition, the Proponent produced an Appin and North Appin Precincts Indicative Plan to illustrate how the new zones might fit within the broader precinct as land is developed. The Indicative Plan has no statutory weight and will be refined as further planning proposals are prepared.

The plans and their purpose are summarised in **Table 1**.

Table 1 PP-2022-3979 Title and Purpose of Plans

(1) APPIN & NORTH APPIN PRECINCTS INDICATIVE PLAN	(2) APPIN (PART 1) PRECINCT PLAN (*THE PRECINCT PLAN*)	(3) APPIN (PART 1) PRECINCT STRUCTURE PLAN (*THE STRUCTURE PLAN*)
Broader context and for information purposes only. It has no statutory weight. It identifies: • *Higher-order transport network* • *Centres hierarchy* • *School sites* • *Conservation areas* • *Residential areas* • *Cultural Sites and Connections*	*It shows the land proposed to be rezoned and incorporated into a new schedule in the Western Parkland City SEPP 2021.* *The precinct plan contains the development provisions (clauses and maps) applicable to the Site and is used in assessing development applications.*	*Structure plan for the Site, showing staging of release areas.* *Development is to be generally consistent with the structure plan. It illustrates land use components including (but not limited to):* • *Low and medium-density residential* • *Retail and employment centres* • *School* • *Open space* • *Drainage network/basins* • *Transport network*
		
The Appin & North Appin Precincts Indicative Plan envisages the delivery of 21,000+ new homes	**The 'precinct plan' envisages the delivery of 12,000 dwellings new homes**	**The 'structure plan' envisages the delivery of 12,000 dwellings new homes in Appin (Part 1) Precinct Structure Plan**

POPULATION GROWTH

Greater Sydney's population is projected to grow to approximately 6.1 million by 2041 – over a million more people than currently live in the Sydney region.

The NSW Government has identified Growth Areas to accommodate the population that will choose to live in greenfield areas (new suburbs). The Greater Macarthur Growth Area (GMGA) is one such growth area and is a logical extension of the urban form of south-west Sydney. The GMGA is divided into precincts. The Appin Precinct and North Appin Precinct are the southernmost land release precincts of the GMGA. The goal is to deliver 21,000 dwellings.

The rezoning and release of land for development will achieve this goal.

THE APPIN (PART 2) PRECINCT PLANNING PROPOSAL

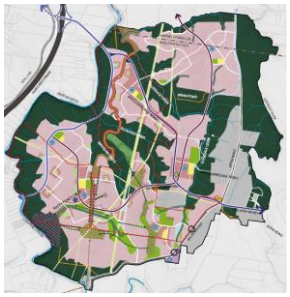
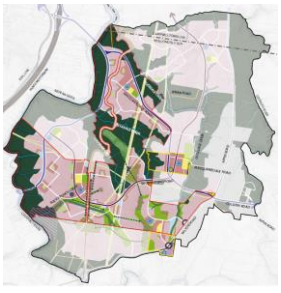
The Appin (Part 2) Precinct Plan (the precinct plan) shows the proposed new zones. 'The precinct plan' will be incorporated into the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021* and contain the provisions (clauses and maps) that will apply to 'the Site.' 'The precinct plan' envisages the delivery of the following:

- 1,312 dwellings (as a mix of low-density, medium density and apartments)
- 30,312 sqm of gross lettable retail/commercial floor area
- 16.91ha conservation land

The planning proposal submission is aligned with strategic land use planning, State and local government policies, infrastructure delivery and PP-2022-3979. The development potential is tempered by a landscape-based approach that protects the environment and landscape values, shaping the character of new communities. A series of residential neighbourhoods are to be delivered within the landscape corridors of the Nepean and Cataract Rivers, supported by local amenities, transit corridors and community infrastructure.

The submission includes a hierarchy of plans. The plans and their purpose are summarised in Table 2.

Table 2 The subject Planning Proposal's Plans and Proposal

(1) APPIN & NORTH APPIN PRECINCTS INDICATIVE PLAN	(2) APPIN (PART 2) PRECINCT PLAN (*THE PRECINCT PLAN*)	(3) APPIN (PART 2) PRECINCT STRUCTURE PLAN (*THE STRUCTURE PLAN*)
Broader context and for information purposes only. It has no statutory weight. It identifies: • *Higher-order transport network* • *Centres hierarchy* • *School sites* • *Conservation areas* • *Residential areas* • *Cultural Sites and Connections*	*It shows the land proposed to be rezoned and incorporated into a new schedule in the Western Parkland City SEPP 2021.* *The precinct plan contains the development provisions (clauses and maps) applicable to the Site and is used in assessing development applications.*	*Structure plan for the Site, showing staging of release areas.* *Development is to be generally consistent with the structure plan. It illustrates land use components including (but not limited to):* • *Low and medium-density residential* • *Retail and employment centres* • *School* • *Open space* • *Drainage network/basins* • *Transport network*
		
