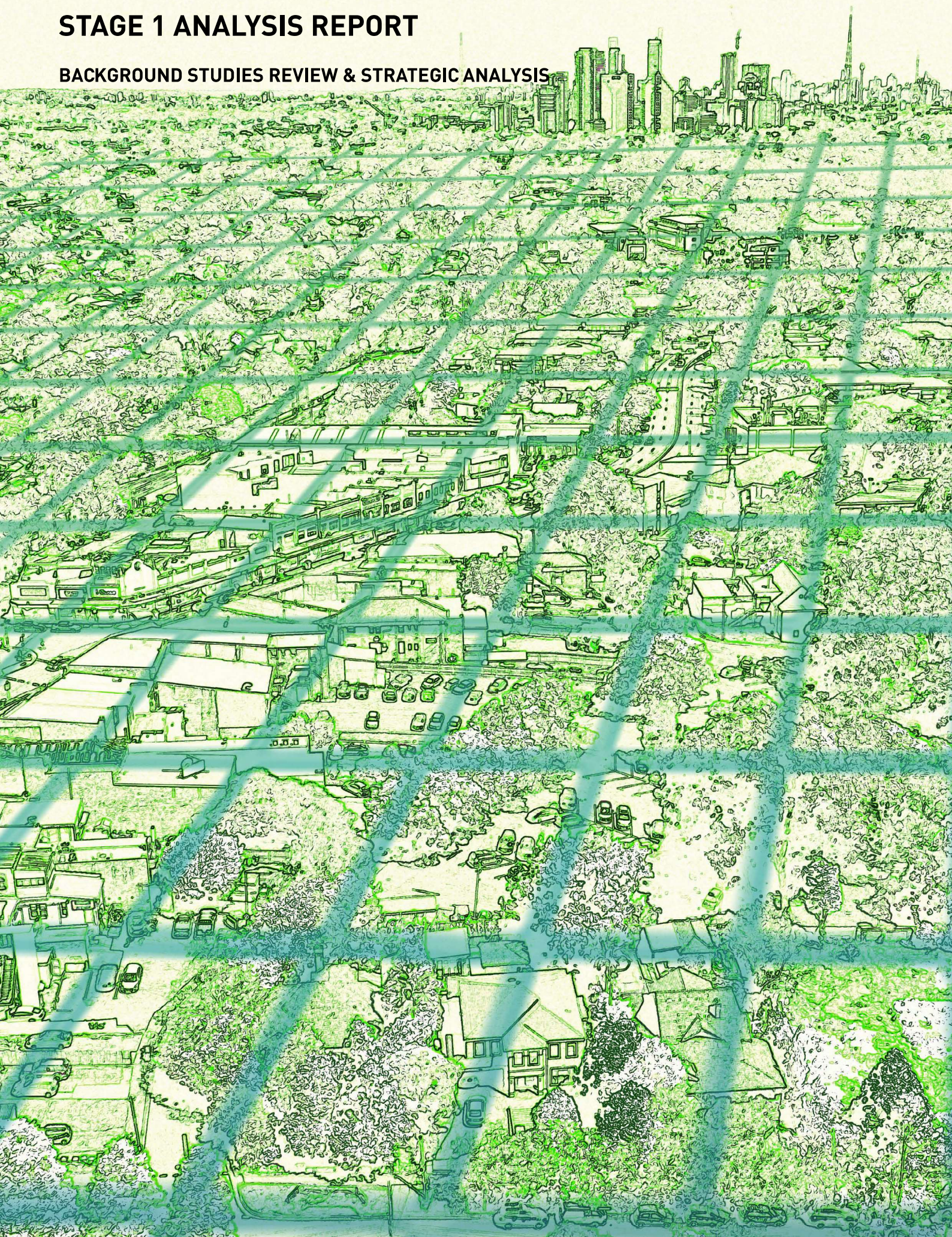


KU-RING-GAI GREEN GRID STRATEGY

STAGE 1 ANALYSIS REPORT

BACKGROUND STUDIES REVIEW & STRATEGIC ANALYSIS



Revisions

STAGE 1 Draft report - for internal review	A	22.12.2021
STAGE 1 Report	B	23.06.2022

Acknowledgement of Country

Council acknowledges the Durrumurragal people as the Traditional Owners of the land of which the Ku-ring-gai local government area is a part, and pays its respects to their Elders, past and present.

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INTRODUCTION

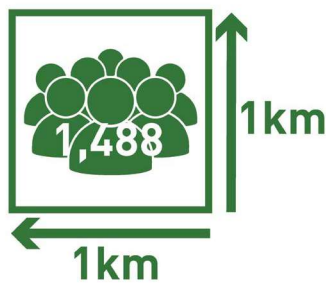
KEY FACTS ABOUT KU-RING-GAI



LGA size km²



population @ 2020



density/km²



Size - land area of approximately 85km²

Population - 2020 = 127,603

Density = 1,488.7 people per sq km

Estimated Average Population Growth of 1% per year (past 20 years)

The Ku-ring-gai Local Government Area (LGA) is situated on Sydney's North Shore, approximately 16km from the city, nestled amongst national parks characterising its leafy aesthetic. The three national parks include Garigal National Park, Lane Cove National Park, and Ku-ring-gai Chase National Park. An extensive array of natural areas and bushland reserves supplement these throughout it's suburbs. It's suburbs extend from Wahroonga in the north, Roseville in the south, St Ives in the east and West Pymble in the west.

Natural vegetation, biodiversity, lush landscapes, and unique fauna and flora are all key attractors and assets for those living in and visiting Ku-ring-gai. Highlights include:

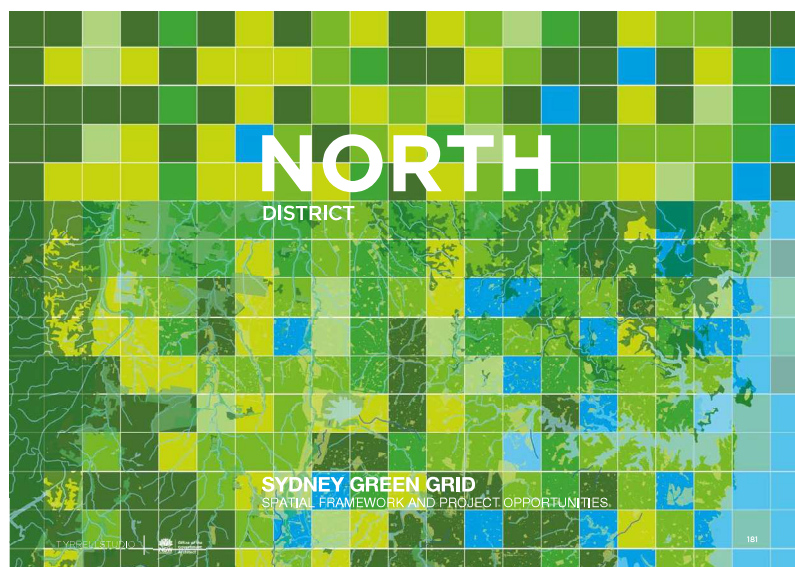
- Nationally significant ecological communities including remnant Blue Gum High Forest and Sydney Turpentine Ironbark Forest
- Over 800 recorded native plant species and more than 400 species of native animals; and
- A 99 hectare bio-banking site comprising three reserves at Rofe Park, Sheldon Forest and Comenarra Creek Reserve.

Ku-ring-gai's reputation as belonging to the 'leafy north shore' is underpinned by its proliferation of mature trees. The percentage of canopy cover across the LGA of trees above 3 metres in height is 51.5%.

ANALYSIS OF CURRENT GREEN GRID STATUS WITHIN KU-RING-GAI

The *Greater Sydney Green Grid (2017)* is a long-term vision for a network of high quality green spaces that connects communities to the natural landscape across metropolitan Sydney. It links existing tree-lined streets, waterways, bushland corridors, parks and open spaces to town centres, public transport and public spaces. The *Greater Sydney Green Grid* builds on established open spaces, the Regional Tracks and Trails Framework and the Principal Bicycle Network produced by the Government Architect New South Wales (GANSW).

“The Sydney Green Grid is a network that seeks to combine hydrological, ecological and urban resilience through a network of green infrastructure.”



Local Authorities across metropolitan Sydney are required to prepare their own Green Grid Strategy, which will implement this overarching vision incrementally over decades, as opportunities arise and detailed plans for connections are refined. The premise of Ku-ring-gai's Green Grid Strategy is to deliver Green Grid infrastructure utilising various mechanisms such as capital works funding, grants, and development contributions.

The North District component of the Greater Sydney Green Grid outlines clear opportunities for Green Grid connections within the Ku-ring-gai LGA. As part of Ku-ring-gai's Local Strategic Planning Statement (LSPS), Council has further developed these opportunities as shown in Figure 1 – Green Grid, and Figure 2 – Walking Green Grid. Council's mapping of Biodiversity (ecological) Corridors as shown in Figure 3 – Ecological Grid, Figure 4 – Hydrological Grid, and Figure 5 – Active Transport compliment these.

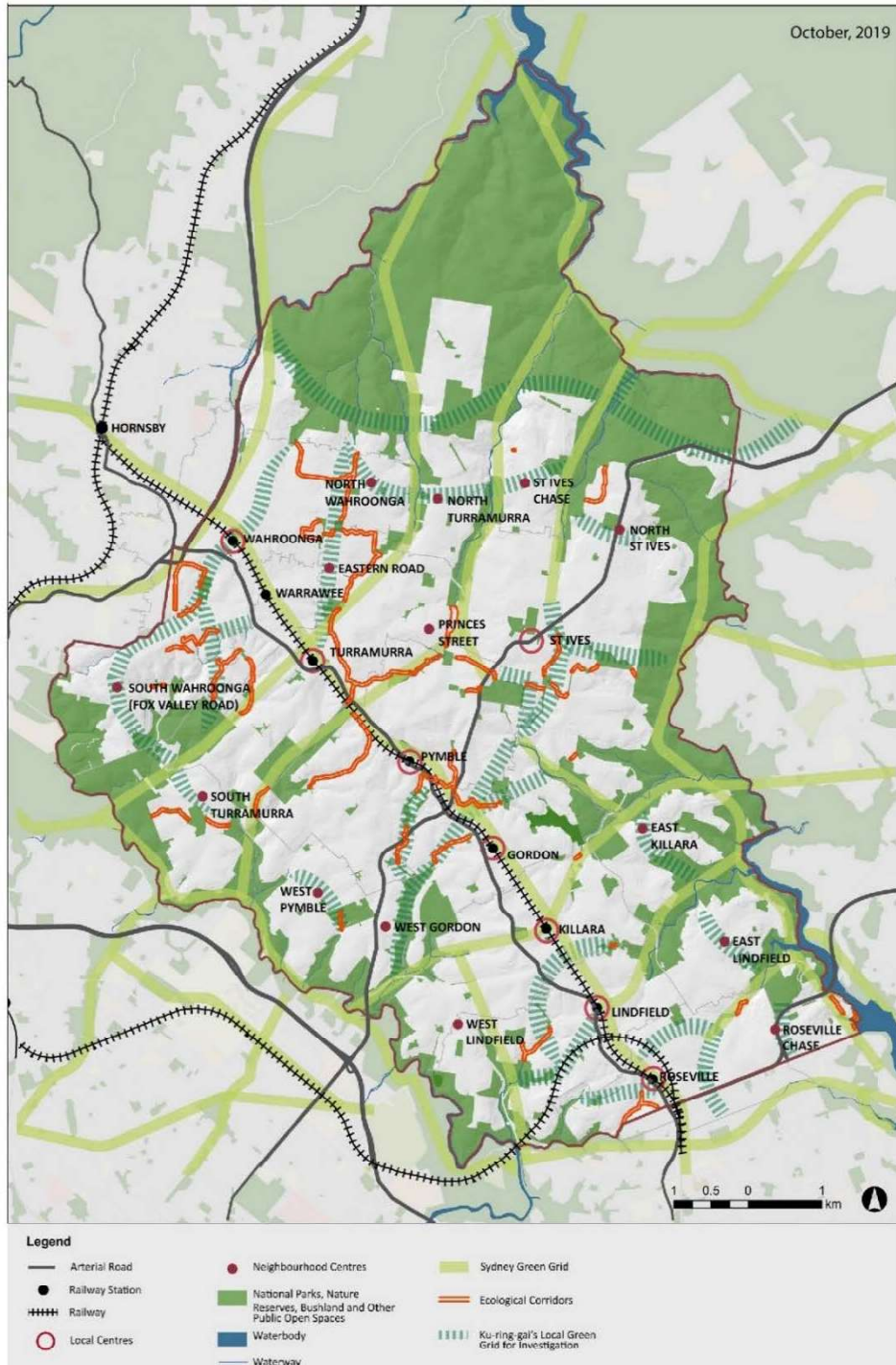


Figure 1 LSPS Green Grid Map

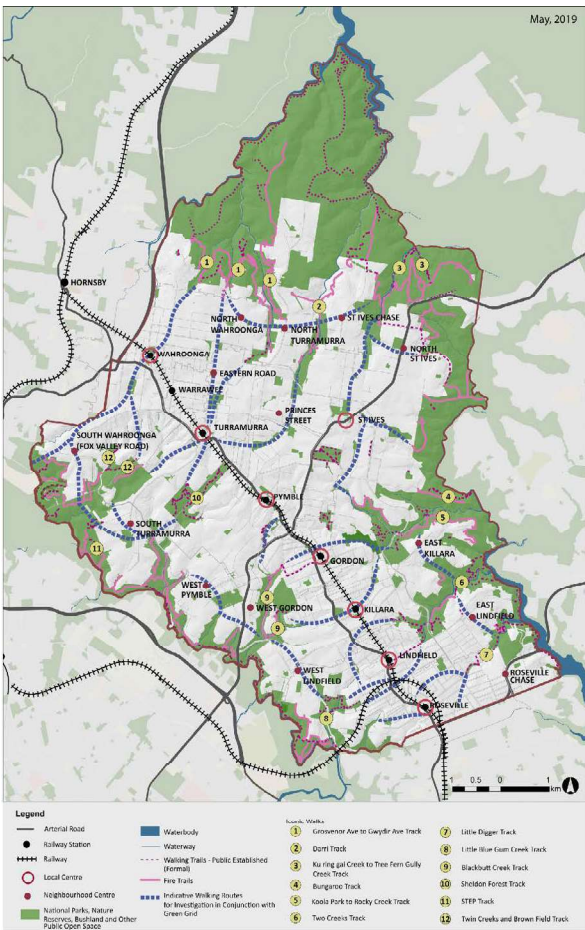


Figure 2 LSPS Walking Green Grid Map

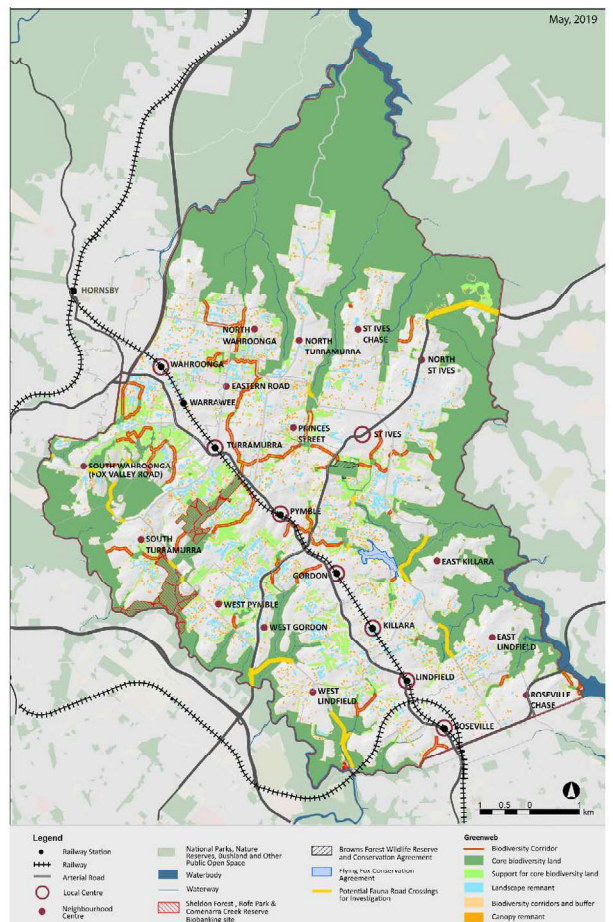


Figure 3 LSPS Ecological Grid Map

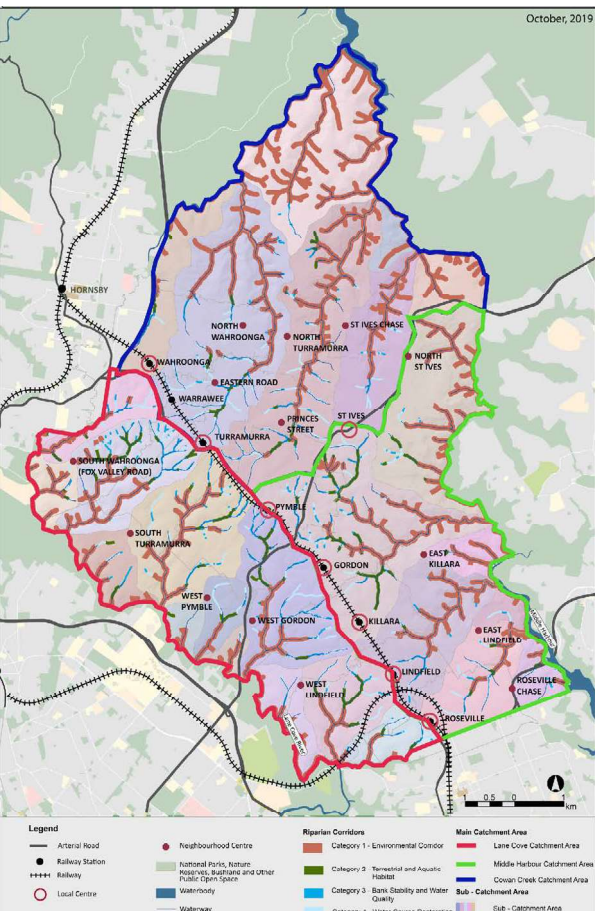


Figure 4 LSPS Hydrological Grid Map

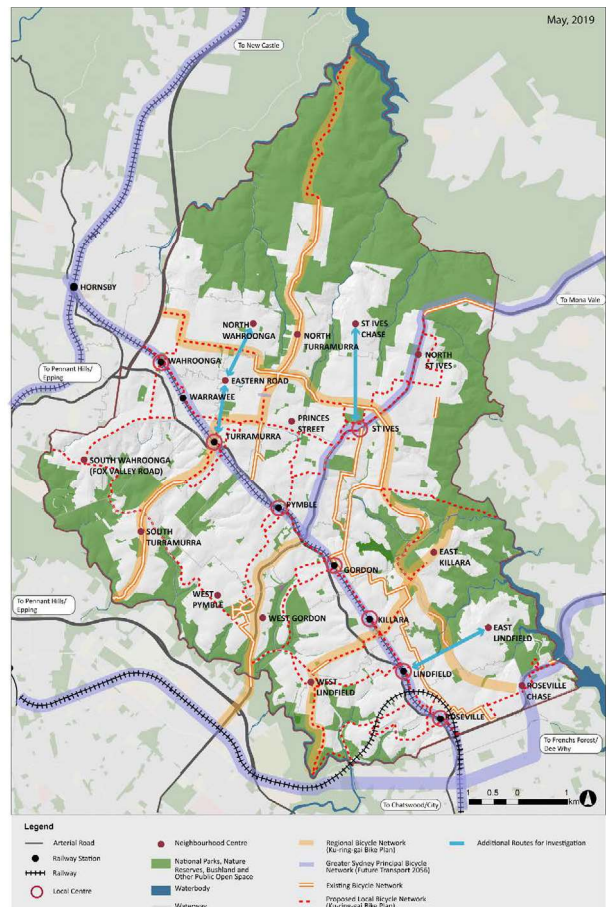


Figure 5 LSPS Active Transport Map

The purpose of this study is to prepare a Ku-ring-gai specific local Green Grid Strategy as outlined in the LSPS. This will involve:

- Reviewing and assessing the practicality and feasibility of the Sydney Green Grid Projects identified for the Ku-ring-gai LGA
- Reviewing and assessing the practicality and feasibility Ku-ring-gai walking trails as identified within the *Ku-ring-gai Destination Management Plan 2017 -2020*
- Reporting on how the Green Grid may support potential biodiversity connections and corridors *Ku-ring-gai Biodiversity and Riparian Lands Study Version 5*
- Articulating a vision, goals and actions for the strategy
- Recommending a preferred network for the Green Grid; and
- Defining a staging and implementation plan.