The Appin & North Appin Precincts Indicative Plan envisages the delivery of 21,000+ new homes	**The 'precinct plan' envisages the delivery of 1,312 dwellings new homes**	**The 'structure plan' envisages the delivery of 1,312 dwellings new homes in addition to Appin (Part 2) Precinct Structure Plan**

PURPOSE OF THE REPORT

Urbis has been engaged by the Proponent to prepare a Sustainable Development Opportunities report to support the Appin (Part) Precinct Plan (the precinct plan) and Appin (Part) Precinct Structure Plan (the structure plan).

Refer to Figure 1 for key attributes of the precinct plan and structure plan area.

The Appin (Part 2) Precinct Plan zones land for conservation, urban development and infrastructure. It establishes the statutory planning framework permitting the delivery of a range of residential typologies, retail, education, business premises, recreation areas, and infrastructure services and provides development standards that development must fulfil. Within the proposed urban development zone, 1,312 dwellings and more than 30,000 sqm of gross lettable floor area for retail and commercial space can be delivered.

Figure 1 – Boundary of the Appin (Part 2) Precinct

LEGEND:

- Appin & North Appin Precinct Boundary
- Appin (Part) Precinct Plan
- Appin (Part 2) Precinct Boundary
- LGA Boundary

LAND OWNERSHIP

- Phillip Nelson Dunbier and Penny Grace Dunbier
- John Joseph McEvoy
- Glynis Rita Patrick

REF	LOT #	PLAN REF	ADDRESS	AREA (HA)
DUNBIER LAND				
1	32	DP736923	110 Macquariedale Road	61.85
2	1	DP1000355	90 Macquariedale Road	0.23
KINGS LAND				
3	3	DP804375	725 Wilton Road	36.61
4	1	DP 804375	525 Wilton Road	1.41

SUSTAINABILITY AND RESILIENCE

With increasing temperatures and likely increase in the frequency of extreme weather events attributed to climate change, there is an increasing risk of unwanted impacts including poor health and lifestyle outcomes and damage to properties and critical urban infrastructure.

Whilst Greater Sydney is experiencing a general trend in increasing average temperatures, the Western Parkland City is heating up twice as fast as the Eastern Harbour City and is experiencing six times the number of days over 35 degrees[1]. The NSW Planning system contains a growing framework of strategic directions, policy and exemplar planning controls to create greener places that will contribute to more sustainable and resilient urban areas. These measures and priorities will be especially relevant to Western Sydney and growth areas such as the Greater Macarthur Growth Area (**GMGA**), as these parts of the Greater Sydney Region are greatly susceptible to impacts of climate change.

Greenfield development provides the opportunity to apply new ideas and processes to prepare for the future. Greater Macarthur 2040 sets clear objectives for sustainable development over 30 years, with new communities integrated into the existing landscape to conserve biodiversity and create greener places.

The recent report delivered to the United Nations by the International Panel on Climate Change (**IPCC**) paints a dire picture of what will happen to the world if global temperatures rise above 1.5 degrees Celsius (2.7 degrees Fahrenheit), a threshold that scientists now believe could happen by 2040.

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member in 2015 provides a framework for action, built upon 17 Sustainable Development Goals (**SDGs**). The SDGs identify that making cities sustainable means meeting the environmental, social and economic needs of the present without compromising the ability of future generations to meet their own needs. It involves creating career and business opportunities, safe and affordable housing, building resilient societies and economies, and creating green and inclusive public spaces.

The design of the built environment significantly contributes to environmental impacts that contribute to climate change and how a community and place are resilient to shocks and stressors, including increasing temperatures and significant weather events. There are simple sustainability trends available to minimise the environmental impacts of existing and new development, including:

- **Net zero carbon –** refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere. To avoid climate emergency, new emissions of greenhouse gas emissions must be as low as possible to achieve a true zero carbon footprint.

[1] Heatwatch - Western Sydney (australiainstitute.org.au)

- **Natural resources and waste –** minimising the use of raw materials and water consumption are critical for increasing the sustainability of a development. The implementation of circular economy practices can provide significant reductions in the development carbon footprint by reusing and recycling materials and minimising waste to landfill.
- **Resilience –** integrating solutions into development outcomes that increase capacity to be adaptable and resilient to extreme events, urban heat and air quality. This includes increasing green infrastructure (tree canopy and cooling landscapes) and improved building design to manage heating and cooling.
- **Energy –** increasing building thermal efficiency to reduce energy consumption is a simple solution to minimising emissions. Improved building materials, insulation and more efficient appliances, along with renewable energy sources should be prioritised.
- **Positive legacy –** set a high standard for contribution to the community and flow-on effects of the portfolio, related to social inclusion, cultural identity and connection to the broader community.

AIMS OF THE REPORT

This Sustainable Development Opportunities Report has been prepared by Urbis on behalf of the proponent.

The objectives of this report are to:

- Identify the range of existing strategic and policy considerations for achieving sustainable and resilient outcomes.
- Present a range of opportunities for sustainable and resilient outcomes for consideration as part of the development of the precinct plan and future development control plan during the progression of the rezoning of the site.
- Set the foundation for further refinement and incorporation of sustainable and resilient development outcomes as the rezoning process progresses to further detailed design and preparation of a Development Control Plan.

The report concludes:

- The master plan is capable of incorporating a range of sustainable and resilient development options, including:
  - **Green infrastructure solutions** – including minimum 40% tree canopy cover across the precinct and cooling materials to mitigate urban heat island effect, and design a structure plan in a way to minimise and avoid impacts on existing biodiversity.
  - **Blue infrastructure solutions** – including incorporating water sensitive urban design, supported by smart infrastructure to enable improved monitoring and efficiency that will lead to benefits for the community and reduced long term operational costs.
  - **Grey infrastructure solutions** – including the master plan being designed in a way that supports dwellings that can maximise energy efficiency and the community can easily use active transport.
  - **Consistent with strategic policy outcomes** – the incorporation of recommended sustainable development opportunities will support the master plan achieving strategic objectives of the NSW Government in relation to sustainability, greener places, and resilient communities.

It is recommended that the opportunities identified in this report are included in the next phase of master planning and design, to support the creation of a sustainable and resilient new community.

The rezoning can be supported in its current form.

STRATEGIC CONTEXT

The following strategic context analysis identifies a range of sustainability and resilience outcomes within the NSW Planning Framework that are to be considered during preparation of a Planning Proposal. This analysis classifies the strategic directions and intended outcomes of the NSW Planning Framework into three streams of focus, being:

- **Green Infrastructure** - Describes the network of green spaces systems (Green Grid) that deliver multiple environmental, economic, and social values and benefits to urban communities. In particular, tree canopy and pervious land that are important for providing shade and reducing heat absorption during the day.
- **Blue Infrastructure** - Offers the opportunity to use Sydney's water systems as an interconnected network and water in the landscape is an effective way of reducing urban heat. Making multi-use of land adjacent to waterways for water treatment, stormwater management, protection of ecological communities, open space and recreation and active transport connections also provides way to create more sustainable and resilient communities.
- **Grey infrastructure** – Relates to the typical human created infrastructure most frequently considered in urban planning that are critical to our daily lives including buildings, roads and public transport, stormwater and sewer infrastructure, water, power and telecommunications infrastructure. There is greater urgency for grey infrastructure to become more resilient to episodic shocks and stressors from significant weather events.

The following sections will inform the recommended potential sustainable development opportunities under Green Infrastructure, Blue Infrastructure and Grey Infrastructure in **Section 4** of this report

STATE WIDE POLICY

Premier's Priorities

Premiers Priorities are the NSW Government's commitment to making policy changes and investment which will make significant difference to the quality of life for those living within NSW. Premiers Priorities 11 and 12 relate to creating quality local environments such as delivering green spaces and more tree canopy. These are discussed below.

Table 3 Premier's Priorities

Priority	Outcomes	Focus
Premier's Priority 11 – Greener Public Spaces		
Increase the proportion of homes in urban areas within 10min walk of quality green, open and public space by 10% by 2023	The target value for the number of homes in urban areas within 10min walk of new or improved quality green, open and public spaces is 230,000 by June 2023.	**Green Infrastructure**
Premier's Priority 11 – Greening Our City		
Increase the tree canopy and green cover across Greater Sydney by planting 1 million trees by 2022	Target value for trees planted and registered with the DPE is 1,000,000 by 2023.	**Green Infrastructure**

Draft Greener Places Design Guide

The Draft Greener Places Design Guide is a framework that provides information on how to implement and increase green infrastructure in the urban areas on NSW. The framework is for government of all levels and industry to generate a network of green infrastructure.