The study will investigate the assessment, prioritisation and implementation of the Greater Sydney Green Grid and Ku-ring-gai Local Green Grid connections as part of the Green Grid Strategy preparation. The overall strategy will incorporate four stages;

- Stage One (*this report*) - Background Studies Review
- Stage Two - Mapping Analysis
- Stage Three - Draft Guidelines, Principles and Actions
- Stage Four - Final Report

The first three stages will form the background report document, whilst stage four will result in the production of the final strategy document to be publicly exhibited and adopted by Council. This stage one report explores the background of Ku-ring-gai's Green Grid, examining existing reports, strategic context, policies and guidelines that will help to inform the next stage, which will include analysis and mapping.

Stage One - Background Studies Review (*this report*)

- Introduction
- Analysis of current Green Grid status in LGA
- Strategic Policy Objectives
- Background studies
- Analysis of Existing Development and Land Use Planning
- Council Policies & Strategies
- Neighbouring Councils - Ryde, Hornsby, Willoughby, Northern Beaches
- Case Studies
- Objectives and Guidelines

Stage Two - Mapping Analysis

- Analysis Mapping - creation of maps to overlay opportunities and constraints to identify routes
- Review and assess the practicality and feasibility of the Sydney Green Grid Projects identified for the Ku-ring-gai LGA
- Review and assess the practicality and feasibility Ku-ring-gai walking trails as identified within the *Ku-ring-gai Destination Management Plan 2017 -2020*
- Investigate how the Green Grid may support potential biodiversity connections and corridors *Ku-ring-gai Biodiversity and Riparian Lands Study Version 5*
- Review mapping layers from Council Geographical Information Systems (GIS) and previous studies – (including, but not limited to) subdivision patterns, open space provision, contours, slope, vegetation, biodiversity, hydrology etc.
- Review available aerial tree canopy coverage mapping data, including heat mapping

- Undertake site visits throughout the LGA – to commence ‘ground truthing’ to better understand the topography and character of potential routes
- Review of nominated Green Grid opportunities as articulated in established Greater Sydney Green Grid Projects and Ku-ring-gai walking trails
- Review Walking Green Grid opportunities
- Review of Ecological, Biodiversity and Hydrological corridors; and
- Establish which Green Grid corridors are suitable for active transport

Stage Three - Draft Guidelines, Principles and Actions

- Articulate a vision, goals and actions for the Strategy;
- Recommend a preferred network for the Green Grid
- Mapping that articulates an overall Green Grid network throughout the Ku-ring-gai LGA, underpinned by:
 - A walking network (active transport)
 - A biodiversity network; and
 - A hydrological network.

Stage Four - Final Report

- The strategy will clearly articulate:
 - Benefits of the Green Grid
 - Vision and principles/objectives
 - Network Map
 - Project priorities
 - Staging plan
 - Funding mechanisms
- Implementation and staging plan, articulating priority projects associated with local and neighbourhood centres, timeframes and funding strategies.
- Identification of 3 priority routes underpinned by crossovers between recreation and biodiversity networks, including indicative cost estimates for these routes
- Concept scenario for a stage 1 project with indicative cost estimate.

The Green Grid Strategy will consider bikeways, pedestrian facilities, walking tracks, fire trails and footpath network improvements having regard for the access, transport, health and recreational needs of the community.

Specifically, it will identify walking and cycling routes, connecting Local Centres and Neighbourhood Centres with nearby parks and natural areas, walking track connections from the St Ives Showground Precinct with existing national park walking trails, and improve biodiversity connections and green infrastructure. Interface and liaison with neighbouring Councils and relevant agencies as applicable to facilitate the development of the Green Grid Strategy will be instigated as part of this process.

Importantly, the Ku-ring-gai Green Grid Strategy is being developed concurrently with the *Ku-ring-gai Urban Forest Strategy*. The *Urban Forest Strategy* is examining the opportunities for expansion of Ku-ring-gai’s urban canopy cover, and the projects implemented as part of the Green Grid will help to facilitate this.

STRATEGIC POLICY OBJECTIVES & SUPPORTING GUIDELINES

STRATEGIC PLANNING AND POLICY FRAMEWORK

State, regional and local planning directions support the preparation of the Green Grid. Key planning priorities, objectives, and documents are outlined below.

Council recognises that the Green Grid network will be a continuous resource independent of ownership boundaries and seeks to collaborate with other agencies and councils to improve open space and bushland management and strengthen partnerships.

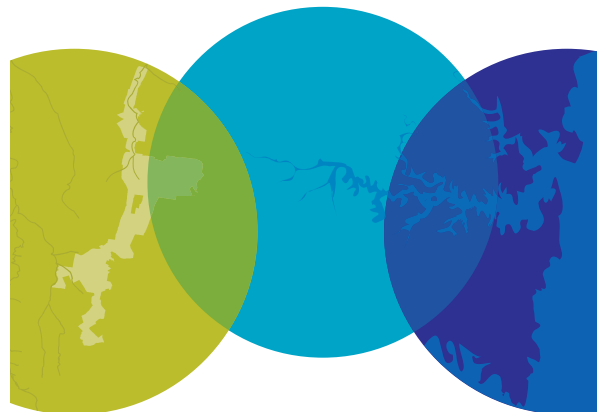
GREATER SYDNEY REGION PLAN: A METROPOLIS OF THREE CITIES - CONNECTING PEOPLE



GREATER SYDNEY REGION PLAN

A Metropolis of Three Cities

– connecting people



March 2018
Updated

Produced by the Greater Sydney Commission, the *Metropolis of Three Cities* document seeks to guide the growth and development of metropolitan Sydney towards 2056. It articulates this by devising directions for the three cities within Greater Sydney - the Eastern Harbour City, the Western Parkland City, and the Central River City. Ku-ring-gai is encapsulated within the Eastern Harbour City.

The vision sets out targets under the headings of;

- Infrastructure and Collaboration
- Liveability
- Productivity; and
- Sustainability

Under the direction 'a city in its landscape; valuing green spaces and landscape', a potential indicator of this describes an 'expanded Greater Sydney Green Grid'.

Fundamental to this sustainability vision is Objective 32 described below.

Objective 32 - The Green Grid links parks, open spaces, bushland and walking and cycling paths.

“Greater Sydney’s Green Grid sets a long-term vision for a network of high quality green areas that will connect communities to green infrastructure. It will promote a healthier urban environment and improve access to spaces for recreation and exercise. Scenic and cultural landscapes and rural landscapes complement green infrastructure.”

The Greater Sydney Green Grid connects communities to the landscape. It is a long-term vision for a network of high quality green areas – from regional parks to local parks and playgrounds – that connect centres, public transport and public spaces to green infrastructure and landscape features. Within the public realm it includes enhanced waterway corridors, transport routes, suburban streets, footpaths and cycleways. The Greater Sydney Green Grid offers a network of green spaces that is far greater than the sum of its parts. It will keep the region cool, encourage healthy lifestyles, support walking and cycling, provide better access to open spaces, enhance bushland and support ecological resilience. Planning and delivery of the green grid will be influenced by the ways people move through places and the multiple roles of green grid corridors. The delivery of the Greater Sydney Green Grid will build on past investments in the Regional Tracks and Trails Framework. Transport for NSW is establishing the Principal Bicycle Network which will provide high quality priority cycling routes across Greater Sydney. Opportunities to integrate the Principal Bicycle Network with the Greater Sydney Green Grid will be an important part of linking centres.

The Greater Sydney Green Grid will be delivered incrementally over decades, as opportunities and connections are refined and funded. Councils and the NSW Government will continue to use a range of land use planning tools, funding programs such as the Metropolitan Greenspace Program and transport initiatives to deliver the Greater Sydney Green Grid.

Open space along the foreshores of beaches, harbours and bays of the Eastern Harbour City form the backbone of its green grid. The popular walking tracks along the coast and Sydney Harbour will be enhanced and complemented by improved connections through tree-lined streets and established urban parks, towards open space along coastal waterways, such as the Northern Beaches coastal lagoons, Cooks River and Georges River.

Strategy 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.

OUR GREATER SYDNEY 2056: NORTH DISTRICT PLAN - CONNECTING COMMUNITIES

Supplementary to the *Greater Sydney Region Plan* are the district plan documents. The Ku-ring-gai LGA is included in the North District Plan. The Green Grid strategy will address the following planning priority within the North District Plan.

Greater Sydney
Commission

OUR GREATER SYDNEY 2056

North District Plan

– connecting communities



March 2018

Planning Priority N19 - Increasing urban tree canopy cover and delivering Green Grid connections.

Connecting the Greater Sydney Green Grid

Enhancing the amenity and activity within, and accessibility to, the Greater Sydney Green Grid will promote a healthier urban environment, improve community access to places for recreation and exercise, encourage social interaction, support walking and cycling connections and improve resilience. Green Grid Priority Projects have been selected to provide district-scale connections that link open space, waterways and bushland.

Councils will lead the delivery of the Greater Sydney Green Grid through land use planning and infrastructure investment mechanisms such as development and land use controls, agreements for dual use of open space and recreational facilities, direct investment in open space, and other funding mechanisms such as local development contributions and voluntary planning agreements. State, regional and district parklands and reserves form a principal element of the Greater Sydney Green Grid for both biodiversity and recreational purposes.

In some areas, rail lines and other linear infrastructure prevent Green Grid connections. Where feasible, planning and investment must consider opportunities for connections across rail lines, roads and other linear infrastructure.

SYDNEY GREEN GRID: SPATIAL FRAMEWORK AND PROJECT OPPORTUNITIES

This report developed by TyrrellStudio has been produced to support Objective 32, and Planning Priority N19 of the *Greater Sydney Region Plan*. It examines the hydrological, recreational and ecological frameworks across Sydney that work together to support elements of the Green Grid. It investigates and determines priority projects that can best facilitate this.

“The Sydney Green Grid promotes the creation of a network of high quality open spaces that supports recreation, biodiversity and waterway health. The green grid will create a network that connects strategic, district and local centres, public transport hubs, and residential areas.”

“The Green Grid is a green infrastructure, design-led strategy that includes the full range of open spaces: from national, regional and local parks through the harbour, ocean beaches, wetlands, rivers and creeks, to playgrounds, playing fields, golf courses and cemeteries. Furthermore, interconnected linkages are fostered within the wider public realm through enhancing creek corridors, transport routes, suburban streets, footpaths and cycleways.

The Green Grid is therefore an open space interconnecting network that will keep the city cool, encourage healthy lifestyles, enhance biodiversity and ensure ecological resilience. The Sydney Green Grid will provide hydrological, ecological and recreation services to the growing city, allowing sustainable growth. The grid will provide enhanced access to recreational open space, routes for walking and cycling, and opportunities for active and passive recreation. It will play a key role in the management of water quality, treatment of stormwater and flood risk. It will protect and connect existing ecological communities and , improve the ability to adapt to and mitigate the impacts of heat, noise and air pollution while improving landscape and urban quality.”

SYDNEY GREEN GRID: SPATIAL FRAMEWORK AND PROJECT OPPORTUNITIES - NORTH DISTRICT

Specifically, priority projects are determined for each of the six districts, of which Ku-ring-gai is within the North District. The North District is examined in terms of its landscape character, strategic context, project opportunity clusters, and objectives including;

- Increase access to open space
- Promote healthy and active living; and
- Create new high quality public realm.

The report identifies a one priority project that interfaces with the LGA, and several other projects within the LGA for investigation. These are identified on the map below.

NORTH DISTRICT: THE GREEN GRID PROJECT OPPORTUNITIES

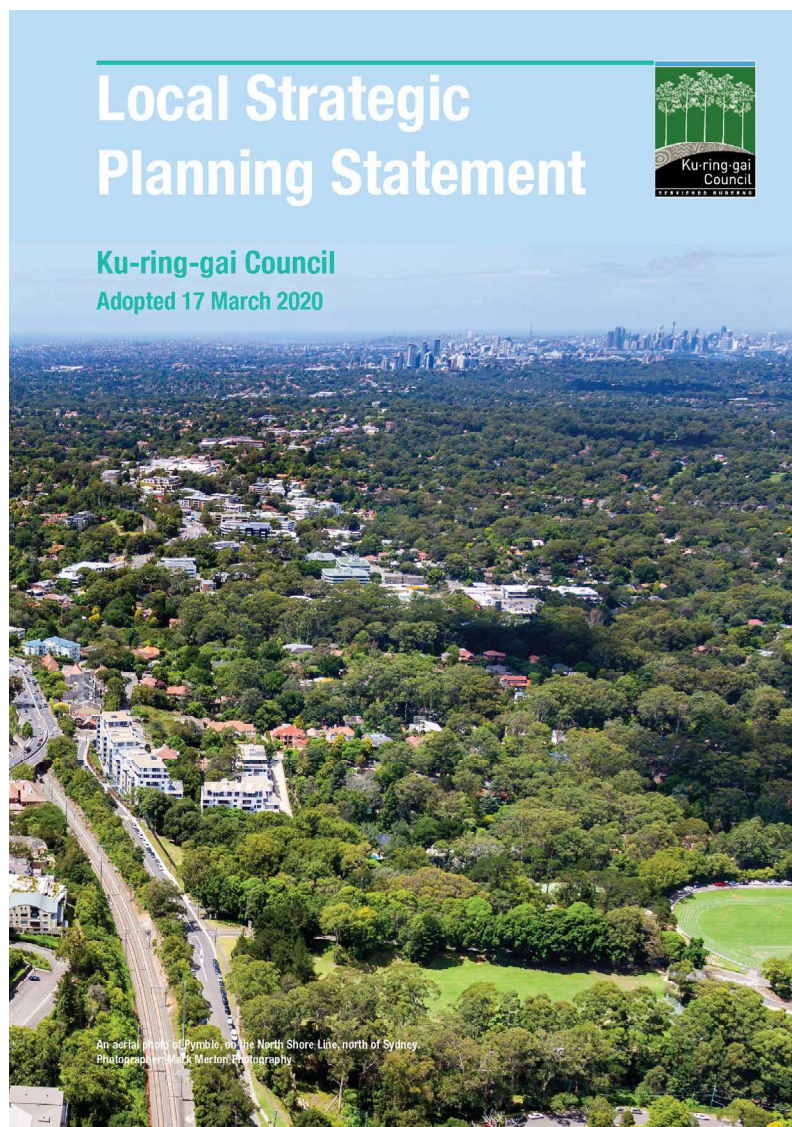
PROJECT OPPORTUNITY	DOMINANT GRID LAYER
1. Sydney's Great Coastal Walk: Barrenjoey Head to Manly	RECREATIONAL
2. NBCL: Curl Curl Lagoon, Open Space and Greendale Ck	HYDROLOGICAL
3. The Great North Walk: Berowra to Brooklyn	RECREATIONAL
4. Lane Cove River and Lane Cove National Park	ECOLOGICAL
5. Manly Dam and Creek Open Space Corridor	HYDROLOGICAL
6. Middle Harbour Beaches and Harbour Foreshore	RECREATIONAL
7. Parramatta River and Sydney Harbour Foreshore	RECREATIONAL
8. Garigal National Park and Coastal Lagoons	ECOLOGICAL
9. Pittwater Road Active Transport Corridor	TRANSPORT
10. Frenchs Forest and Hospital Precinct Green Links	RECREATIONAL
11. Dee Why Town Centre Green Links to Beaches	RECREATIONAL
12. Middle Harbour Village Shops to Bushland Green Links	RECREATIONAL
13. Narrabeen Lagoon and South Creek	HYDROLOGICAL
14. NBCL: Warriewood Wetlands and Narrabeen Creek	HYDROLOGICAL
15. St Leonards and Chatswood to Bushland Green Links	RECREATIONAL
16. Pacific Highway Urban Transformation	DEVELOPMENT
17. M2 Active Transport Corridor	TRANSPORT
18. Pennant Hills Road Green Link	TRANSPORT
19. NBCL: Dee Why Lagoon and South Creek	HYDROLOGICAL
20. Ingleside Green Links	RECREATIONAL
21. Chatswood CBD Green Links	RECREATIONAL
22. Shrimptons Creek Green Link: Eastwood to Macquarie PK	HYDROLOGICAL
23. Northern Rail Line Linear Open Spaces	RECREATIONAL
24. Berowra Valley Regional Park Open Spaces	ECOLOGICAL
25. Berowra and Hornsby Villages to Bushland Green Links	RECREATIONAL
26. Lovers Jump, Cowan and Ku Ring Gai Creek Corridors	HYDROLOGICAL
27. Hornsby CBD Open Spaces and Green Links	RECREATIONAL
28. St Leonards Open Space and Green Streets	RECREATIONAL
29. North Sydney CBD Open Spaces and Green Streets	RECREATIONAL
30. Waterloo Road Green Link, Macquarie Park	RECREATIONAL
31. Bantry Bay and Middle Harbour Trails	ECOLOGICAL
32. Terrys Creek Bushland Link	ECOLOGICAL
33. Pacific Highway Centres Open Spaces and Green Links	DEVELOPMENT
34. Warringah Road Active Transport Corridors	RECREATIONAL
35. Upper Middle Harbour Foreshores	ECOLOGICAL
36. Middle Harbour Creeks and Bushland	HYDROLOGICAL
37. Colah Creek and Bushland, Galston	HYDROLOGICAL
38. Bobbin Head and Cowan Creek Foreshores	ECOLOGICAL
39. Ku-ring-gai National Park Trails	ECOLOGICAL
40. Lane Cove and Artarmon Green Street Links	RECREATIONAL
41. Balgowlah to Manly Green Street Link	RECREATIONAL
42. Manly Creek Golf Course Edges	RECREATIONAL
43. Wakehurst Parkway Active Transport Corridor	TRANSPORT
44. Road Reserve Corridor: Macquarie Park to Eastwood	RECREATIONAL
45. Hornsby Quarry	RECREATIONAL
46. Ku-ring-gai and Pittwater Foreshores	RECREATIONAL
47. Murrumbidgee National Park and Muogamurra Trails	ECOLOGICAL
48. Hawkesbury River Foreshore Trails	HYDROLOGICAL
49. Oxford Falls and Middle Creek Trails	HYDROLOGICAL
50. Terrey Hills Perimeter Trail Network	ECOLOGICAL



Figure 6 North District Green Grid Project Map - Ku-ring-gai highlights

LOCAL STRATEGIC PLANNING STATEMENT (LSPS)

Plans for Ku-ring-gai's economic, social and environmental land use needs for the next 20 years (2016-2036). This is the first LSPS developed and endorsed by Council in March 2020.