Table 4 Greener Places Design Guide

Themes	Strategies	Outcomes	Classification
2. Urban tree canopy: green infrastructure for climate adaptation and resilience	1. Protect, maintain and enhance the existing urban tree canopy 2. Create an interconnected urban tree canopy across NSW	Economic benefits: The existing urban tree canopy in 10 global cities was found to provide on average US$482 million per year in savings through improved air quality, avoided stormwater processing by wastewater facilities, heating and cooling savings, and carbon dioxide sequestration. Improved health and wellbeing: Increasing tree canopy lowers ambient temperature and help increase outdoor amenity. It also lowers air pollution. Urban trees and the heat island effect: Increasing tree canopy reduces the urban heat island effect, lowering ambient temperatures and increasing carbon sequestration.	Green Infrastructure

Resilience Outcomes for the Planning System

In December 2021, the NSW Government released the *Resilience Outcomes for the Planning System* framework (**NSW Resilience Report**). The NSW Resilience Report acknowledges the need to promote resilience outcomes in the land use planning system. In 2017, the simulated economic cost of natural disasters in NSW was calculated to be $3.6bn for that year (Deloitte Access Economics 2017). The economic and social risks of natural disasters is predicted to increase, particularly due to climate change, the increasing quantity and severity of significant weather events, and the continuing vulnerability of our settlements to these significant weather events. The resilience outcomes identified below will be used to inform recommended potential sustainable development opportunities in Section 4 of this report

Table 5 Resilience Outcomes for the Planning System

Objectives	Outcomes	Alignment with UN SDG's	Focus
The NSW Government seeks to build this resilience through a number of avenues in the planning system. The Resilience Outcomes for the Planning System	Resilience is a foundational characteristic of sustainable places and communities Risk is identified and addressed for sustainable and adaptable places and communities Governance and accountable decisions are improved for the	These outcomes are aligned with a number of UN SDG's including: 8: Decent work and economic growth 9: Industry, innovation, and infrastructure 10: Reduced inequalities	**Grey Infrastructure**

Objectives	Outcomes	Alignment with UN SDG's	Focus
has been created to promote resilience in the land use planning system.	long-term benefits for the community and the place Resilience is embedded into the regulatory framework Settlement planning is informed by resilient social, cultural, economic, environment and built outcomes Resilience is advanced through locally led and place-based approaches for shared responsibility Recovery, adaption and transition pathways are business as usual	11: Sustainable cities and communities 13: Climate action 15: Life on land	

Greater Sydney Region Plan: A Metropolis of Three Cities

The Greater Sydney Region Plan is an overarching vision for the Greater Sydney area. It is built around delivering a places where most residents live within 30min of work, education, health services and great places. Part of this vision is emphasis on sustainability and resilience through collaboration of all levels of government and key stakeholders such as communities and interest groups. The relevant sustainability and resilience objectives are outlined below and will be used to inform recommended potential sustainable development opportunities in Section 4 of this report.

Table 6 Relevant Directions and Objectives from the Greater Sydney Region Plan: A Metropolis of Three Cities

Direction	Objectives	Strategies/Actions	Focus
A City in its Landscape	**Objective 25:** The coast and waterways are protected and healthier	**25.1:** Protect environmentally sensitive areas of waterways and the coastal environment area **25.2:** Enhance sustainability and liveability by improving and managing access to waterways, foreshores and the coast for recreation, tourism, cultural events and water-based transport. **25.3:** Improve the health of catchments and waterways through a risk-based approach to managing the cumulative impacts of development including coordinated monitoring of outcomes. **25.4:** Reinstate more natural conditions in highly modified urban waterways.	**Blue Infrastructure**
	Objective 26: A cool and green	**26.1:** Implement the South Creek Corridor Project and use the design principles for South	**Green Infrastructure**