Local Planning Priorities specific to the Green Grid:

Planning Priority K32 - Protecting and improving Green Grid connections.

Planning Priority K33 - Providing a network of walking and cycling links for leisure and recreation.

Planning Priority K34 - Improving connections with natural areas including river and creek corridors, bushland reserves and National Parks.

Ku-ring-gai Structure Plan

The Structure Plan is an integral part of the LSPS. The Structure Plan for Ku-ring-gai highlights the key productivity, liveability and sustainability elements of the LSPS. It is a foundation for understanding the spatial integration of key elements, and highlights the locations where the local planning priorities and actions are to be implemented. The Structure Plan also helps to provide an understanding of Ku-ring-gai within the broader context of adjoining local government areas of the Greater Sydney Region, the North District and identifies the key links and relationships with adjoining Northern Beaches Council, Hornsby Council, Willoughby Council and City of Ryde Council areas.

The Structure Plan identifies the following key elements of the LSPS, including Productivity, Liveability, and Sustainability. Sustainability outlines;

- key existing green infrastructure including National Parks, nature reserves, bushland and public open spaces;
- key existing waterways and waterbodies;
- Green Grid corridors for investigation.

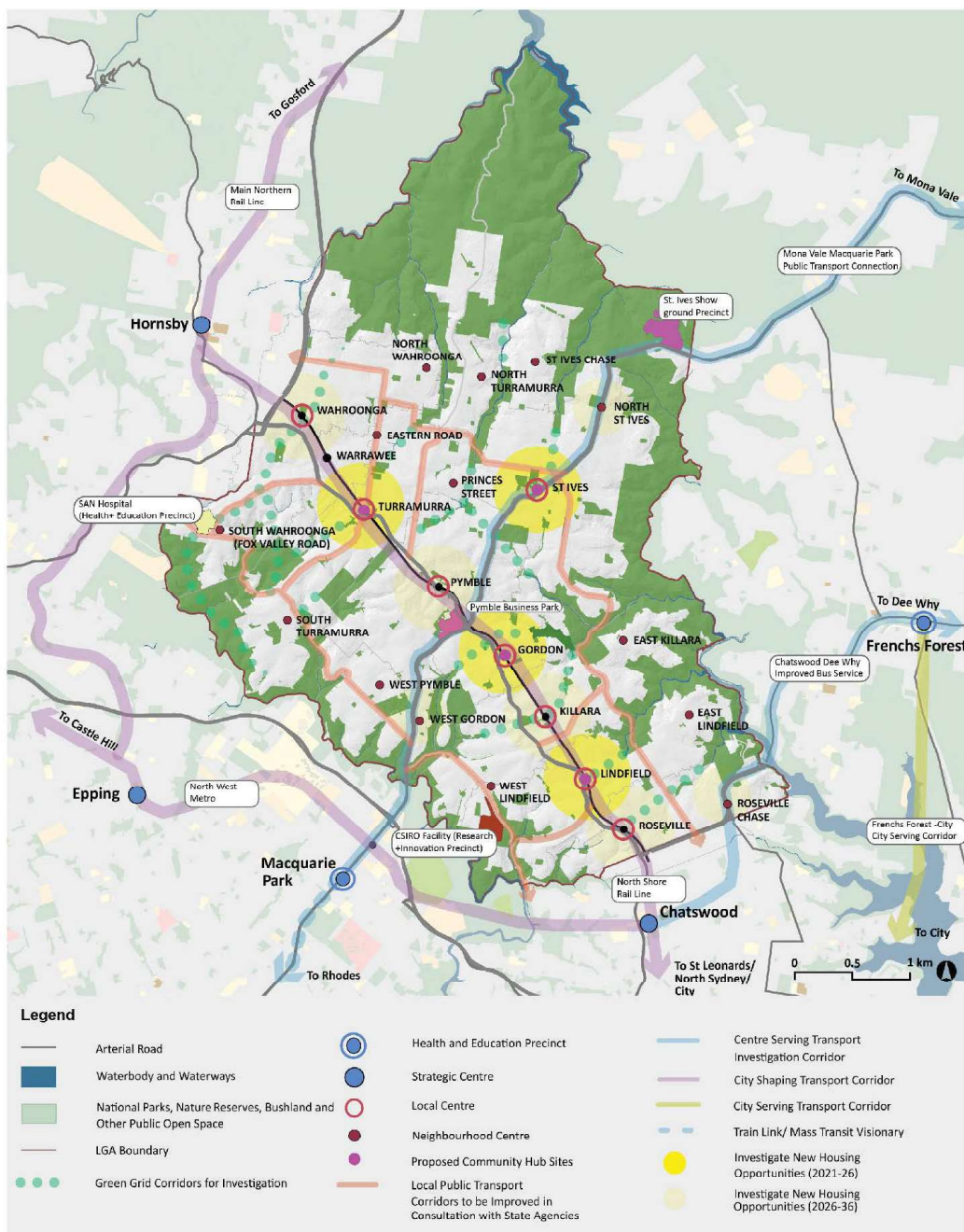


Figure 8 LSPS Structure Plan

The following extract is taken from the LSPS (pg 160), and outlines the requirements for production of the Green Grid Strategy.

Green Grid

Background

Ku-ring-gai's liveability and sustainability rely on maintaining, managing and planning for green infrastructure. Green infrastructure is the network of green spaces and water systems within both public and private ownership, that deliver multiple environmental, economic and social values and benefits to urban communities. It extends beyond physical vegetative structures (such as the urban forest) and includes natural and semi-natural systems as well as the management and integration of various components of urban environments Greener Places (the draft green infrastructure policy by GA NSW, 2017) and the Greater Sydney Region Plan and North District Plan highlight the importance of planning for, protecting, creating and maintaining green infrastructure within Greater Sydney. This planning framework has sought to protect and improve Sydney's network of water related systems (our Hydrological Grid), biodiversity and urban forest (our Ecological Grid) and passive and active recreation and transport (our Recreational Grid).

The Greater Sydney Region Plan's vision for the Eastern Harbour City (including Ku-ring-gai) is for improved access to foreshores, waterways and the coast for passive and active recreation, tourism, cultural events and waterbased transport. This vision is to be achieved through implementation of the Sydney Green Grid, providing a network of water related systems (our Hydrological Grid) and green spaces (our Ecological Grid), that will connect communities (through our Recreational Grid) to green infrastructure.

Improved access and connections from Ku-ring-gai's Local Centres to nature and green infrastructure is increasingly important, as the number of people living in high density dwellings increases. There is significant opportunity for local residents and visitors to walk or cycle via a network of streets and parks to bushland areas given that all centres (with the exception of Wahroonga and Pymble) are within a 1km walk of a natural area.

The Ku-ring-gai LGA provides extensive walking trails traversing bushland reserves and connections with the adjoining national park trails.

While extensive planning has been undertaken to enable recreation in natural areas, there is a gap in the provision of marked recreational trails leading from the Local Centres and rail stations to the bushland reserves via local streets and parks. Currently Council only has one marked track from Lindfield Station to the Two Creeks Track which starts in Seven Little Australians Park.

Strategic response

To inform the assessment, prioritisation and implementation of the Sydney Green Grid and Local Green Grid connections, Council will investigate the creation of a Green Grid Strategy. This Strategy will consider bikeways, pedestrian facilities, walking tracks, fire trails and footpath network improvements having regard for the access, transport, health and recreational needs of the community.

The Strategy will include an analysis of opportunities, constraints and required actions, regarding implementation of the Sydney Green Grid, including the following key projects:

- **Sydney Green Grid Project 16 Pacific Highway Urban Transformation.** This includes Council's projects within the Local Centres along the Pacific Highway:
 1. the Lindfield Village Green project which comprises turning an at grade public carpark into a public park, and providing basement car parking beneath;
 2. Lindfield Community Hub and Turramurra Community Hub projects which include the provision of new public parks, as well as;
 3. tree planting and greening within the Local Centres and other areas along the highway and rail corridor

- **Sydney Green Grid Project 33 – Pacific Highway Centres.** Open Spaces and Green Links which seeks to provide a connection through urban areas (including town centres) to open space and bushland on either side of the Pacific Highway.
- **Sydney Green Grid Project 4 – Lane Cove River and Lane Cover National Park.** Priority Corridor 1 - which includes open spaces along the Lane Cove River foreshores to create unique recreational experiences, linking the Lane Cove National Park to Macquarie Park, Macquarie University, Chatswood and Epping.

Further work on this project is required to inform feasibility and create design options to improve track accessibility under wet conditions along the Browns Waterhole walking and cycling track, North Epping and South Turramurra. Preliminary investigation has been undertaken regarding improved flood mitigation and accessibility options over a heavily used crossing point of the Lane Cove River, linking Ku-ring-gai and Ryde local government areas and connecting the Great North Walk.

Ku-ring-gai Local Green Grid connections

These Green Grid connections have sought to address connectivity shortcomings, identified within the *Ku-ring-gai Biodiversity & Riparian Lands Study 2016*; including that:

- There is no continuous, good condition vegetation/ habitat crossing the urban area of Ku-ring-gai in either a north-south or east-west direction.
- Middle Harbour Valley (including Garigal National Park) is considered to be poorly connected to surrounding bushland; including Ku-ring-gai Chase National Park to the north (connectivity is highly compromised by Mona Vale Road).
- The Lane Cove Valley bushland (including Lane Cove National Park) is not connected to adjacent protected areas or reserves, including bushland in the Berowra Valley in the Hornsby and Ryde local government areas.

The Green Grid Strategy will include further consideration of:

- The need to minimise fragmentation and impact upon bushland areas.
- Walking track connections between Richmond Park and Governor Phillip Reserve. This link is designed to replace the Sydney Green Grid, crossing through the Ku-ring-gai Flying Fox Reserve. This Reserve is subject to a long-term Conservation Agreement and home to an important maternal colony of grey-headed flying-fox. As Council does not support public recreation within this reserve, further development of this Section of the Sydney Green Grid is also not supported.
- The rarity, significance and the special conservation agreements associated with Dalrymple Hay Nature Reserve / Browns Forest and Sheldon Forest, which need to be fully recognised. The nature of these reserves and their protection needs to be promoted. It is envisaged the current ongoing restricted access and usage will continue to ensure their preservation for future generations. To discourage any unintended future use as general transit ways, Green Grid track linkages will not rely on passage through these reserves, but will employ neighbouring or adjoining routes.
- Walking track links to improve connections between Local Centres and rail stations via a network of streets, private bushland and other agency lands and parks to bushland areas connecting with the Great North Walk and broader trail network along Lane Cove River, Middle Harbour and Cowan Creek.
- Walking track connections from the St Ives Showground Precinct with Brooklyn, Bobbin Head and West Head, linking with existing national park's infrastructure and walking trails as identified within the Ku-ring-gai Destination Management Plan 2017 -2020.
- Opportunities to combine recreation and transport with biodiversity corridors (as identified within Council's DCP Greenweb Map and LEP Terrestrial Biodiversity Map).
- Opportunities to improve biodiversity and recreational disconnect caused by main roads (in particular Ryde Road, The Comenarra Parkway and Mona Vale Road).
- Opportunities and priorities to enhance a variety of open spaces; improve streetscapes; connect with local European heritage and Aboriginal cultural heritage, and undertake street tree planting.

- Access to waterways, water based recreation and creation/inclusion of Water Sensitive City features.

The Green Grid Strategy, planning and implementation will be integrated with other Ecological Grid and Hydrological Grid projects within Ku-ring-gai, and the broader North District, and will inform and be informed by priority actions identified within the LSPS, namely within Urban Forest (Planning Priorities K30 and K31), Bushland and Biodiversity (Planning Priorities K28 and K29), Climate Change Resilience and Adaptation (Planning Priorities K39 and K40) and Water Sensitive City (Planning Priorities K35, K36, and K37).

Green Grid - Ku-ring-gai Local Planning Priorities and Actions

Ku-ring-gai Council	Ku-ring-gai Local Planning Priorities
	K32. Protecting and improving Green Grid connections
	K33. Providing a network of walking and cycling links for leisure and recreation
	K34. Improve connections with natural areas including river and creek corridors, bushland reserves and National Parks
	Actions <ul style="list-style-type: none"> Investigate and deliver the Sydney Green Grid and Ku-ring-gai Local Green Grid, including collaboration with other agencies, councils and private landholders (medium term). Investigate the creation of a Green Grid Strategy that: <ul style="list-style-type: none"> - Refines Sydney Green Grid and Ku-ring-gai Local Green Grid opportunities, constraints and required actions. - Identifies walking and cycling routes from connecting Local Centres with nearby parks and natural areas, walking track connections from the St Ives Precinct with existing national park walking trails, including improved biodiversity connections and green infrastructure (medium term). Update Ku-ring-gai Bicycle Plan to include outcomes from the Green Grid Strategy (medium term).
North District Plan	Planning Priority N19 Increasing urban tree canopy cover and delivering Green Grid connections
Greater Sydney Region Plan	Objective 32 The Green Grid links parks, open spaces, bushland and walking and cycling paths