Direction	Objectives	Strategies/Actions	Focus
	Parkland city in the South Creek Corridor	Creek to deliver a cool and green Western Parkland City.	
	Objective 27: Biodiversity is protected, urban bushland and remnant vegetation is enhanced	**27.1:** Protect and enhance biodiversity by: Supporting landscape-scale biodiversity conservation and the restoration of bushland corridors Managing urban bushland and remnant vegetation as green infrastructure Managing urban development and urban bushland to reduce edge-effect impacts.	**Green Infrastructure**
	Objective 30: Urban tree canopy is increased	**30.1:** Expand urban tree canopy in the public realm.	**Green Infrastructure**
	Objective 31: Public open space is accessible, protected and enhanced	**31.1:** Maximise the use of open space and protect, enhance, and expand public open space	**Green Infrastructure**
	Objective 32: The Green Grid links parks, open spaces, bushland and walking and cycling paths	**32.1:** Progressively refine the detailed design and delivery of: Greater Sydney Green Grid priority corridors Opportunities for connections that form the long-term vision of the network Walking and cycling links for transport as well as leisure and recreational trips.	**Green Infrastructure**
An efficient city	**Objective 33:** A low carbon city contributes to net zero emissions by 2050 and mitigates climate change **Objective 34:** Energy and water flows are captured, used and re-used **Objective 35:** More waste is re-used and recycled to support the	**33.1:** Support initiatives that contribute to the aspirational objective of achieving net-zero emissions by 2050 especially through the establishment of low-carbon precincts in Planned Precincts, Growth Areas and Collaboration Areas. **34.1:** Support precinct-based initiatives to increase renewable energy generation and energy and water efficiency especially in Planned Precincts and Growth Areas, Collaboration Areas and State Significant Precincts. **35.1:** Protect existing, and identify new, location for waste recycling and management.	**Grey infrastructure**

Direction	Objectives	Strategies/Actions	Focus
	development of a circular economy	**35.2:** Support innovative solutions to reduce the volume of waste and reduce waste transport requirements.	
A resilient city	**Objective 36:** People and places adapt to climate change and future shocks and stresses **Objective 37:** Exposure to natural and urban hazards is reduced **Objective 38:** Heatwaves and extreme heat are managed.	**36.1:** Support initiatives that respond to the impacts of climate change. **37.1:** Avoid locating new urban development in areas exposed to natural and urban hazards and consider options to limit the intensification of development in existing urban areas most exposed to hazards. **37.2:** Respond to the direction for managing flood risk in the Hawkesbury-Nepean Valley as set out in Resilient Valley, Resilient Communities – Hawkesbury-Nepean Valley Flood Risk Management Strategy.	**Grey infrastructure**

Greater Macarthur 2040

The Greater Macarthur 2040 plan is a more regional plan for the Greater Macarthur Growth area that breaks down the themes of the Greater Sydney Region Plan. If focusses on land use and infrastructure implementation as the area develops and changes. Its focal point is liveability, productivity and sustainability all of which are interlinked. Relevant directions to sustainability and resilience are outlined below and will be used to inform recommended potential sustainable development opportunities in Section 4 of this report.

Table 7 Relevant Strategic Context from Greater Macarthur 2040

Vision/ Directions	Outcomes	Planning principles	Focus
Landscape			
Sustainable Design	Achieving net zero by 2050 is an aspirational target for NSW. This target also includes building resilience to climate change. Planning can manage some risks from natural hazards and the GMGA will consider	Consider opportunities for green cover, creating open spaces, and permeable and reflective surfaces and heat island effects to avoid increasing urban surface temperatures and effects, especially where there are vulnerable communities.	**Green Infrastructure**
		Incorporate green walls and roofs to complement local green canopy.	**Green Infrastructure**
		External colours and materials should be natural, muted tones of green, brown, blue, and grey. White, light-coloured, red,	**Grey Infrastructure**

Vision/ Directions	Outcomes	Planning principles	Focus
	opportunities for open space, green cover, and the minimisation of developments ecological footprint.	green, yellow, or orange roofs and walls should be discouraged	
		Design and locate new roads, bridges, water supply and wastewater systems to be resilient to the future impacts of climate change	**Grey Infrastructure**
		Increase tree canopy cover in line with the 5 Million Trees for Greater Sydney and Greener Places Programs.	**Green Infrastructure**
		Design new development to aim for zero emissions, including electric vehicle charging infrastructure and the potential for renewable energy power supply	**Grey Infrastructure**
		Protect ecological footprints by incorporating ecological design principles during detailed planning and meeting BASIX requirements	**Grey Infrastructure**
		Incorporate ecologically sustainable development principles	**Grey Infrastructure**
Waterway health	Waterways and riparian vegetation areas have incredibly important biodiversity and ecological values. To ensure that these high value areas are protected into the future, a more coordinated and integrated study into land use and water infrastructure planning will be undertaken at the precinct planning stage for the land release precincts.	Incorporate development that protects, maintains or restores waterway health along with the community's environmental values and uses of waterways through a risk-based approach to manage the cumulative impacts of developments. Ensure an integrated approach to drinking water, wastewater, and stormwater services is considered to drive more sustainable water management outcomes. Incorporate development that fosters the relationship between water, landscapes and urban living, to enhance human and social wellbeing, and promote community co-design and governance in urban water strategies.	**Blue Infrastructure**
Waste	Incorporating waste and resource recovery programs	Provide for sustainable design and waste management	**Grey Infrastructure**