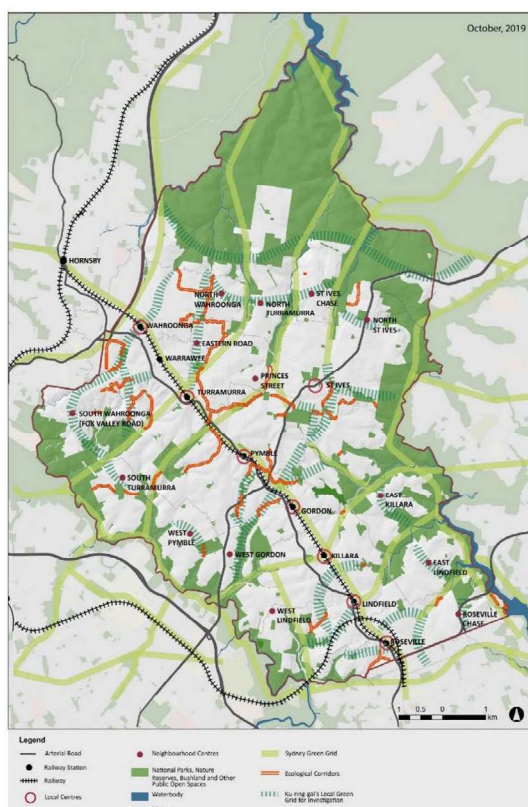


Figure 9 LSPS Green Grid Map

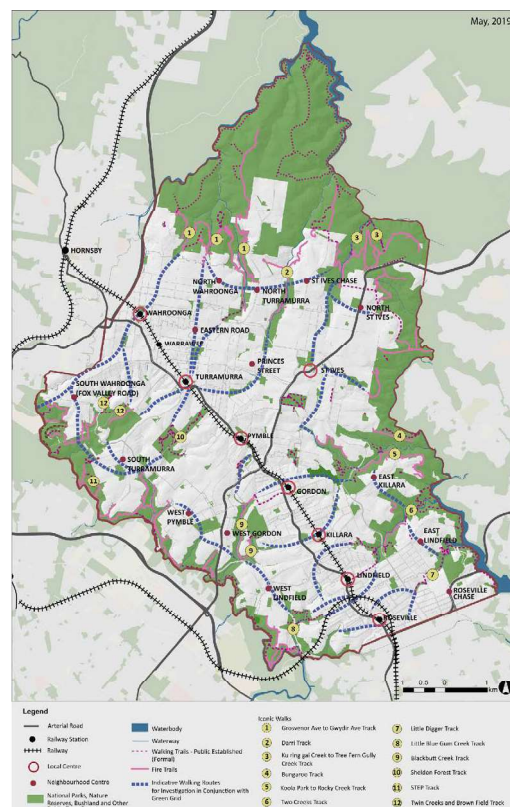
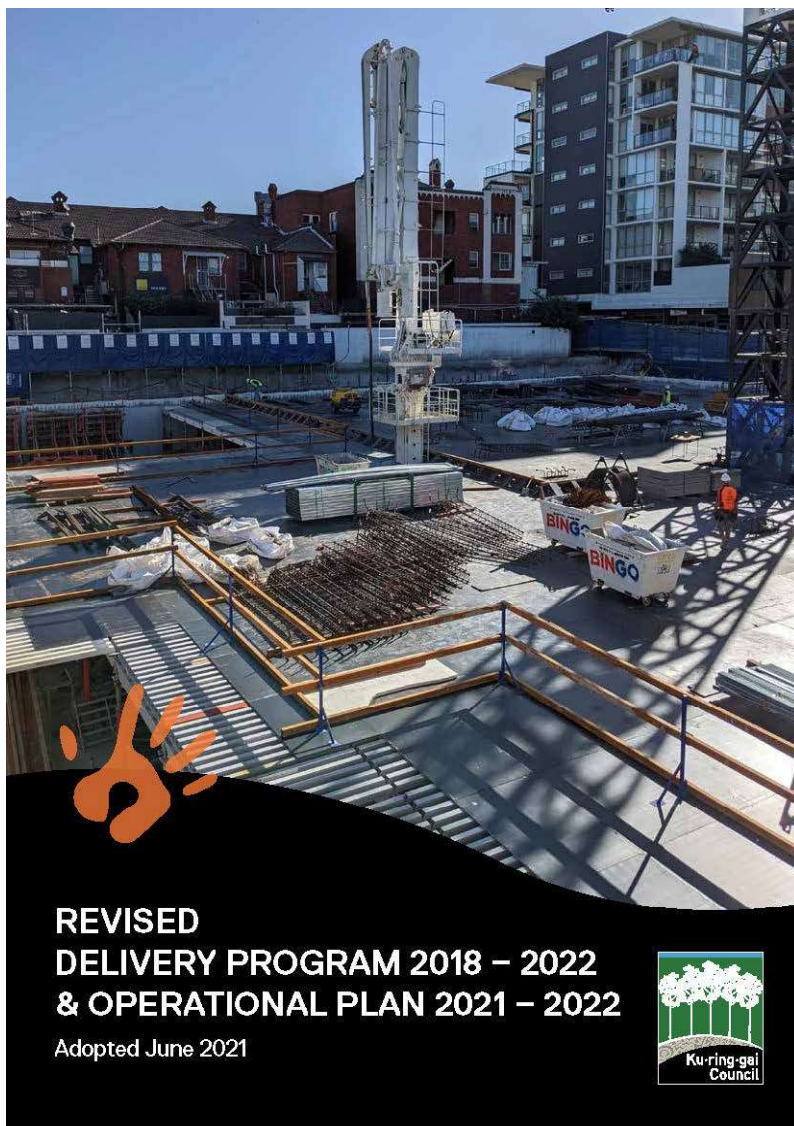


Figure 10 LSPS Walking Green Grid Map

KU-RING-GAI COUNCIL REVISED DELIVERY PROGRAM 2018-2022, AND OPERATIONAL PLAN 2021-2022

To ensure the delivery of the Green Grid, Council's Operational Plan outlines the tasks required to be completed by staff.



Theme 3 Places, Spaces and Infrastructure

Issue P6: Enhancing recreation, sporting and leisure facilities

Long Term Objective P6.1: Recreation, sporting and leisure facilities are available to meet the community's diverse and changing needs.

Operational Plan Tasks - Year 3

P6.1.1.11: Commence preparation of a Green Grid Strategy for Ku-ring-gai in alignment with the Local Strategic Planning Statement (LSPS).

SUPPORTING GUIDELINES

PUBLIC SPACES CHARTER

The Public Spaces Charter incorporates 10 principles to support the NSW Government priority of increasing access to quality, green public spaces. The charter and associated guidelines are recommended for use by practitioners to create great public spaces.

Defining what makes a great public space can be determined by answering the following questions;

Am I able to get there?

Am I able to play and participate?

Am I able to stay?

Am I able to connect?

The Green Grid traverses both 'Great Open Spaces' and 'Great Streets'. Foundational elements that respond to the four defining questions about great public spaces to be addressed within the Green Grid include;

	Great Open Spaces	Great Streets
<i>Am I able to get there?</i>	<ul style="list-style-type: none"> • People can easily access and move through the place • A short walk from homes and places of work • Multiple entry points • Near public transport • People can access by walking or riding a bike • Equitable and accessible footpath network 	<ul style="list-style-type: none"> • Appropriate traffic levels and speeds • Transport choice • Wide footpaths and equitable access • Easy crossing points with tactile indicators • Reduced obstructions and clutter • Clear wayfinding
<i>Am I able to play and participate?</i>	<ul style="list-style-type: none"> • Diversity of activities • Play spaces for all ages • People of all ages and abilities have spaces to exercise or relax • Event spaces and facilities • Places for community groups and clubs • Sport and recreational facilities for health and wellbeing 	<ul style="list-style-type: none"> • Other public spaces along the street • Play streets and shared zones • Interactive activities and place infrastructure • Places to relax and rest • Regular programming, events and things to do • Contribute to the night-time economy
<i>Am I able to stay?</i>	<ul style="list-style-type: none"> • Comfortable places to sit in the sun or shade • Landscaped with trees and plants • Feels safe day and night • Well-maintained and clean • Places protected from the wind, sun and rain • Visually attractive and well-designed 	<ul style="list-style-type: none"> • Space for business customers to wait or dine outdoors • Shady, green and leafy • Safe and well-lit • Setbacks for local street character • Quality materials • Variety of businesses and services nearby
<i>Am I able to connect?</i>	<ul style="list-style-type: none"> • Promotes positive social interactions • Inspires community stewardship • Places for social gathering, with opportunities for socialising and celebrating • Vibrant and welcoming • Public art, heritage and local character 	<ul style="list-style-type: none"> • Vibrant public art and colourful flowers • Interesting things to see at eye level • Places of meaning with diverse public life • 10+ things to see, do and connect with • Evidence of community volunteerism

Table 1 - Public Spaces Charter benchmarks

By then instigating elements of the ten principles, a quality public space can be delivered.

1. Open and welcoming - *Everyone can access public space and feel welcome, respected and included.*
2. Community focused - *Public space brings people together and builds strong, connected and resilient communities.*
3. Culture and creativity - *Public space provides a platform for culture and creative expression that makes places more colourful, animated and thought-provoking.*
4. Local character and identity - *Public space reflects who we are and our diverse stories and histories.*
5. Green and resilient - *Public space connects us to nature, enhances biodiversity and builds climate resilience into communities.*
6. Healthy and active - *Public space allows everyone to participate in activities that strengthen our health and wellbeing.*
7. Local business and economies - *Public space supports a dynamic economic life and vibrant urban and town centres.*
8. Safe and secure - *Everyone feels safe to access and use public space at all times of the day.*
9. Designed for place - *Public space is flexible and responds to its environment to meet the needs of its community.*
10. Well-managed - *Well-managed and maintained public space functions better and invites people to use and care for it.*

GREENER NEIGHBOURHOODS GUIDE **Guiding Strategic Planning For Urban Forests**

This guideline produced by Department of Planning and Environment (DPE) provides comprehensive information for Councils on how to produce an Urban Forest Strategy. It acknowledges that not all Councils will produce an Urban Forest Strategy as it is not mandated, however the management of its Urban Forest may be enacted through a variety of mechanisms or strategies, including a Green Grid Strategy.

It articulates the entire process, and includes best practice guidelines and targets. It also draws on existing work done to date globally with an array of case studies and resources.

DRAFT GREENER PLACES DESIGN GUIDE - OPEN SPACE FOR RECREATION, URBAN TREE CANOPY, AND CONNECTING BUSHLAND AND WATERWAYS

Government Architect New South Wales (GANSW) created a draft guideline for delivering green infrastructure within the urban environment, with specific focus on open space for recreation, urban tree canopy, and connecting bushland and waterways. The guidelines deliver on a performance based approach to meeting the needs of the community through provision of sufficient green infrastructure resources to support population growth and densification. The delivery of the Green Grid traverses all aspects of this guide. Open spaces, bushlands and waterways all provide destinations for green links, and the urban tree canopy helps build upon and support the green link network.

One of the key strategies outlined in providing 'Open Space for Recreation' includes;

"5. Link to the network of green infrastructure - Developing vibrant towns and streetscapes with a pedestrian friendly laneway network that connects to open space is essential for usability and access. Defining a pedestrian, cycle, and green network can connect urban centres to local and regional open space."

From the 'Urban Tree Canopy' strategies, strategy 2 articulates "Create an interconnected urban tree canopy across NSW, that:

- links green spaces through the green infrastructure network."

In the 'Connecting Bushland and Waterways' component of the guidelines, it introduces the idea of 'Strategic Urban Biodiversity Frameworks (SUBFs)', which is a holistic, action based approach alternative to biodiversity strategies. Specifically, Strategy 5 "Connect Urban Habitats", includes the following two recommendations relating to the Green Grid;

“3. Use SUBFs and green infrastructure networks (e.g. the Sydney Green Grid) to connect habitats when planning, designing, and managing precinct-level redevelopments (including State, district, and locally significant sites).

4. In collaboration with local government and planning panels, implement green infrastructure frameworks such as the Sydney Green Grid, and monitor their progress and periodically revise it. “

Protecting our biodiversity in urban areas is a critical component of the establishment of the Green Grid. The Green Grid Strategy would be a mechanism to deliver a SUBF.

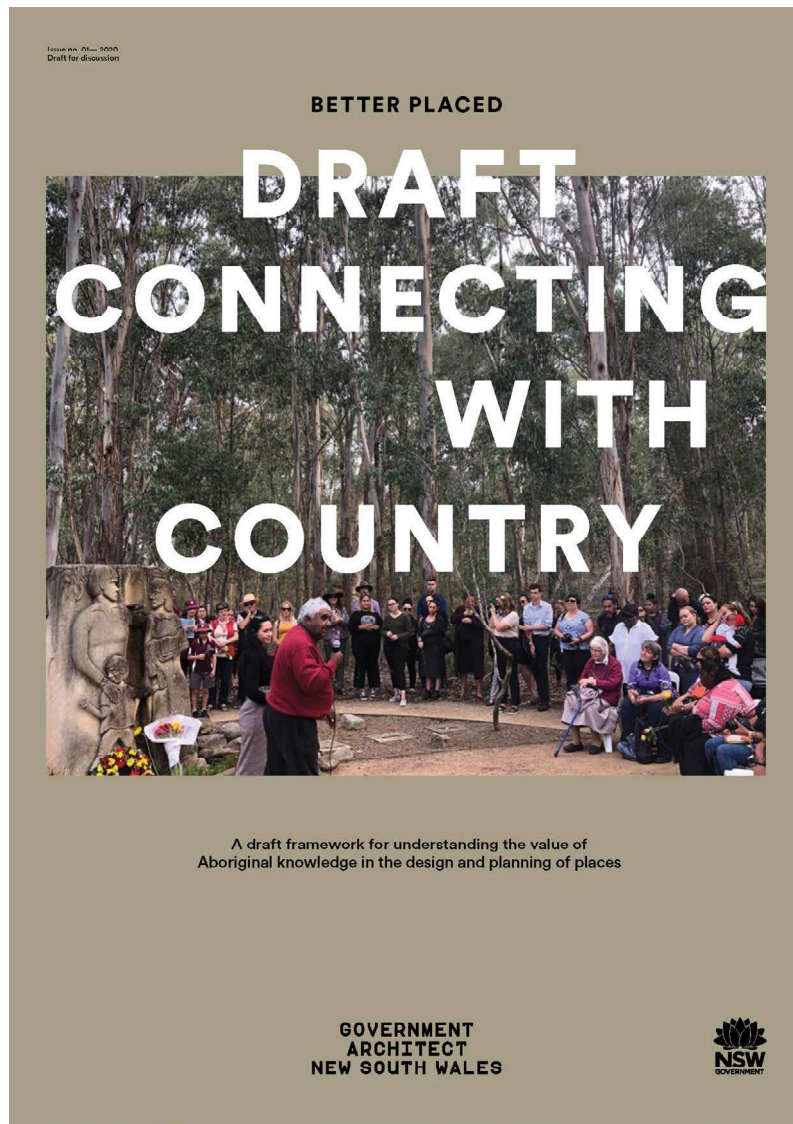
CONNECTING WITH COUNTRY

HISTORY OF THE KU-RING-GAI AREA

The Aboriginal Heritage Office (AHO) plays a pivotal role in protecting, enhancing, and encouraging the preservation of Aboriginal history within Ku-ring-gai, as well as fostering education and relationship building with first nations communities. One of its key roles is the protection and maintenance of important aboriginal historical sites. The Ku-ring-gai area has a rich Aboriginal history as evidenced by its proliferation of significant archaeological sites. These sites include rock art in the form of stencils and engravings, shell middens, axe grinding grooves, ceremonial or burial grounds, and camps amongst others, which are located throughout Ku-ring-gai's three National Parks. In order to protect many of these significant sites, their location is not made publicly available. Many more are likely to be present and others have been lost through development. The loss of these sites due to development speaks to a wider story of erasure and destruction and underpins the lack of available knowledge of first nations culture and relationships with this area. Disease, warfare, and the appropriation of lands was catastrophic for the first nations people of the area. With culture and history being disseminated orally, much of this history has been lost. This reflects a lack of available information relating to aboriginal history in the area, and as such rather than relying on conjecture, a limited history of first nations relationship with the area is presented in the context of this report.

There are particular issues associated with the most appropriate naming for clan and language groups for the area. It is understood that the most likely clan groups who inhabited the Ku-ring-gai area were the Durrumurragal. The Durrumurragal people lived on Country having intrinsic connections to the land and waters for thousands of years before the arrival of European settlers. Daily life centred around engaging with the land as means of sustenance in a physical and spiritual sense. Hunting for food and gathering of provisions was dictated by the seasons, and due to this affinity with the land efficiencies led to a wealth of time available to nurture relationships between family groups, individuals and the land, embracing spirituality. What is clear is that seasonality encouraged movement through the landscape, and more investigation is required to determine what some of these routes may have been. Ideally, Green Grid routes would reflect these movement patterns that had been developed over thousands of years.

BETTER PLACED: DRAFT CONNECTING WITH COUNTRY, GOVERNMENT ARCHITECT NEW SOUTH WALES
A draft framework for understanding the value of Aboriginal knowledge in the design and planning of places.



The draft Connecting with Country document produced by GANSW was published in 2020, and is now well into its 12 month pilot phase. This phase seeks to test out the efficacy of the framework against projects in order to fine tune the document as a finalised guideline to be mandated. The framework is critical in guiding the establishment of better relationships for engaging and working with first nations communities to care for Country and achieve high quality projects across the state.

Commitment

Through our projects, we commit to helping support the health and wellbeing of Country by valuing, respecting, and being guided by Aboriginal people, who know that if we care for Country – it will care for us.

Three strategic goals:

1. reduce the impacts of natural events such as fire, drought, and flooding through sustainable land and water use practices
2. value and respect Aboriginal cultural knowledge with Aboriginal people co-leading design and development of all NSW infrastructure projects
3. ensure Country is cared for appropriately and sensitive sites are protected by Aboriginal people having access to their homelands to continue their cultural practices.

Principles for action:

- protect the health and wellbeing of Country and therefore of Aboriginal communities, and by extension all communities
- embed Aboriginal knowledge into the design and planning of our built environment to make NSW a better place for all its citizens.

Strategies for connecting:

Pathways for connecting - cultural awareness

- learning from first languages and place names
- developing mutually beneficial relationships with Country
- reawakening memories of cultural landscapes
- finding common ground.

Project life cycles with Aboriginal perspective

- **Project formation** can be understood as an immersive process of **sensing** – the point at which we start with Country.
- **Project design** and conceptualisation can be understood as process of **imagining** – listening to Country.
- **Project delivery** can be understood as a process of **shaping** – designing with Country.
- **Project maintenance** can be understood as part of an ongoing continuum of **caring** for Country.

The Green Grid will explore engagement with the framework through the following methods.

Establish and build relationships that are ongoing.

Relationships - Aboriginal Heritage Office (AHO), and exploring further opportunities. Council has a key stake in the AHO, and will continue to foster this relationship. Reaching out to engage and build new relationships with other cultural contacts and community members will be ongoing.

Seek knowledge - co-design and co-manage.

Walking Country - walking is fundamental to the Green Grid. Walking on Country during the analysis phase will assist in building understanding of the land, and determining appropriate routes. As part of relationship building, opportunities for doing this with first nations people will be investigated throughout the life-cycle of the project.

Protect and respect heritage

Working towards maintaining the integrity of significant sites by either providing interpretation opportunities, or discouraging access to them.

BACKGROUND STUDIES

The following studies have specific relevance to the Green Grid Strategy in their examination of the existing condition of the LGA, enabling identification of the opportunities and constraints for the strategy. This section will also review the Destination Management Plan 2017-2020 which outlines Council's vision for encouraging and supporting visitation to the LGA.

KU-RING-GAI LOCAL CHARACTER BACKGROUND STUDY

Prepared by consultants SJB, adopted by Council June 2021.

SJB were engaged by Ku-ring-gai Council (KMC) to undertake research, prepare a 'baseline' report and identify Broad Local Character Areas for the Ku-ring-gai Local Government Area (LGA).

This work was in response to the Ku-ring-gai Local Strategic Planning Statement (LSPS) Planning Priority K12. The objective of this priority is to manage change and growth in a way that conserves and enhances Ku-ring-gai's unique visual and landscape character. There are four (4) Actions related to this Planning Priority, as follows:

Action 1 - Define Ku-ring-gai's unique visual and landscape character through community engagement.

Action 2 - Undertake a Local Character Study in accordance with the Department of Planning, Industry and Environment's Local Character and Place Guidelines February 2019. The study will include investigation of areas of special landscape, views and vistas, visual quality, topography and the Urban Forest (including bushland, tree canopy, street trees, gardens). It will also consider Green Grid links and biodiversity corridors.

Action 3 - Implement recommendations from the Local Character Study.

Action 4 - Prepare Local Character Mapping for an LEP Overlay and Local Character Statements for inclusion in the DCP, in consultation with the Department of Planning and Environment (DPE).