Vision/ Directions	Outcomes	Planning principles	Focus
	decrease carbon emissions and help provide a circular economy.	Integrate technology that contributes to and promotes achievement of the NSW Government's target of net-zero carbon emissions by 2050 Introduce opportunities for sustainable and efficient use of resources to minimise waste, water and energy from development.	
Built Form			
Engaging and well-designed places	Better design, guided by green and sustainable planning controls that are complemented by innovative approaches by the private sector, will create places where people want to live and work.	A focus on environmental sustainability and responsiveness to meet the needs of local residents and workers.	**Grey Infrastructure**

WOLLONDILLY STRATEGIC POLICY

Wollondilly 2040 Local Strategic Planning Statement

Wollondilly 2040 outlines the intended planning outcomes over the next 20 years in the Wollondilly LGA. A number of the planning priorities relate to sustainability and resilience which are outlined below and will be used to inform recommended potential sustainable development opportunities in Section 4 of this report.

Table 8 Relevant Strategic Context from Wollondilly 2040 LSPS

Planning Priority	Outcomes	Actions	Focus
Planning priority 2: Embracing innovation to enhance connected and sustainable communities	Introducing smart technologies and innovation will benefit sustainability and liveability within communities	**2.1:** Review the Wollondilly Smart Shire Strategy **2.2:** Develop a policy around technology requirements for new development **2.4:** Incorporate smart technology engineering specifications, developed through the Western Sydney Planning Partnership, into our design specifications and Wollondilly Development Control Plan 2016 (DCP)	**Grey Infrastructure**

Planning Priority	Outcomes	Actions	Focus
Planning priority 12: Valuing the ecological health of Wollondilly's waterways	Wollondilly has a high number of waterways, many of which are within drinking water catchments. Protecting and enhancing these waterways drives sustainable development while creating amenity for the communities surrounding the waterways.	**12.1:** Prepare and adopt an integrated water management policy and strategy including the development of water sensitive urban design guidelines. **12.2:** Review the LEP and DCP to strengthen protection of waterways and riparian areas and to implement the integrated water management policy and strategy. **12.3:** Analyse and review water quality and modelling data to identify risks and improvement opportunities and to develop priority mapping **12.5:** Continue to undertake compliance action regarding inappropriate onsite wastewater systems and erosion and sediment controls. **12.6:** Develop the Sensor Network for water quality. **12.7:** Require developments of a certain scale to provide baseline data for water quality ahead of and during development.	**Blue Infrastructure**
Planning priority 13: Protecting biodiversity and Koala habitat corridors	Wollondilly is home to a number of different threatened ecological communities. Protecting and enhancing these communities is important to protecting biodiversity and threatened species.	**13.1:** Update the Biodiversity Strategy to provide an overall framework for the protection and management of biodiversity **13.4:** Investigate opportunities to protect high priority biodiversity areas including koala habitat corridors **13.5:** Investigate mechanisms to help retain native vegetation **13.6:** Develop a strategy for the management of roadside bushland and weeds including identification of necessary funding for implementation	**Green Infrastructure**
Planning priority 14: Planning high quality well connected open spaces	Creating green infrastructure is important for building sustainable communities. Green grid connection provides recreation links for both the	**14.1:** Develop an open space hierarchy with identified service levels, to be applied to new and existing open spaces and sports facilities **14.2:** Develop open space master plans in consultation with communities and in accordance with the adopted priority list	**Green Infrastructure**

Planning Priority	Outcomes	Actions	Focus
	local community whilst also improve water management and biodiversity. Continuing to build upon Wollondilly's open space provisions to better suit the community's needs will improve access across the Shire and connections between towns and villages.	**14.3:** Implement the Wollondilly Open Space, Recreation & Community Facilities Strategy **14.4:** Develop a Greener Place Plan to inform strategic planning for open space and recreational areas **14.5:** Develop a Green Grid Strategy to recognise opportunities for connections	
Planning priority 15: Delivering an urban tree canopy	Wollondilly's growth areas are generally cleared open fields with limited canopy cover. Increasing canopy cover in urban centres and planning for tree canopy in new growth areas is greatly important for sustainability and liveability. Increased canopy cover will lower the urban heat island effect, improves air quality, absorbs carbon and rainfall etc.	**15.1:** Prepare an urban tree canopy strategy **15.2:** Review and revise relevant provisions in the DCP to incorporate restoration of trees, support canopy cover targets and to improved canopy cover across roads and footpaths **15.3**: Develop a significant tree register that recognises heritage, environmental, cultural, aesthetic and tree canopy value	**Green Infrastructure**
Planning priority 17: Planning resource recovery options to serve local and district needs	As the population grows in the Wollondilly area, further pressure will be put on the waste disposal processing facilities.	**17.1:** Review the LEP to: Investigate amendments to escalate the importance of waste and recycling Identify barriers to waste infrastructure development Ensure flexibility to accommodate material recovery facilities, food and garden organics processing facilities and waste transfer stations in appropriate locations	**Grey Infrastructure**