This Background Study is primarily focused on the analysis and identification of Ku-ring-gai's physical characteristics, relating to Action 1, noted above. The study is intended to provide the basis for further research into 'local character' in the future. It is important to note that this study does not include a detailed examination of the social and cultural characteristics of the LGA, which is sought in the Department of Planning and Environment's (DPE) Local Character and Place Guidelines, 2019.

Preparation of a Local Character Study, as per Action 2, including 'desired future character statements', will be the subject of a future study and further community engagement.

Local Strategic Planning Statement

Planning Priority K12, Action 2

Undertake a Local Character Study in accordance with the Department of Planning, Industry and Environment's Local Character and Place Guidelines February 2019. The study will include investigation of areas of special landscape, views and vistas, visual quality, topography and the Urban Forest (including bushland, tree canopy, street trees, gardens). *It will also consider Green Grid links and biodiversity corridors.*

As the Local Character Background Study is a baseline study only at this juncture, its focus was to develop and define broad character areas within the LGA, as outlined below. Table 1 provides a brief description of the character areas with its key features relevant to the Green Grid, and then examines some of the opportunities and constraints these present.

1. Green Fingers
2. Ku-ring-gai Ridge and Centres
3. Northern Plateau
4. Western Slopes
5. West Pymble
6. Lower West
7. Lower East
8. North Turramurra Table

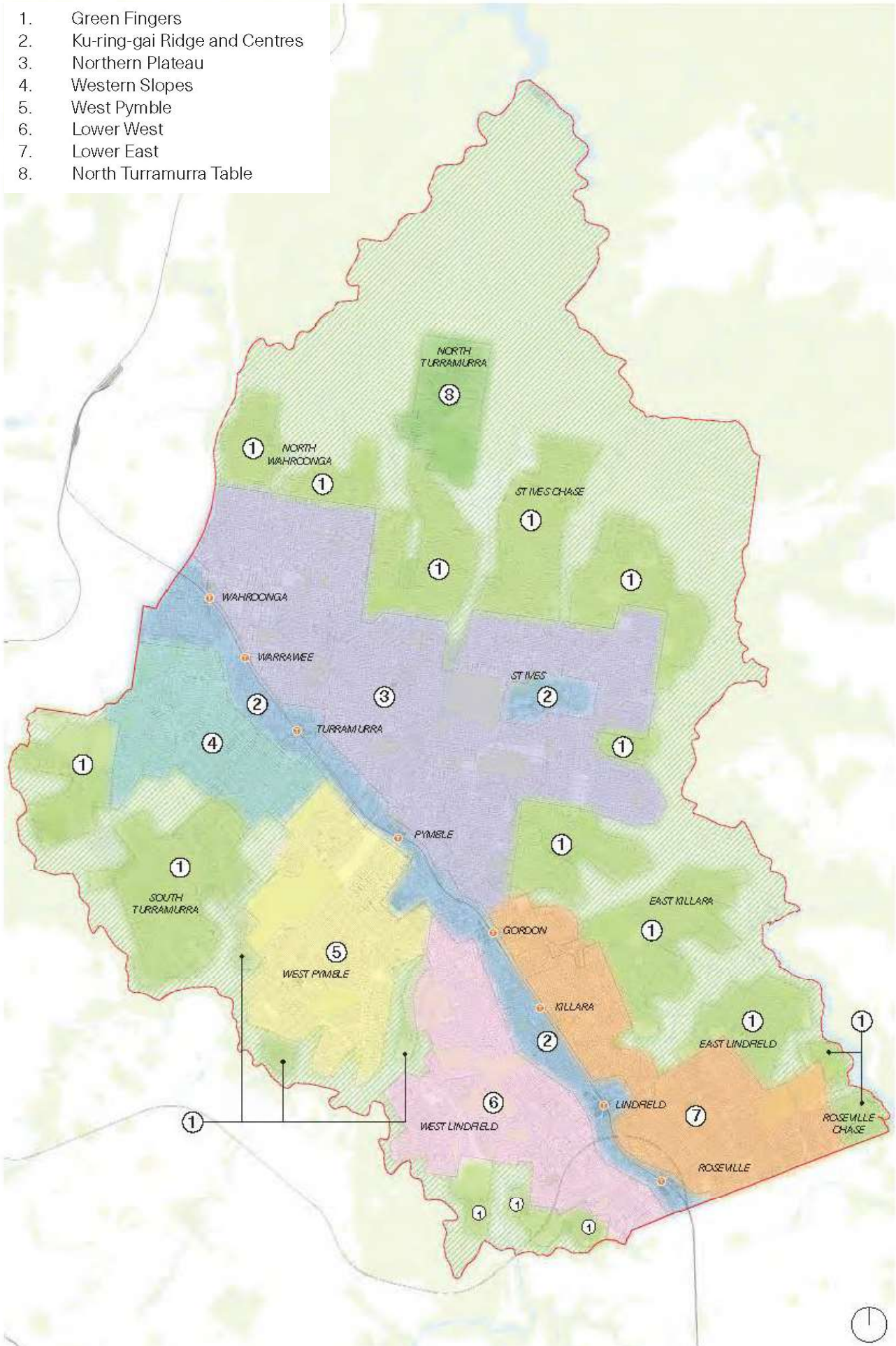


Figure 11 Ku-ring-gai Local Character Areas Map

CHARACTER AREA - KEY FEATURES RELEVANT TO THE GREEN GRID	OPPORTUNITIES	CONSTRAINTS
1. Green Fingers - key links to bushland/national parks - typically located on the fringes/periphery of the LGA - generally well vegetated with mature trees - steep topography leading into gullies - flatter areas along ridgelines - typically residential	- established corridors to enhance green grid	- ensuring connections to inner character areas - topography presents challenges for walkability
2. Ku-ring-gai Ridge and Centres - Pacific Hwy and rail corridor - centres - less tree canopy - more dense development	- development controls requiring implementation of green grid initiatives	- existing infrastructure site constraints
3. Northern Plateau - typically flatter (formerly agricultural) - predominantly residential - less tree canopy than other areas	- topography facilitates good walkability	- limited opportunities for tree planting in some residential settings
4. Western Slopes - steep slopes - highly vegetated - biodiversity identified	- established corridors to enhance green grid	- topography presents challenges for walkability
5. West Pymble - mixed suburban layout - many flat areas - some slopes to gullies - biodiversity identified	- established corridors to enhance green grid - topography facilitates good walkability in areas	- limited opportunities for tree planting in some residential settings
6. Lower West - Mixed residential - large estates and high density - Connections to bushland - undulating topography - heritage areas - golf courses	- established corridors to enhance green grid	- limited opportunities for tree planting in some residential settings - topography presents challenges for walkability
7. Lower East - Heritage areas - extensive mature street tree canopy - connections to bushland	- reinforce existing extensive established street tree canopy	- limited opportunities for tree planting in some residential settings/heritage constraints
8. North Turramurra Table - limited tree canopy - irregular layout and mix of uses	- topography facilitates good walkability - potential for tree planting as a result of cleared land	- ensuring connections to inner character areas due to isolation

Table 2 - Local Character Areas Green Grid Analysis

KU-RING-GAI BIODIVERSITY AND RIPARIAN LANDS STUDY (VERSION 5, 2016)

The Ku-ring-gai Biodiversity and Riparian Lands Study (Version 5, 2016) provides a foundational framework for the articulation of the Green Grid. The study has reviewed biodiversity and riparian patterns across the LGA, and sets out guidelines for the maintenance and enhancement of these conditions:

- sets targets for biodiversity and provides a review of relevant current Council policy and guidelines
- provides an outline analysis of geology, soils, water (catchments), flora and fauna; and
- explores the pressures on/challenges to maintaining or increasing biodiversity.

Riparian mapping

The elements mapped are waterways, which include rivers, tributaries, and piped channels. The mapping for riparian areas has been modelled around a Core Riparian Zone (CRZ), which is typically 40 metres measured from the top of the bank inland, either side of the watercourse. This zone incorporates no services or infrastructure. These are then divided into three categories - 1,2,3 & 3a, with 1 being the largest and most significant, grading down to 3a being the least significant or smallest. This classification takes into account the scale and potential for existing and future development.

The key focus of the riparian mapping is the establishment of corridors between major watercourses, National Parks and reserves which includes:

- Lane Cove River
- Garigal and Ku-ring-gai Chase National Parks; and
- Sheldon Forest and Dalrymple Hay nature reserves.

Biodiversity mapping

The mapping of biodiversity incorporates assessment of fauna and flora, and vegetation communities. It includes Biodiversity lands mapping, Greenweb mapping, and vegetation communities. These maps are not intended to be used at a scale less than 1:2000 and provide general information.

- **Biodiversity mapping** is biodiverse and supporting lands, including four of the five greenweb categories - not including canopy remnants. Typically areas are registered as Ku-ring-gai Natural Areas, Department of Planning and Environment (DPE) protected areas, and Regional Fauna habitat.
- **Greenweb mapping** includes core biodiversity lands, support for core biodiversity lands, landscape remnant, biodiversity corridors and buffer areas, and canopy remnant. Key Vegetation Communities (KVCs) help to direct mapping and categorisation/classification.
- **Vegetation community mapping** - identifies all the different vegetation communities represented within the LGA. It includes significant trees, but data incorporates a high degree of inaccuracy/variability.
- **Fauna & Flora assessment** - based on regional Catchment Management Authority (CMA) data, identifying the different species found within the LGA and where they are located.
- **Biodiversity hotspots** (including multiple threatened species) are identified.
- **Regional & Local fauna habitat** - based on CMA data and local studies including water catchment areas, and bushfire prone lands vegetation mapping.

Biodiversity Corridors

The mapping of biodiversity and riparian areas informs the identification of biodiversity corridors within the LGA. A biodiversity corridor is characterised as being:

- important for habitat, migration, genetic diversity etc.
- a link between key habitat areas and providing a connection between patches, remnants or fragments, includes urban vegetation
- preference for loop corridors, providing multiple connections between habitats
- a minimum of 40 metres wide.

The objectives of a biodiversity corridor are to:

- conserve the existing native flora and fauna in Ku-ring-gai
- protect and increase abundance and dispersal of threatened flora and fauna species and populations
- minimise obstructions to fauna migration through the consideration of design and construction
- provide opportunities for habitat and foraging, such as the provision of winter flowering plants for migratory species
- maximise the area and structural diversity of native vegetation, especially in areas adjacent to reserves and natural areas
- provide vegetation and structure to encourage native fauna (such as small flowered Grevillea to attract butterflies) (Australian Museum 2005)
- maximise the width of biodiversity corridors and retained vegetation
- maintain islands of structured vegetation
- encourage co-operative research projects to improve understanding and management of corridors within Ku-ring-gai; and
- facilitate community awareness of flora and fauna conservation and encourage partnership with landowners.

The table below outlines the issues and management strategies for biodiversity corridors

Issues	Management Strategy
Predation from introduced species and companion animals such as feral cats, foxes and dogs	<ul style="list-style-type: none"> · Baiting programs · Sound barriers · Providing education programs · Wildlife Protection Areas (these include council natural areas where cats and dogs are prohibited)
Nutrient loads and weed invasion Note: Weeds may very well be useful in providing protection for wildlife. Weeding a corridor might make it useless	<ul style="list-style-type: none"> · Weed management · Establishing bush care groups · Designing corridors through sites managed for regeneration · Managing stormwater outlets and improving drainage
Corridor vegetation and habitat condition, and bushfire risk	<ul style="list-style-type: none"> · Creating and maintaining habitats (including consideration of vegetation structure and habitat features - logs etc.) · Appropriate landscaping · Maintaining separate clumps of vegetation and habitat within a bushfire asset protection zones (including horizontal and vertical separation) · Maintaining public safety · Creating buffer zones surrounding the corridor, by replanting native vegetation in areas adjacent to the corridor
Human disturbance on public and private land	<ul style="list-style-type: none"> · Providing rubbish bins and walking tracks · Creating mowing exclusion zones · Educating private landholders
Managing barriers	<ul style="list-style-type: none"> · Facilitating crossing · Installing structural modifications
Community awareness	<ul style="list-style-type: none"> · Liaising with the community · Providing education programs

Table 3 - Biodiversity Corridors - Issues and Management Strategies

The biodiversity corridors mapped as part of the study provide the basis for exploration of Green Grid routes. Riparian mapping supports this, however physical interventions into these corridors will be limited and will not form core routes.

DESTINATION MANAGEMENT PLAN 2017-2020

Council's *Destination Management Plan 2017-2020* articulates the vision for supporting and enhancing visitation to the LGA by improving infrastructure, management and overnight stay accommodation. As outlined in the LSPS, it provides direction for exploration of Green Grid routes.

"This Plan has been developed to provide strategic direction for Council to plan for the sustainable management, development and marketing of tourism in Ku-ring-gai over the next four-years to 2020. In developing this Plan careful consideration has been given to ensure that the development and promotion of tourism celebrates and protects Ku-ring-gai's distinctive natural and built environments whilst providing benefits for the local community."

"Ku-ring-gai has significant opportunities to capitalise on its strategic location in Sydney, and to further develop and enhance its tourism offerings related to its abundant natural environment, Aboriginal and European Heritage, expertise in delivering innovative festivals and events, and contemporary recreational facilities."

"Primary Experiences (St Ives Precinct)

- *Festivals and events*
- *Nature based and Aboriginal tourism*

The main opportunities to grow Ku-ring-gai's Visitor Economy relate to potential of the St Ives Precinct as a tourism destination for events, unique trekking, nature based and Aboriginal tourism experiences."

One of the key elements of the vision is improving walking trails which the Green Grid will be fundamental in instigating. The St Ives Precinct Plan of Management has recently been endorsed by Council which provides the framework for activities in this region including walking trails.

Specific walking and associated tourism opportunities identified in the Destination Management Plan for St Ives Showground Precinct include:

- Better connect the Precinct to the Great North Walk
- Develop self-guided walks through attractions such as the Ku-ring-gai Wildflower Garden Phantom Falls
- Enhance current walking trails to make them circular
- Position the site as a hub for Aboriginal and cultural tourism
- Establish regular bush walking with members of the Indigenous community

Other identified tourism opportunities that could be facilitated through the Green Grid include:

- Link the regions 'brand' around 3 common themes; the natural environment, the coastline and Indigenous history
- Promote Ku-ring-gai a significant green space close to Sydney
- Build on the 'Leafy North Shore Image' through environmental credentialing and Indigenous tourism
- Promote key attractions, cultural precincts, nature walks and heritage trails
- Develop visitor maps to show connectivity of attractions and experiences
- Increase visibility through improved signage that provide visitors with clear directions.

“National Parks Interface

National Parks & Wildlife Service (NPWS) tourism and planning personnel consulted at the Bobbin Head Regional Operations office appreciated the strategic position and value of the St Ives Precinct for nature based tourism both from the existing activities and assets at the Wildflower Gardens and in the future as a world-class trekking hub with accommodation and tourist services. The personnel were very supportive of Council initiative in promoting tourism and recognised the potential for linking with NPWS infrastructure, trails and in building new connecting trails where necessary. It was appreciated that a new iconic walking track tourist product could be developed that connected by walking trails the St Ives Precinct with Brooklyn, Bobbin Head and West Head which already have brand awareness, infrastructure and high quality scenic values. The conceptual nature of these connections would be as follows:

- Bobbin Head via Warrimoo Track and return or by existing ferry service from Bobbin Head to Palm Beach/the Basin then back to the St Ives Precinct*
- Brooklyn, via existing Warrimoo, Berowra, and Great North Walk tracks with rail access at Berowra, Cowan and Brooklyn stations and ferry services at Brooklyn and Bobbin Head*
- West Head, via the Basin camping area that also has ferry services to Palm Beach and a combination of existing and new trails*
- Both the Brooklyn and West Head walks would be day walks from St Ives Precinct although there are options to do sections. From St Ives Precinct West Head would be the order of 18km and Brooklyn 22km although this distance could be reduced to approximately 17km with the construction of a 4 km section across the park that removes the need to join the Great North Walk down to Berowra Waters.”*



Figure 12 Ku-ring-gai Walking Trail Links Map

OPEN SPACE PROVISION

“Open space can be used for purposes such as personal and social recreation, sport and physical activity, active transport corridors, waterway and riparian corridors, biodiversity and fauna conservation, and visual and landscape amenity. Such settings include natural areas and linkages, foreshore areas, informal parkland, sports grounds and courts, children’s playgrounds, historical sites, formal gardens, and linear walking, cycling, and equestrian tracks.” GA NSW, Draft Greener Places Design Guide, 2020

Council is well resourced in terms of its diversity and volume of open space that it provides to the community for both active and passive recreation. For the Green Grid, the focus will remain on public open space, as this is within Council’s immediate purview to manage and instigate change. Public open space is defined as accessible by the public and is owned and managed by a local, state or federal authority. Ku-ring-gai’s open space suite incorporates land designated as public domain, park, sportsfield, bushland and national parks. Public Open Space affords the greatest opportunities to realise the Green Grid.

As stated in the Council adopted LSPS,

“Ku-ring-gai has a generous supply of environmentally significant open space; with NSW National Parks and Wildlife Service and Ku-ring-gai Council managed reserves constituting the majority of Ku-ring-gai’s greenspace. While these areas are a valuable resource, they do not fulfil all the open space needs of residents as they are not accessible to all members of the community and recreation potential is limited due to topography and environmental sensitivities. Council’s challenge will be to continue to plan and provide access to a range of open spaces to meet the recreation and leisure needs of the community.” LSPS 2020

The Ku-ring-gai local government area has 3,356 hectares of open space, including the following:

- 1747 hectares of bushland within three local national parks;
- 1151 hectares of natural areas;
- 98 hectares of parkland and gardens;
- 116 hectares of sportsgrounds;
- 68 hectares of Council owned golf course; and
- 176 hectares of drainage reserve.

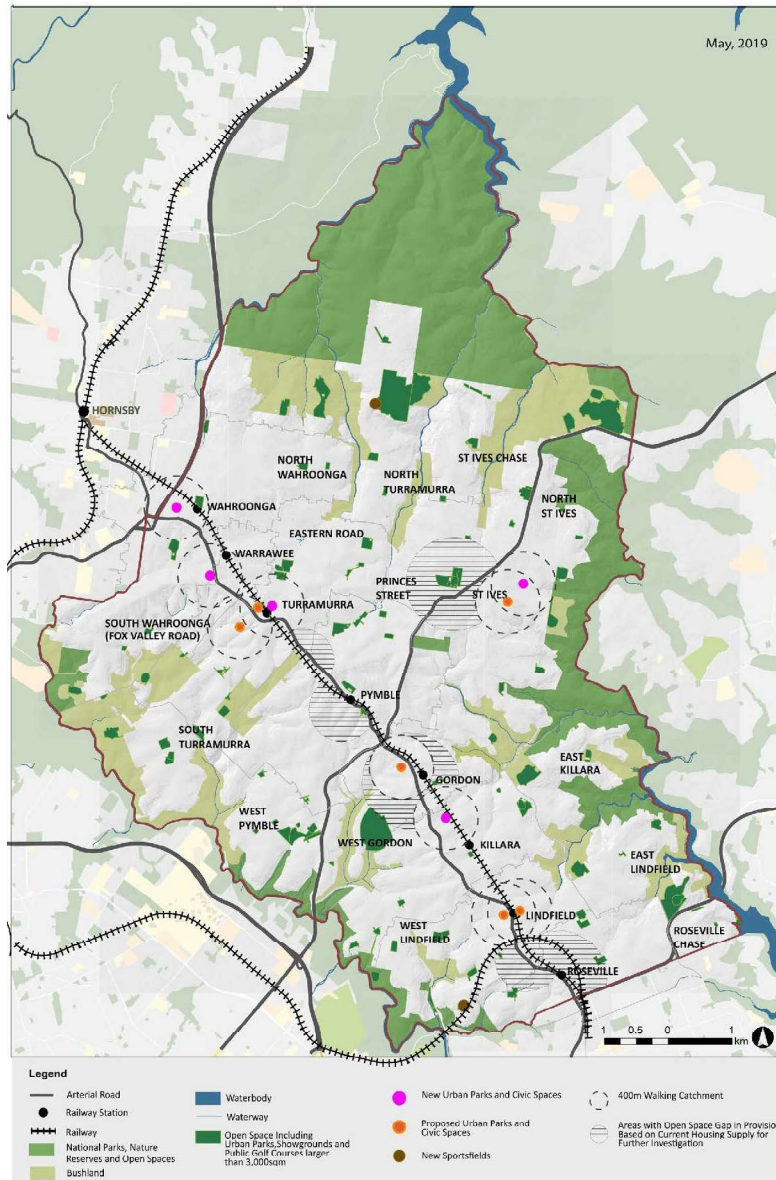


Figure 13 LSPS Open Space Provision

“Open space systems provide for a range of functions – leisure and recreation, conservation and preservation, visual amenity, environmental education and appreciation, drainage, and screening/buffering. Individual sites within the system may be of local or higher (from district to national) hierarchical significance.

Ku-ring-gai’s open space system comprises parks, gardens, bushland, sports grounds and courts, road reserves, civic spaces and undeveloped land with a diverse range of functions and from local to regional hierarchical significance.” Open Space Acquisition Strategy, 2006

There are a number of documents relating to open space provision which guide Council’s management and acquisition of land defined as open space.

OPEN SPACE STRATEGY, 2005

People, Parks, and Bushland: Open Space Strategy for Ku-ring-gai was prepared in 2005, and is due to be updated. It was prepared in order to assess Ku-ring-gai’s current open space provision and establish strategies and guidelines for its management in the future to meet changing demands. It looked at population and demographics, and took into consideration projections for the future. It identified a lack of publicly accessible local open space within walking distance of residences for a significant portion of the population.

OPEN SPACE ACQUISITION STRATEGY, 2006

The *Open Space Strategy* prompted the development of the *Open Space Acquisition Strategy (2006)* to enable Council to target areas where land was to be acquired for public open space. In conjunction with this was the establishment of a contributions plan to fund acquisitions.

This strategy was prepared by consultants Environmental Partnership and Recreation Planning, and is due to be updated. The *Open Space Acquisition Strategy (OSAS)* was established as a response to the *Open Space Strategy* prepared by Council the previous year, where gaps in open space provision were identified. "The OSAS establishes a series of principles for acquisition of open space and identifies priority areas for acquisition based on existing quantum of open space and projected population growth." *LSPS*

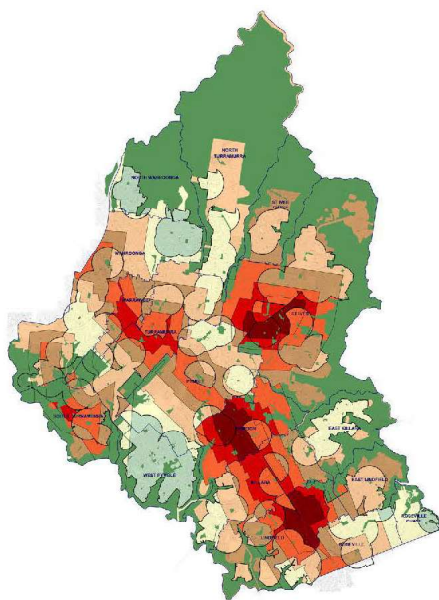


Figure 4-1 Ku-ring-gai Open Space Acquisition Program – 2006 Priority Acquisition Areas



Figure 4-2 Ku-ring-gai Open Space Acquisition Program – Implementation Status – May 2018

Figure 14 LSPS Open Space Acquisition

The OSAS has facilitated the enhancement of open space provision by approximately 23,000 square metres since 2010.

RECREATION NEEDS STUDY

Recreation needs analysis studies have been prepared for Council to align with the establishment of contributions schemes. The new *Recreation Needs Study* currently in production will interface closely with the new *Open Space Strategy*, and revised *Open Space Acquisition Strategy*, examining demographics, needs and provision for recreation facilities across the LGA. This will ensure balanced consideration of activity needs whether active, passive, structured or unstructured. The *Recreation Needs Study* will enable Council to determine what the current and potential future activities are that the community engages in, and therefore identify where shortfalls occur in the provision of facilities. It will also reference the *Recreation in Natural Areas Strategy* which was adopted in 2020. Ku-ring-gai's *Recreation in Natural Areas Strategy* specifically relates to the management of human activities in Council managed natural areas, and is explored later in the document.

The *Open Space Strategy* will then facilitate the development of how and where these resources can be provided. The *Recreation Needs Study* in combination with the *Open Space Strategy* will provide Council with an evidence base and strategic framework for effective recreation, open space, infrastructure, and financial planning for the future.

The open space network provides the foundation for establishing the Green Grid. Allowing connections for fauna and flora, and humans between these open space resources will reinforce these links. Recreational reserves, bushland, and urban public domain can all be connected via tree-lined active transport routes. Opportunities for connecting biodiversity corridor loops will also be explored. The Green Grid will be a unifying agent to connect our open space resources.

DEVELOPMENT

Building on the *Local Character Background Study*, this section of the study will examine what Ku-ring-gai looks like in terms of its development.

History

Ku-ring-gai is well known as a collection of leafy suburbs, due to much of the LGA being National Park. Much of Ku-ring-gai was cleared to make way for agricultural purposes, and logging.

European settlement

The first European settlement of the area is recorded in 1814, when William Henry took up land along the Lane Cove River to farm. Farming (including orchards) and logging were the primary land uses for most of the 1800's. In the 1890s, construction of a railway line through Ku-ring-gai made the area more accessible and sparked the development of suburbs, moving away from the established farm lots and small communities. The main centres developed around these stations substantively in the post-war period, each having its own unique character relative to its topography and development pattern. Ku-ring-gai has maintained a predominantly residential character, with no land currently zoned for industrial purposes.

LAND USE PLANNING

LOCAL ENVIRONMENT PLAN 2015 (LEP)

Council's Local Environment Plan was adopted in 2015. This legislation outlines zoning for the LGA which determines environmental protections and permissible uses for the development of land within the different zones, which include:

Residential Zones

- R1 General Residential
- R2 Low Density Residential
- R3 Medium Density Residential
- R4 High Density Residential
- R5 Large Lot Residential

Business Zones

- B1 Neighbourhood Centre
- B2 Local Centre
- B4 Mixed Use
- B5 Business Development
- B7 Business Park

Special Purpose Zones

- SP1 Special Activities
- SP2 Infrastructure

Recreation Zones

- RE1 Public Recreation
- RE2 Private Recreation

Environmental Protection Zones

- C1 National Parks and Nature Reserves
- C2 Environmental Conservation
- C3 Environmental Management
- C4 Environmental Living

Waterway Zones

- W1 Natural Waterways

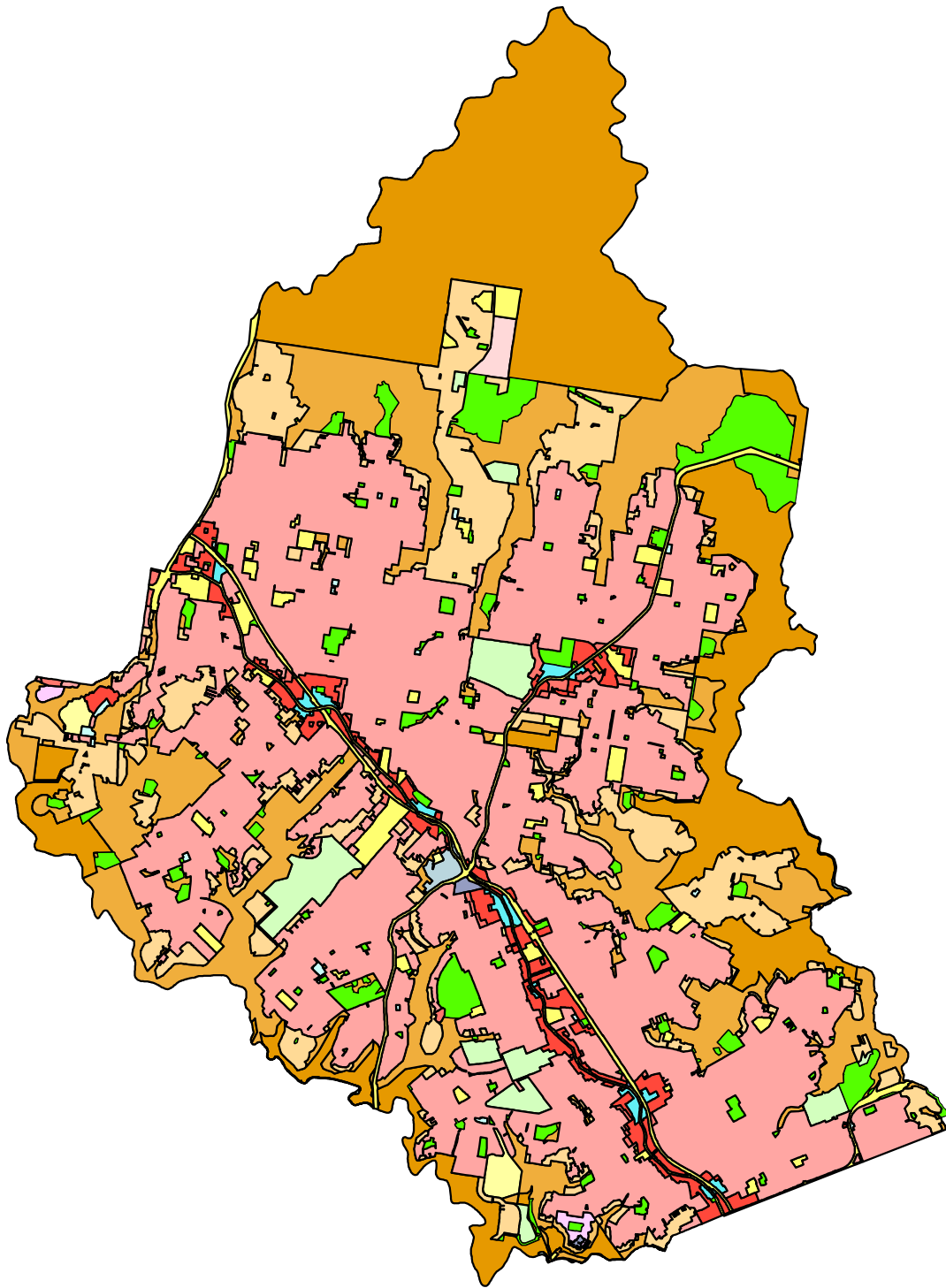
In 2021, 79.54% of the LGA is classified as 'urban' or developed, with the remaining 20.46% being National Park (Zone C1). Of the 79.54% urban area, 18.85% of this is identified as nature reserve and public open space. The majority of the urban land within the LGA is zoned as R2 Low Density Residential, making up 40.43% of the area.

The LEP contains environmental overlays including the mapping of areas of biodiversity and riparian significance. These overlays specify additional development restrictions and requirements for land within these areas, enabling more planting opportunities to strengthen ecological resilience and limiting development in the context of the Green Grid. Additional local provisions alongside these include controls over earthworks, stormwater and water sensitive urban design, requirements for multi dwelling housing and residential flat buildings, and residential lot sizes and setbacks. Land zoned as C4 Environmental Living has prescriptive controls relating to landscaped areas and floor space ratios, aiming to maximise the land available for planting to support biodiversity. These provisions support the broader framework to ensure that the Green Grid can be delivered.

Further general LEP conditions for development which may influence the establishment of the Green Grid include floor space ratios, heritage conservation, and bush fire hazard reduction.



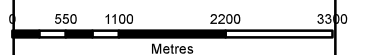
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Zoning - KLEP 2015

Land Use Zoning

B1	B7	C4	R4	SP1
B2	C1	R1	R5	SP2
B4	C2	R2	RE1	W1
B5	C3	R3	RE2	



Scale: 1:70000



21/10/2021

Figure 15 KLEP Zoning Map

DEVELOPMENT CONTROL PLAN 2021 (DCP)

Complementary to the LEP is the Ku-ring-gai Development Control Plan. This provides specific guidance relating to the siting, design and assessment of new developments within the LGA. It is divided into three sections:

Section A - Site analysis, land consolidation and subdivision, dwelling houses, secondary dwellings, multi-dwelling housing, residential flat buildings, mixed use buildings, non-residential and office buildings, child care centres, sex industry premises, signage and advertising, tree and vegetation preservation.

Section B - Guidelines for urban precincts and sites, land contamination, bushfire risk, biodiversity, riparian lands, heritage items and heritage conservation areas, development near road and rail noise.

Section C - General site design, access and parking, building design and sustainability, water management.

Whilst each development type has site guidelines incorporating landscape provision, Section A, Part 13 *Tree and Vegetation Preservation* details requirements for existing and new tree planting.

This section of the DCP sets out stipulate the requirements to retain as much existing vegetation as possible, whilst nominating that replacement is mandatory where removals take place. As with the LEP, the controls work to facilitate best practice management of development to ensure the protection and enhancement of urban forest canopy and biodiversity, which are crucial to the Green Grid.

Opportunities for the Green Grid

The greatest opportunities for instigating projects for the Green Grid lie within space that is classified as public land - land owned or managed by Council. The percentage of the LGA classified as public land is 32.05%. This reveals that the remaining land - 67.95% - is in private ownership (of which 53.57% is residential).

To establish the connections for the Green Grid to be successful, partnerships with stakeholders and landowners will be critical. Private landholders and developers will be subject to these LEP and DCP controls, and therefore it is up to Council to ensure that these go far enough in order to facilitate delivery of Green Grid projects.

DRAFT PUBLIC DOMAIN PLAN 2020

The draft public domain plan provides guidance for the development of the LGA in areas which are classified as 'public domain' - areas that are owned and managed by Council and are publicly accessible. The draft public domain plan has been developed around targets identified in the North District Plan, with specific targets defined within Ku-ring-gai's LSPS.

Liveability and Sustainability Framework - North District Plan
Sustainability - delivering Green Grid

Planning Priority N19

Increasing urban tree canopy cover and delivering Green Grid connections. Increasing the Green Grid means:

- expanding urban tree canopy in the public realm
- providing opportunities for connections that form the long term vision of the network; and
- walking and cycling links for transport as well as leisure and recreational trips.

Ku-ring-gai LSPS (Sustainability)

K32. Protecting and improving Green Grid connections

K33. Providing a network of walking and cycling links for leisure and recreation

The Public Domain Plan is applicable to publicly accessible spaces within local centres, and provides direction for;

- Street Character and Function
- Public Spaces
 - provide shade and shelter in public spaces through the planting of trees
 - retain and enhance areas of local biodiversity and fauna habitat within public spaces, where possible
- Tree Canopy
 - protect and supplement the tree canopy cover of each Local Centre
 - protect and enhance the existing landscape character of the area
 - provide shade and shelter through the use of canopy planting
 - enhance the pedestrian and visual amenity of the streetscape; and
 - assist in the establishment of bio-linkages through canopy connectivity, where possible.
- Pedestrian Access and Circulation
 - enhance pedestrian connections within and between the Local Centre and to surrounding residential areas
- Multi-modal Transport Integration
- Vehicle Access and Circulation
- Views and View Corridors
- Wayfinding and Signage

Local Centre specific plans for Turramurra, Gordon, Lindfield, *Roseville, St Ives and Pymble* will be explored in detail in later stages of the Strategy as they include specific plans for creating green linkages.

COUNCIL POLICIES AND STRATEGIES

The following section provides a review of the current Council adopted policies and strategies that are likely to have influence over the implementation of the Green Grid. A number of updates to these policies are in draft format pending adoption by Council.

URBAN FOREST POLICY

Urban Forest is defined as all of the trees, other vegetation as well as the soil, seedbank and water that support these. It includes the network of vegetation within both public and private ownership, encompassing the spectrum of vegetation growing within:

- Natural soils that exists independent of human involvement
- Altered soils, including gardens, bio-retention basins, raingardens; and
- Engineered structures such as tree cells / vaults, vertical and roof top gardens.

Council is committed to protecting and enhancing Ku-ring-gai's leafy, bushland character and identity through sustainable management of its Urban Forest. This includes:

- Integration of green landscaping elements within built infrastructure
- Conservation of our magnificent environment for future generations; and
- Balancing benefits from the protection, health and growth of the urban forest against associated risks.

The *Urban Forest Policy* provides the framework for managing trees and vegetation within the LGA. It provides specific guidelines for ensuring the health and longevity of trees and associated vegetation. This includes legislative, policy and management measures to increase health, sustain canopy, increase green infrastructure, ensure species diversity, monitor progress, manage risks, and engage the community.