Planning Priority	Outcomes	Actions	Focus
Planning priority 18: Living with climate impacts and contributing to the broader resilience of greater Sydney	Environmental hazards can have a negative effect on the population, the natural environment, the viability of agriculture and industry. As the Wollondilly has a significant bush fire hazard interface, and flood risks in certain areas. It is important that resilience is central to planning. This means taking hazards into account when choosing appropriate locations for development and implementing technologies which will reduce environmental impacts and increase resilience.	**18.1:** Establish a framework to reduce emissions in Council operations, increase resilience and adapt to the impacts of climate in Wollondilly **18.2:** Review and update the DCP to ensure greater certainty of sustainable outcomes for new development **18.9:** Review the LEP for opportunities to better manage natural and manmade hazards **18.11:** Work with the Department of Planning, Industry and Environment on delivering sustainable precincts in growth areas. 1**8.12:** Prepare a study in partnership with emergency service agencies to evaluate the threats and risk level from both natural and manmade hazards and establish appropriate management.	**Grey Infrastructure**

POTENTIAL SUSTAINABLE DEVELOPMENT OPPORTUNITIES

Setting appropriate vision and design metrics is important for influencing sustainable and resilient built environment outcomes. But NSW is in the early stages of developing its understanding on how to effectively and feasibly achieve this. Creating sustainable new communities requires the careful selection and incorporation of sustainable development solutions through the various design and development phases of a project.

The strategic context analysis prepared in Section 3 of this report identified strategic directions under three focus streams, being:

- Green Infrastructure
- Blue Infrastructure
- Grey Infrastructure

The relevant strategic directions and intended outcomes under the above three streams have been used to inform the identification of potential sustainable development options structured under the same three streams as addressed in the following sections of this report. The potential sustainable development options have been prepared for consideration of implementation into the masterplan design during the progression of a Planning Proposal to rezone the site, and will inform preparation of appropriate sustainable development controls to guide development outcomes in the future.

A series of options to be explored and incorporated into future development guidelines for Appin Vale are recommended to have regard to the *WSROC Urban Heat Planning Toolkit* and the *Cool Suburbs tool.*

The Cool Suburbs Tool (**CST**) is a voluntary, industry-based performance (ratings) tool prepared by WSROC in 2022 for place-based heat resilience. The CST has been designed for use by both developers and government, with the goal of supporting improved heat-mitigation outcomes.

The CST is intended to inform and guide planning and development decisions by providing a synthesis of urban heat science in an easy-to-use platform.

The CST's objectives include:

- Setting out a broad range of measures (represented by credits in the CST) that guide improved place-based urban heat resilience.
- Identifying specific measures that should be considered at different stages of the development process; supporting the Tool's use in early stages of planning and design.
- Scoring (via a rating system) the urban heat resilience of a range of developments from precinct to lot scale.
- Providing guidance for the assessment of urban heat resilience in existing, transforming, and new suburbs.