Council's *Urban Forest Strategy*, *Urban Forest Replenishment Program* and *Urban Forest Monitoring Program* will support this Policy and will provide the framework and resources for the management of the urban forest.

In conjunction with the *Urban Forest Strategy* which is currently being developed, the *Green Grid Strategy* will outline direct actions for maintenance and expansion of the urban forest.

URBAN FOREST STRATEGY

(In Production - Due 2022)

The *Urban Forest Strategy* is one component in a wider framework for ensuring the health, longevity and enhancement of Ku-ring-gai's Urban Forest. The endorsement (in February 2020) of the *Urban Forest Policy* was the first step in this process. Supporting this was a Strategic Directions paper, which outlines Council's requirements for a new approach to Urban Forestry and how we can best achieve this goal. The key program to assist in facilitating this is the Urban Forest Monitoring Program. This program enables data collection, monitoring and review to inform the directions and outcomes Council should aim for in managing its Urban Forest successfully. The first part of this program was undertaken in 2020 through the collection of high-resolution airborne multispectral and thermal imagery and associated reporting; providing analysis of Ku-ring-gai's 2020 vegetation cover and recommendations for future monitoring (ArborCarbon 2020). The endorsed *Urban Forest Policy* outlines the key objectives for the development and ongoing management of Ku-ring-gai's urban forest. The *Urban Forest Strategy* document is fundamental in articulating our historical and current situation and then determining how we are best placed to expand and enhance this asset into the future.

The strategy document will incorporate the following:

- Analysis of historical context;
- Analysis of the urban forest current status;
- Review of strategic context;
- Establishing the environmental, community and economic benefits of an urban forest;
- Address the issues and challenges faced in establishing, maintaining and enhancing Ku-ring-gai's urban forest (including within Ku-ring-gai bushfire risk);
- Articulate the vision, principles, objectives, goals and actions for the strategy;
- Support and inform (where possible) creation of green infrastructure, Council's Water Sensitive City, management of heat island effects, Biodiversity corridors and Ku-ring-gai's Green Grid;
- A long term Urban Forest monitoring and improvement program addressing:
 - benchmarks for future canopy targets (containing LGA, and sub groupings such as zoning, suburb, Council managed open space);
 - Canopy and vegetation mapping; and
 - Projected or desired canopy extents in prioritised areas.
- Provide actions, programs and targets to manage Ku-ring-gai's Urban Forest and meet strategy objectives, addressing the following key areas:
 - Tree and other vegetation targets;
 - Risk to and from the Urban Forest (including pests, disease);
 - Urban forest species, structural and age diversity; and
 - Asset management, including monitoring, protection, replacement, removal, planting.
- Partnerships, advocacy and engagement including the community and other Urban Forest Stakeholders.

The *Urban Forest Strategy* will provide direction for:

- Council planning documents including Local Environmental Plans (LEP), Development Control Plans (DCP) and Public Domain Plans;
- Town Centre upgrades;
- Planting on public and private land, including Council's Urban Forest Replenishment Program;
- Creation of a public land and street tree inventory; and
- Utilisation of green infrastructure and water sensitive urban design.

Clear canopy targets will be identified, and measures to achieve these will be incorporated into the relevant LEP/DCP documents. In order to achieve canopy targets it is likely that a significant portion of planting will need to occur on private land. Strategies to achieve this through education and collaboration will be articulated as part of the actions in the *Urban Forest Strategy*.

Fundamental to supporting the *Urban Forest Strategy* is community engagement and support. Clearly defined approaches to education and fostering of community support will be included in targets and actions. Stewardship is something that needs to be encouraged within the Ku-ring-gai community to ensure that the Urban Forest is nurtured and long-lived. This coincides with community engagement goals for the Green Grid, which will be explored in later report stages.

Also essential to achieving canopy targets is street tree mapping and identification of opportunities for canopy expansion. This is expected to be informed through a combination of remote and field data, collected as part of the Urban Forest Monitoring Program. Opportunities for tree planting (and where relevant vegetation planting) will be included in the *Urban Forest Strategy*. Canopy expansion opportunities will not include areas of national parks and established bushland, but focus on the built environment with a view to mitigating Urban Heat Island Effects (UHIE).

The critical aspect of the *Urban Forest Strategy* that will influence the Green Grid are the identification of planting opportunities, particularly in those areas susceptible to the impacts of the UHIE. The Green Grid will provide a mechanism for ensuring that the canopy targets identified in the *Urban Forest Strategy* through tree planting are achieved.

The *Urban Forest Strategy* is a four stage report document that is being produced by consultants ArborCarbon and Good Canopy Company. A preliminary round of community engagement has been conducted, with another to co-incide with the public exhibition of the draft strategy prior to its adoption by Council. This is scheduled for mid 2022.

RECREATION IN NATURAL AREAS STRATEGY

The *Recreation in Natural Areas Strategy* provides a management framework for the provision and support of a diverse and accessible range of recreation opportunities in the natural areas of Ku-ring-gai in a way that protects and enhances our local environment.

The objectives of the strategy are to:

- Provide and support a range of ecologically sustainable, diverse, inclusive and accessible recreation opportunities and supporting infrastructure within Ku-ring-gai's natural areas
- Manage recreation in natural areas to ensure the protection of environmental, social and cultural values
- Prevent the unauthorised construction and use of informal tracks and trails and other recreation infrastructure within the Ku-ring-gai Local Government Area (LGA)
- Create an informed and educated community who appreciate the value of our natural areas and sustainable, nature based recreation
- Promote Ku-ring-gai's nature based recreation opportunities to encourage active and healthy lifestyles
- Identify management actions that improve the overall experience of recreation in Ku-ring-gai; and
- Participate in regional collaborations, advocacy and partnerships to represent the interests of Ku-ring-gai's recreation user groups and individuals.

Management actions – trail dependent recreation

Within Ku-ring-gai's natural areas, the majority of recreation is trail dependent. A well-maintained and connected trail network benefits multiple user groups and allows people of all ages and abilities to enjoy and connect with nature through recreation and exploration. These trails are also crucial for fire management, for accessing and servicing utilities and for providing access for environmental monitoring and conservation. Network expansion will be focused around strategic linkages and multi-use opportunities. Information on points of interest, the natural environment and Aboriginal heritage will make recreation in natural areas more meaningful and provide the connection to nature that people are seeking.

Specific actions from the *Recreation in Natural Areas Strategy* applicable to the Green Grid include;

- Identify strategic trails within Ku-ring-gai's natural areas for formalisation or construction, if feasible, in accordance with Sydney's Green Grid and Ku-ring-gai's Green Grid Strategy; and
- Identify strategic mountain bike tracks within Ku-ring-gai's natural areas for formalisation or construction, if feasible, in accordance with Sydney's Green Grid and Ku-ring-gai's Green Grid Strategy.

Legend

- National Parks Walking Track Priority
- Naturally Accessible Sites
- Iconic Walks
- Fire Trails
- Trail Network for Categorization
- Track Network (Walkers Only)
- ▤ Potential Strategic Links (Green Grid)
- National Parks
- Natural Area
- Open Space (Not Natural Area)

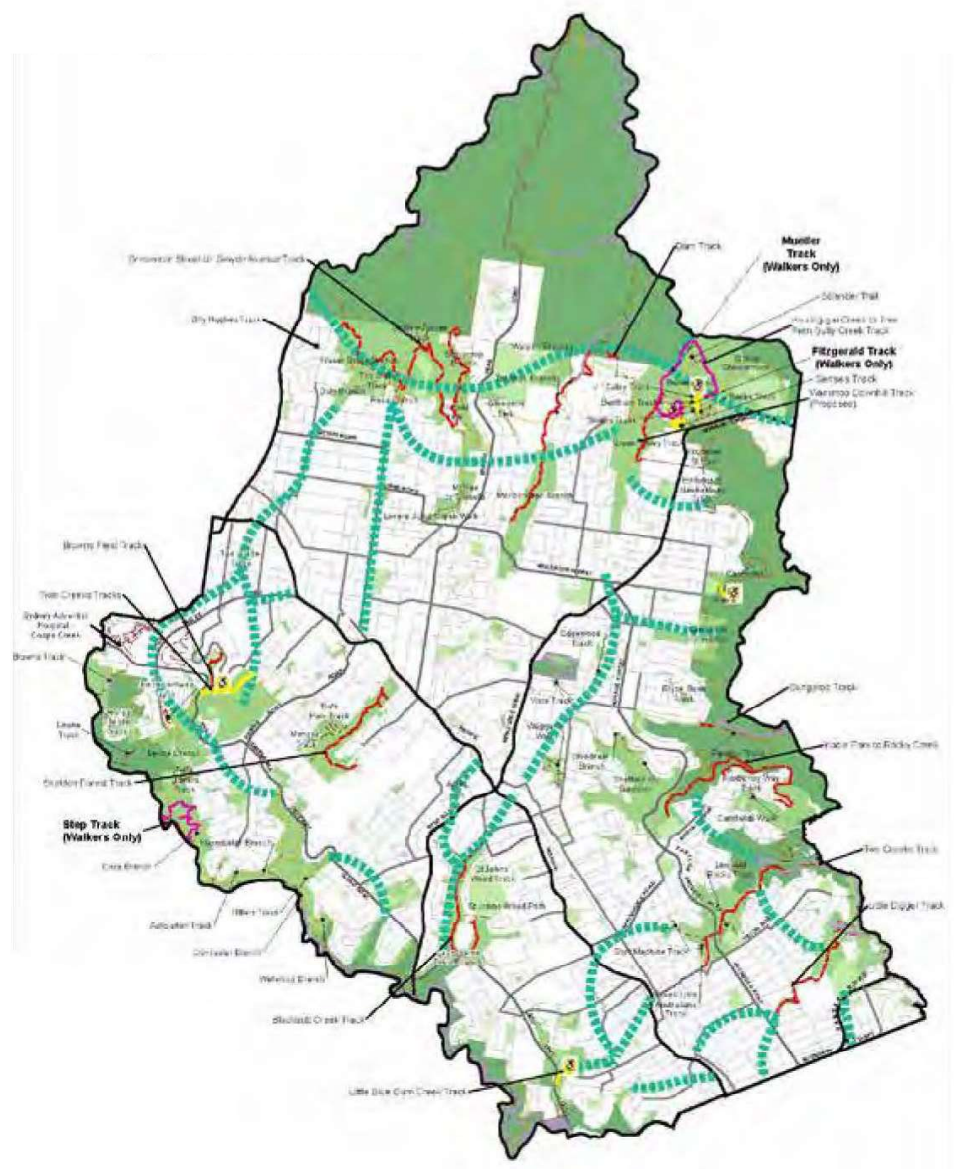


Figure 16 Strategic direction for trail dependent recreation

KU-RING-GAI BIKE PLAN

This report prepared by consultants GHD in 2012 outlines the proposed cycling routes for the LGA. It examines both on and off road opportunities, with a focus on commuter cycling as opposed to recreational routes. It provides a comprehensive analysis of opportunities and constraints and is supported by comprehensive community consultation.

The report aligns with State identified strategies including:

- The upgrade of walking and cycling infrastructure in local centres, including cycleway development in Turramurra by Transport for NSW, in cooperation with local government; and
- Improved access to public transport by aligning walking and cycling routes with public transport routes.

In addition a large proportion of respondents identified the Pacific Highway as a key gap in the Ku-ring-gai cycling network that needs to be a priority.

The map below outlines the existing and proposed bicycle network for Ku-ring-gai. This will be incorporated into the Stage Two report of mapping and analysis.

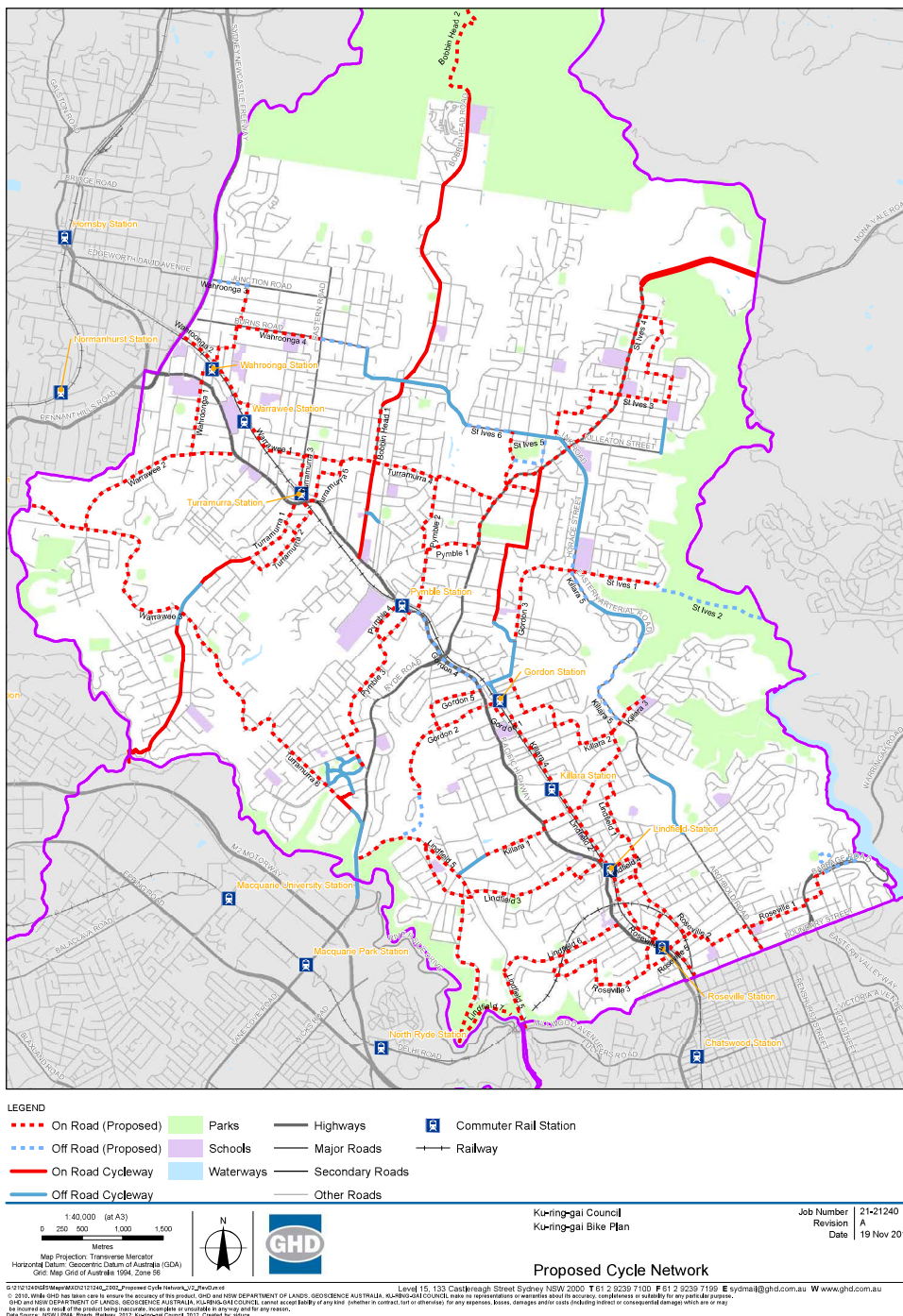


Figure 17 Ku-ring-gai proposed cycle network

BIODIVERSITY POLICY

This Policy provides a management framework for the protection and conservation of the Ku-ring-gai LGA's biodiversity assets and values, in accordance with international, national and state agreements, legislation, policies and programs.

Ku-ring-gai is a biodiverse LGA with many endangered ecological communities (EEC), and Council recognises the need to protect and enhance this. Strategically, Council is obliged to do this under 'The Greater Sydney Region Plan - A Metropolis of Three Cities'.

Most of the vegetation classified as EEC within the LGA occurs on private land (70%). It is critical that Council manages this through zoning and permissible uses and other planning regulations.

The implementation program for the policy incorporates three streams:

1. *Natural resource management* - focussing on protection of natural systems rather than amelioration.
2. *Statutory Planning, Policy and Regulation* - putting in place strong protection for biodiversity and habitat in order to utilise offsets as a last resort.
3. *Partnerships, Advocacy and Education* - engaging landholders, inspiring behavioural change.

Implementation activities specific to the Green Grid include:

- Promote, protect and enhance connectivity corridors including Riparian Lands, Green Grid and Greenweb (including biodiversity corridors); and
- Investigate and develop active partnerships to enhance biodiversity outcomes with key stakeholders (for example, coordinated programs, activities and strategic planning with other Councils, state government, and other land holders).

Council will monitor and report against this Policy as follows:

Objective

Conservation

Retain, maintain and restore biodiversity within Ku-ring-gai LGA, including:

- protecting biological diversity of native fauna and flora
- protecting the ecological processes necessary for their continued existence
- encouraging the recovery of threatened species, communities, populations and their habitats
- identifying and mitigating key threatening processes
- protecting, restoring and enhancing biodiversity corridors and buffers; and
- applying best practice natural resource management and ESD principles.

Data application / indicator

Green Grid Strategy created and implemented.

Data collection / measurement

Number of Green Grids, including infrastructure, improved.

FAUNA MANAGEMENT POLICY

The purpose of this Policy is to provide a framework for Council to manage native and invasive species within the Ku-ring-gai Local Government Area (LGA).

The objectives of this Policy are to:

- Maintain, protect and enhance Ku-ring-gai's diverse native fauna and their habitat
- To identify, protect and enhance biodiversity corridors and green infrastructure within Ku-ring-gai's Green Grid
- Assist the community to positively co-exist with native fauna on public and private land
- Control the spread of invasive species, reduce their impacts and prevent the establishment of new invasive species
- Stop the decline of and support the recovery of listed threatened fauna species and populations and to manage key threatening processes associated with these species
- Implement a fauna monitoring and research program, which incorporates on ground surveys and seeks to support and integrate research from other organisations, to inform Council's fauna management program; and
- Form collaborative partnerships with a range of stakeholders to facilitate positive fauna management outcomes.

This Policy focuses on the management of native and invasive species on public and private land within the Ku-ring-gai LGA. This includes the following objective applicable to the Green Grid.

Objective

To identify, protect and enhance biodiversity corridors and green infrastructure within Ku-ring-gai's Green Grid.

Data application / indicator

Greenweb biodiversity corridors reviewed, promoted, maintained or improved.
Green Grid Strategy created and implemented.

Data collection / measurement

Canopy extent within biodiversity corridors improved or maintained.
Number of Green Grids, including infrastructure, improved.

Other policies which are relevant to the Green Grid but do not have specific measurable objectives related to it include;

WATER SENSITIVE CITY POLICY

The purpose of this policy is to adopt and implement the management principles of a Water Sensitive City by responding to the issues of water conservation and water security, flooding risks, degradation of urban waterways and rising temperatures in a way that enhances the liveability of Ku-ring-gai.

CLIMATE CHANGE POLICY

Ku-ring-gai Council's climate change policy commits to appropriately respond to the challenge of climate change and play a leading role in the community. Council's Climate Change Policy and the supporting *Towards Net Zero Emissions - 2030 Action Plan* provides a pathway for Council to take all reasonable and practical measures to increase climate change resilience and reduce greenhouse gas emissions across the organisation and within the community.

WEED MANAGEMENT POLICY

This policy outlines Council's weed management responsibilities and approach concerning its obligations under the *New South Wales (NSW) Biosecurity Act 2015* in respect of responding to legislation and community concerns, and provides guidance for various Council programs.

TREE WORKS NOTIFICATION POLICY

The purpose of the *Tree Works Notification Policy* is to consult with the public and Ward Councillors regarding proposed works in relation to tree removal and tree work applications where a significant tree is involved and the removal or pruning of which may be detrimental to the enjoyment of the property. It also serves to clarify the circumstances when the notification of tree works is required and not required, and applies to trees on both public and private land.

NEIGHBOURING COUNCILS - RYDE, HORNSBY, WILLOUGHBY, NORTHERN BEACHES

Within the North District as identified in the Greater Sydney Region Plan, Ku-ring-gai has several neighbouring Councils including City of Ryde, Hornsby, Willoughby, and Northern Beaches. The Green Grid extends beyond LGA boundaries, and where these interfaces occur, liaison and negotiations between Councils will be pivotal in ensuring connectivity is maintained. The success of the Green Grid program is also dependent on Councils working collaboratively to ensure that residents can access information across Council boundaries.

Each Council is at differing stages in their development of a local Green Grid Strategy. The analysis included here provides a snapshot of their progress towards the end of 2021. Ku-ring-gai will work with these Councils into the future as our Strategy is developed and specific interfaces become apparent.

RYDE - RYDE-EASTWOOD-MACQUARIE PARK (REM) GREEN LINKS MASTERPLAN

Ryde Green Links masterplan is the most progressive exploration of the Green Grid of all published works from neighbouring Councils.

The Ryde - Eastwood - Macquarie Park (REM) Green Links are envisaged as three interconnected urban green corridors, which function as biodiversity corridors, continuous green transport connectivity (active and mass transport) along activated open spaces, and serves as a platform for cultural engagement and recreation.

The name REM Green Links represents the local centres of cultural significance: (West) Ryde, Eastwood and Macquarie Park. 'Green Links' embodies the idea that these centres will be connected by the open space networks, with Green representing the environment and sustainability and 'Links' representing the interconnectivity for ecology, transport, recreation and culture.

It identifies three key project corridors for development including:

Shrimptons Creek Green Link: will form an open space corridor connecting Macquarie Park and West Ryde, running from north-east to south-west through the centre of the City of Ryde and onwards to Meadowbank.

County Green Link: will form a connection between Macquarie Park and Eastwood via Marsfield.

Terrys Creek Green Link: is located on the north-western boundary of the City of Ryde, between Eastwood and Epping. This Green Link will form a connection between Macquarie Park and Eastwood via Lane Cove National Park

HORNSBY - BIODIVERSITY CONSERVATION STRATEGY (DRAFT)

Hornsby's draft Biodiversity Conservation Strategy makes strong references to implementing corridors associated with the Green Grid. Most of the Hornsby Green Grid will be delivered through their Walking and Cycling Strategy (to be developed). A possible connection along the Pacific Highway and rail corridor has been identified.

WILLOUGHBY - 'LOVE YOUR TREES', OUR GREEN CITY PLAN, INTEGRATED TRANSPORT STRATEGY (2020)

Willoughby Council references their sustainable transport aspirations as part of their Our Green City Plan, but the Integrated Transport Strategy of 2020 makes no reference to the green grid (only a 'green web'). Willoughby Council's LSPS references the Green Grid, but does not identify the production of an independent Green Grid Strategy. Identified as enhanced walking and cycling connections.

NORTHERN BEACHES - WALKING PLAN, NORTHERN BEACHES BIKE PLAN

Northern Beaches has a walking plan focussed on getting people out of cars, and a bike plan which make reference to Green Grid connections. Their LSPS does not identify a separate Green Grid Strategy, and this correlated with correspondence with staff. There may be provision of a map as part of Open Space and Recreation Strategy, and possible connections will be explored as part of this mapping. Any Green Grid projects identified would be subject to feasibility studies.

CASE STUDIES

RYDE GREEN LINKS MASTERPLAN

The Green Links Masterplan outlines City of Ryde's response to delivering the Green Grid by connecting Ryde, Eastwood and Macquarie Park. This will not only connect Ryde's town centres, but also the Parramatta and Lane Cove Rivers. Their LGA has 3 priority corridors which are being funded in part by the Metropolitan Greenspace Program. It provides the missing links for existing cycling and walking networks, and is a collaboration with State Government agencies who own portions of the land that the links encompass. Their aim for the green links is to;

- provide linear open space connections via green, vegetated corridors
- connect walking and cycling with public transport where feasible

The three corridors are:

1. Shrimptons Creek Green Link
2. County Green Link; and
3. Terry's Creek Green Link - this connects to Brown's Waterhole in Ku-ring-gai.

The masterplan document for the Green Links seeks to provide direction on the physical outcomes, and integration of programs and management and maintenance to realise the vision. The thematic objectives of the masterplan include environment, green transport, recreation, and culture and community. Environment and green transport form the backbone of the links, with recreation and culture and community providing activation points along the way.

Objectives

Environment

- protect and enhance natural areas including bushland, waterways and ecosystems
- manage and mitigate effects of climate change on people and ecology (green grid); and
- collaborate with volunteers (bush care groups), businesses and the community to care for and enhance natural areas.

Green Transport

- create safe, continuous and permeable active transport corridors with connections to the surrounding networks
- explore connectivity and interconnectivity with current and future mass transport options; and
- enhance and maintain connections and accessibility to centres, open spaces and places, including improved cycleways and walkways.

Recreation

- deliver a series of interconnected, high quality open spaces that encourage active lifestyles and social interaction; and
- integrate a range of active and passive recreation opportunities for the community to meet, play, learn and connect.

Culture & Community

- celebrate cultural diversity and promote inclusion
- protect, enhance and interpret cultural heritage
- use the Green Links for educational purposes and to share stories and information.
- provide places that support events; and
- create and enhance community infrastructure along the Green Links and enhance amenity value, design quality, identity and sense of place.

The masterplan is divided into two stages. The first stage of the masterplan which has been released, is the Stage 1 Context Analysis report, which addresses the following:

- Introduces the REM Green Links and explains the purpose, scope and objectives of the Masterplan
- Provides background information on the strategic context of the Green Links as well as the context around green transport, ecology, recreation and culture
- Presents an overview of the existing character of the Green Links corridor, divided into six precincts; and
- Presents lessons from other Green Links around the world.

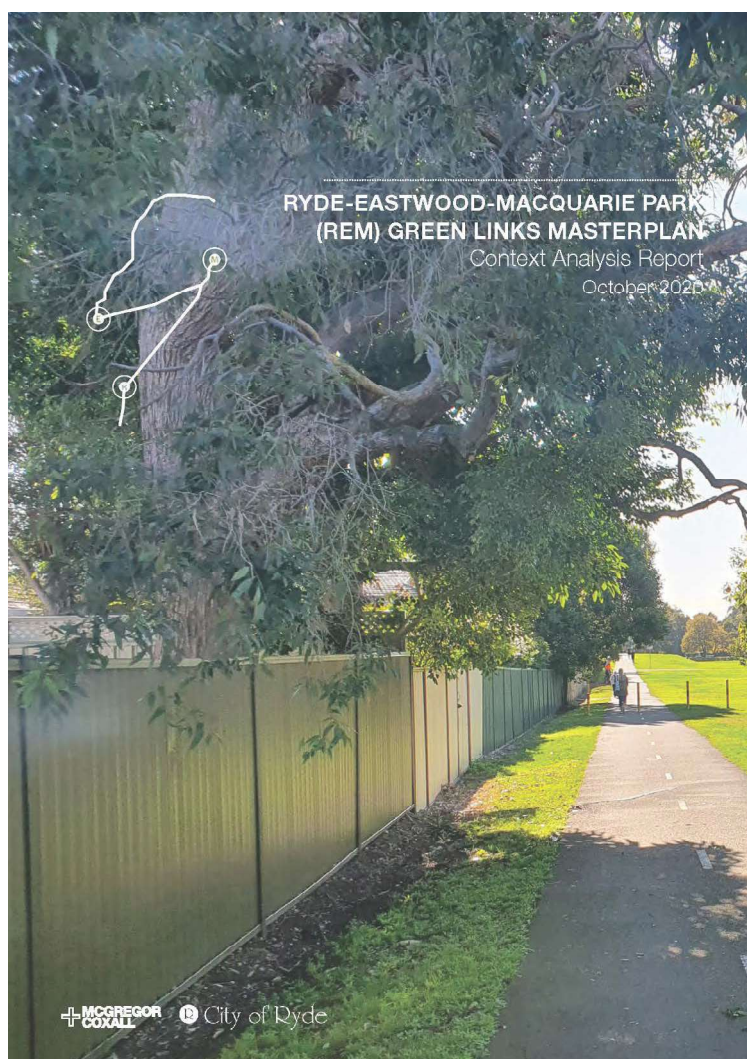
The final component of the masterplan which is due to be completed following stakeholder and community consultation will:

- Summarises the outcomes of stakeholder engagement
- Presents the strategies which guide the Masterplan and future design and implementation
- Presents the Masterplan, including plans for seven precincts and their interconnectedness
- Summarises the proposed implementation strategy for the Masterplan; and
- Presents guidelines for the design stage, including recommendations on materials, finishes and planting.

Terry's Creek Green Link - Browns Waterhole Precinct

Green Transport

North of Vimiera Road an underpass under the M2 motorway provides connection to the concrete path that connects Browns Waterhole to Kissing Point Rd, South Turrumurra. This is one of the key connections for cyclists and pedestrians to cross Lane Cove National Park and the M2 motorway, connecting the City of Ryde with Ku-ring-gai Council.



PARRAMATTA WAYS

The Parramatta Ways is a key component of Parramatta City Council's delivery of the Green Grid. It is a comprehensive strategy for improving the liveability of Parramatta by incorporating walking and greening strategies throughout the LGA.

Alongside the major Sydney Green Grid routes already identified, the premise of this study was to analyse key walking routes throughout the LGA determining those which presented the most need in terms of lack of infrastructure, offered the most connections, and had the highest user numbers. This involved an approach where networks of hydrology, ecology, topography, cultural highlights, transport, heritage, high density residential development, impediments to walkability, and local character were analysed and overlaid to build up hierarchies for potential routes. The creation of living streets by making streets more walkable is a priority of the Parramatta Ways. The fundamental premise of this strategy is to incorporate street tree planting along these routes to increase shade, provide habitat and create a comfortable walking environment. This involves redefining street design by prioritising pedestrians and promoting the creation of safer, comfortable, and interesting streets/routes.

Project Objectives

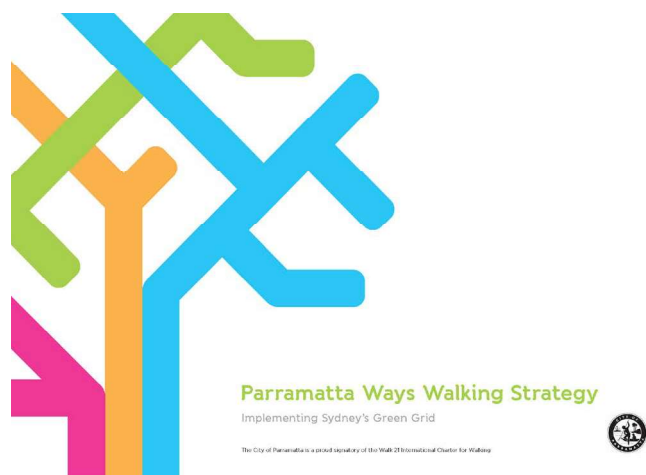
- Create a walkable city
- Reveal Parramatta
- Improve the environment
- Build on local identity
- Support healthy lifestyles
- Engage the community

Project Targets

- Identify and complete priority missing pedestrian network connections
- Increase recreational walking participation
- Increase walk to school rates
- Increase walk to work/public transport trips
- Increase foot traffic to local centres
- Increase tree canopy cover along network
- Increase perceptions of safety associated with walking
- Ensure all residents live within 5min walk of the Parramatta Ways network

Key Network Strategies

- Stitch together key destinations into a connected walking network
- Utilise regional green corridors to maximise local walking and open space connection opportunities
- Build a series of identifiable loops that encourage recreational walking
- Create a finer network of pedestrian friendly streets across the LGA supporting the walking network



OBJECTIVES AND GUIDELINES

Following the background review, a number of objectives and guidelines have been developed that will provide the framework for the Green Grid strategy for Ku-ring-gai.

OBJECTIVES

What would we like the Green Grid to achieve? These objectives articulate the overarching vision for what Council want our Green Grid to deliver.

Increased canopy cover across the LGA

Ku-ring-gai benefits from a well-established and extensive urban tree canopy. Pressures from development, climate change and risk mitigation all impact on how this is able to thrive and expand. Clear targets for the delivery of an improved urban forest canopy are essential for ensuring the longevity and success of our urban forest. Green Grid projects are fundamental to achieving this.

A consolidated active transport network providing comfortable walking and cycling routes

Active transport is critical in sustainable progress towards meeting climate change mitigation targets. Council is pursuing opportunities to develop the best possible links that provide the infrastructure to support both walking and cycling transport options. Integral to the comfort of these routes is shade and an aesthetically pleasing environment, which co-ordinated street tree planting as part of the Green Grid can deliver.

Walkable connections between points of interest in the LGA

Local Centres, historic sites, parks and recreation facilities all provide points of interest within the LGA which residents want to access. The Ku-ring-gai Green Grid will endeavour to make walking the preferred way to get to, from and between these points by improving green infrastructure interventions along these routes, ensuring they are shaded, pleasant and accessible.

Enhanced biodiversity and riparian corridors

Fundamental to the Green Grid is the enhancement and protection of our existing natural systems. These need to be supported and expanded wherever possible. The balance needs to be struck between creating new connections to re-link patches of bushland, and allowing the appropriate level of access to sensitive areas.

GUIDELINES

How are we going to get there?

The next stages subsequent to this report will provide the framework for the delivery of Ku-ring-gai's Green Grid.

Stage Two - Mapping Analysis

- Analysis Mapping - creation of maps to overlay opportunities and constraints to identify routes
- Review and assess the practicality and feasibility of the Sydney Green Grid Projects identified for the Ku-ring-gai LGA
- Review and assess the practicality and feasibility Ku-ring-gai walking trails as identified within the *Ku-ring-gai Destination Management Plan 2017 -2020*
- Investigate how the Green Grid may support potential biodiversity connections and corridors *Ku-ring-gai Biodiversity and Riparian Lands Study Version 5*
- Review mapping layers from Council Geographical Information Systems (GIS) and previous studies – (including, but not limited to) subdivision patterns, open space provision, contours, slope, vegetation, biodiversity, hydrology etc.
- Review available aerial tree canopy coverage mapping data

- Undertake site visits throughout the LGA – to commence ‘ground truthing’ to better understand the topography and character of potential routes
- Review of nominated Green Grid opportunities as articulated in established Greater Sydney Green Grid Projects and Ku-ring-gai walking trails
- Review Walking Green Grid opportunities
- Review of Ecological, Biodiversity and Hydrological corridors; and
- Establish which Green Grid corridors are suitable for active transport.

Stage Three - Draft Guidelines, Principles and Actions

- Articulate a vision, goals and actions for the Strategy
- Recommend a preferred network for the Green Grid; and
- Mapping that articulates an overall Green Grid network throughout the Ku-ring-gai LGA, underpinned by:
 - A walking network
 - A biodiversity network; and
 - A hydrological network.

Stage Four - Final Report

- The strategy will clearly articulate:
 - Benefits of the Green Grid
 - Vision and principles/objectives
 - Network Map
 - Project priorities
 - Staging plan; and
 - Funding mechanisms.
- Implementation and staging plan, articulating priority projects associated with local and neighbourhood centres, timeframes and funding strategies.
- Identification of 3 priority routes underpinned by crossovers between recreation and biodiversity networks, including indicative cost estimates for these routes; and
- Concept scenario for a stage 1 project with indicative cost estimate.

REFERENCES

- Greater Sydney Commission The Plan A Metropolis of Three Cities - The Greater Sydney Region Plan
- North District Plan
- Future Transport Strategy 2056
- Public Spaces Charter
- Greener Neighbourhoods Guide
- Draft Greener Spaces Design Guide
- Ryde - Ryde-Eastwood-Macquarie Park (REM) Green Links Masterplan
- Hornsby - Biodiversity Conservation Strategy (Draft)
- Willoughby - 'Love Your Trees', Our Green City Plan, Integrated Transport Strategy (2020)
- Northern Beaches - Walking Plan, Northern Beaches Bike Plan
- Parramatta Ways

Ku-ring-gai Council documents

- Local Strategic Planning Statement, 2020
- Ku-ring-gai Council Revised Delivery Program 2018-2022 and Operational Plan 2021-2022
- LEP
- DCP
- Draft Public Domain Plan 2020
- Ku-ring-gai Local character background study
- Ku-ring-gai Biodiversity and Riparian Lands Study (Version 5)
- Open Space Strategy, 2005
- Open Space Acquisition Strategy, 2006
- Urban Forest Policy
- Recreation in Natural Areas Strategy
- Ku-ring-gai Bike Plan
- Biodiversity Policy
- Fauna Management Policy
- Water Sensitive City Policy
- Climate change Policy
- Weed Management Policy
- Tree Works Notification Policy