GREEN INFRASTRUCTURE – POTENTIAL OPPORTUNITIES

Green Cover 	**Greater green cover such as tree canopy and vegetation has shown to have a major impact on urban heat by increasing evapotranspiration and shading adjacent surfaces.**	Target 40 per cent tree canopy cover across the project area. Where trees are not feasible, other vegetation can also play a cooling role. Increase the density of trees planted in the future public domain. Provide regular pockets of nature with seats for resting and shade from trees to improve the streetscape, comfort, amenity and increase biodiversity. Lot areas and dimensions sized to enable the retention and establishment of trees.
Pervious and cooling surfaces 	**Non-permeable and human made surfaces have been identified as major heat sources in urban areas. Increasing areas of pervious surfaces will reduce urban heat effect and increase groundwater absorption.**	Increasing the areas of pervious land within the masterplan increases the opportunity for tree planting and reduces surface run-off, in turn increasing groundwater absorption. Grass is prioritised over paving in areas of open space that are not under tree canopy. Where hardstanding areas are required, utilise alternative materials where possible that can reduce surface run-off and have more cooling surfaces.
Retention of existing trees 	**Planted trees can take decades to mature to provide its long-term benefits. Retaining existing mature and significant trees contributes to the character, value and environmental outcomes of a new community.**	Retain existing mature and significant trees where possible to provide shade and biodiversity early in the delivery of the new community. Ensure consistency with any native vegetation precinct plan and promote the delivery of any vegetation offsets locally to the subdivision. Promote early planting of medium and large size trees to compensate for loss of existing significant trees.
Protect biodiversity and wildlife corridors 	**Biodiversity is vital in supporting human life on Earth. It supplies clean air and water, and fertile soils. It cannot be done just by setting aside land in national parks and reserves and must be integrated into our urban areas.**	Avoid or minimise impacts to biodiversity, particularly with regards to endangered, vulnerable and threatened species, habitats and communities and implement tree protection measures during construction. Connect ecosystems by providing opportunities for cross-corridor wildlife movement across new or existing habitat corridors. Where trees require removal, felled timber is used to create hollows elsewhere within the site to replace and create new fauna habitat.

BLUE INFRASTRUCTURE – POTENTIAL OPPORTUNITIES

Water Sensitive Urban Design 	**Urban heat mitigation starts with retaining water in the landscape.**	Integrate water sensitive urban design solutions and techniques including vegetated swales, permeable surface areas, enhancement of riparian areas, drainage reserves adjacent to wetlands and passive irrigation design. Water is stored near amenity to provide cooling effects of surrounding areas. Best Practice Environmental Management Guidelines for Urban Stormwater are met. Localised flooding is controlled and increasingly intense rainfall events are planned for, as projected by climate change models.
Integration of waterways 	**Existing natural waterways and waterbodies are unique features that should inform and be part of a master plan.**	Natural features including waterways are integrated into development to promote wellbeing, climate resilience, and benefit from its cooling effects. Existing creeks, drainage channels, ponds and wetlands are incorporated into the masterplan and inform the location and scale of open space.
Smart water infrastructure 	**Utilising smart technology can improve operational outcomes and provide data on future decision making that can save time, money and resources over the lifecycle of the built form.**	Smart technology is integrated into blue infrastructure (along with grey infrastructure) to enable monitoring of the environment, increase operational efficiency and enable early warnings of infrastructure issues that may result from significant weather events or other shocks and stressors.

GREY INFRASTRUCTURE – POTENTIAL OPPORTUNITIES

Lot layout 	**The master plan should be designed to maximise efficiency through orientation, lot size and depth to enable passive ventilation and appropriate solar access**	Lots are oriented to enable solar access for passive heating, lighting and renewable energy generation through solar panels. Site controls promote reduced site coverage (smaller homes).
Active transport 	**Transport contributes to a significant amount of carbon emissions and pollution in urban areas. Active transport allows for healthier lifestyles and reduced impacts on the environment.**	Neighbourhoods should be compact, permeable and logical to minimise travel times and maximise accessibility. Neighbourhoods should be of a walkable scale to ensure access to amenities such as activity centres, schools and community facilities, public open space and public transport. Include active transport networks which are integrated with existing transport networks, by providing footpaths, public and green spaces and cycle paths. Provide shelter for pedestrian and cyclist movement (tree canopy, shade structures).
Roof colour and surfaces 	**The concentration of many houses with dark roof colours not only contributes to increased urban heat but they can also increase the temperature inside the individual houses.**	Use of materials that are light in colour and have a high solar reflective index (SRI) to lower heat absorption. External colours and materials should be natural, muted tones of green, brown, blue, and grey. White, light-coloured, red, green, yellow, or orange roofs and walls should be discouraged.
Efficient built form 	**Reducing our reliance on fossils fuels is imperative if we want to reduce the effects of climate change. Building more energy efficient buildings and changing energy consumption habits is also imperative for mitigating the effects of urban heat on the population.**	Transition away from gas connections to promote electrification for cooking and heating. Streetlights and other public infrastructure requiring energy supply are of the highest efficiency standard available and integrate smart technology where appropriate. Minimise future maintenance and upgrade requirements through durable and easily recycled materials choices. Incorporate maximum efficiency appliances. Encourage rooftop solar panels and residential battery storage Encourage provision of electric vehicle charging infrastructure in buildings.

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