

FIELD OF MARS RESERVE MASTERPLAN REPORT

ADOPTED

AUGUST 2021

 City of Ryde

Lifestyle and opportunity
at your doorstep

CONTENTS

SECTION 1: INTRODUCTION..... 3

Introduction.....	4
Background Summary: Matters to be addressed by the Masterplan	5

SECTION 2: CONTEXT ANALYSIS: mapping.....7

Location in the City of Ryde	8
Biodiversity and Park Connections in City of Ryde	10
Access.....	12
Biodiversity and Park Connections	14
LEP 2014 Zoning	16

SECTION 3: SITE ANALYSIS: mapping and images... 19

Land Categorisation (2009).....	20
Access and Landscape.....	22
Environment.....	24
Usage	26
Flood Prone Land and Utilities	28
Bushfire Prone Land.....	30
Images - Entry Points	32
Facilities	34
Open Space Zones.....	35
Paths and Tracks	36
Vegetation Impacts.....	38
Signage.....	39

SECTION 4: MASTERPLAN


Design Strategy	44
Information	47
Detail Plan 1 Eastern Open Space Zone.	51
Detail Plan 2 Western Open Space Zone.....	52
Detail Plan 3 Central and Southern	
Open Space Zones.	53
Grade 2 Track.....	54
Grade 3 Track.....	55
Precedent Images -	
Entry Treatments and Park Furniture	56
Signs.....	57
Nature Exploration and Edge Management....	58
Bushland Tracks Grade 2.....	59
Bushland Tracks Grade 3.....	61
Accessible Paths / Tracks	
and Informal Access.....	63
Vegetation Types.....	64
Stormwater Management	65

SECTION 5: IMPLEMENTATION PLAN66

Project Implementation Plan	67
-----------------------------------	----

Section 6: REFERENCES 69

Relevant Acts and Strategic Documents.....	70
Flora and Fauna.....	74
Water Management	75
Reserve Management and History	77
Track Standards / Photo Credits.....	79

This Masterplan Report was prepared by: 



Technical content, plans and images (unless otherwise credited): Gondwana Consulting
Masterplan Report graphic design layout and images (unless otherwise credited): City of Ryde
Images (unless otherwise credited): Field of Mars Environmental Education Centre

Revision	Date	Status
1	March 2021	Initial Draft for Council Review
2	April 2021	Draft for Stage 2 Community Consultation
3	June 2021	Draft updated following Stage 2 Community Consultation
4	July 2021	Draft re-formatted by Council for adoption
5	August 2021	Final adopted by Council
6	October 2023	Updated following public hearing for proposed land categorisations (pending adoption)
7	December 2023	Updated with adopted land categorisations

A low-angle, upward-looking photograph of several tall, slender trees with light-colored bark and dense green foliage. The trees converge towards the top of the frame, creating a sense of height and reaching towards the sky. The sky is a clear, bright blue with some wispy white clouds. A strong sun flare is visible on the right side of the image, casting a bright light and creating a lens flare effect across the scene. The overall mood is serene and natural.

SECTION 1: Introduction

INTRODUCTION

City of Ryde Council (Council) has a diverse network of open space that covers various levels of recreation use. The Field of Mars Reserve (the Reserve) is the largest remnant bushland reserve under the care, control and management of the City of Ryde covering approximately 50 hectares.

The Reserve is located in East Ryde and it is bounded by Cressy Road, Buffalo Creek, Pittwater Road, Moncrieff Drive, Finch Avenue and Kellaway Street. The Reserve forms part of a wider open space system and habitat corridor network which includes, the Field of Mars Cemetery to the west and linkage parks such as Pidding, Barton and Burrows Parks and to the east, the Lane Cove National Park (NSW National Parks and Wildlife Service) and Buffalo Creek Reserve (Hunters Hill Council).

The Reserve was established as a *Reserve for Public Recreation and Promotion of the Study and the Preservation of Native Flora and Fauna* in 1975. Council has been the appointed Trustee of the Reserve since 1988. The Reserve is a Wildlife Refuge under the *NPWS Act 1974* and is nominated as a Wildlife Protection Area under the *Companion Animals Act 1998* (CAA). Cats and dogs are excluded from the Reserve at all times.

The Reserve is valued as a significant wildlife refuge. The environmental values of the reserve are paramount and underpin the management protocol for the Reserve. The Reserve represents an intact transition of ecological communities from upper Shale areas to lower wetland areas.

The purpose of this Masterplan is to:

- To locate new and existing facilities such as boardwalks, walking tracks, amenities building, signage etc in a coherent and considered manner
- Review and develop a walking trail hierarchy
- Identify how the Reserve will be upgraded over the next 20 years.

The Masterplan aims to:

- Establish processes that enable the future enhancement and management of the Reserve's Natural Areas, biodiversity and habitat.
- Conserve biodiversity and maintain ecosystem function, protection and conservation.
- Conservation of the natural vegetation of Reserve especially endangered ecological communities and habitat areas for threatened species.
- Establish and manage environmentally and ecologically sensitive areas of remnant bushland, water courses, and wetlands.
- Put in place measures that will minimise and mitigate any disturbance caused by human intrusion.
- Guide Council's management of existing assets, to minimise impacts on natural areas and ensure management aligns with legislative protection outcomes.
- Identify the importance of corridor linkages and connections between the Reserve and other parks and reserves both within the City of Ryde and with neighbouring catchments and Local Government Areas.
- Consider stormwater management in the Reserve and the interrelationship with Buffalo Creek, Strangers Creek and the wider Lane Cove River catchment.
- Ensure the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including places, objects and features of significance to Aboriginal people.
- Ensure that appropriate public use, educational opportunities and enjoyment of the Reserve is encouraged without compromising its natural values.
- Ensure the aims, objectives and actions align with applicable legislations and Council's other adopted plans and strategies such as the *Ryde Biodiversity Plan 2016*.



BACKGROUND SUMMARY: Matters to be addressed by the Masterplan

(For more detail refer to the summary of background references in Section 5 of this report)

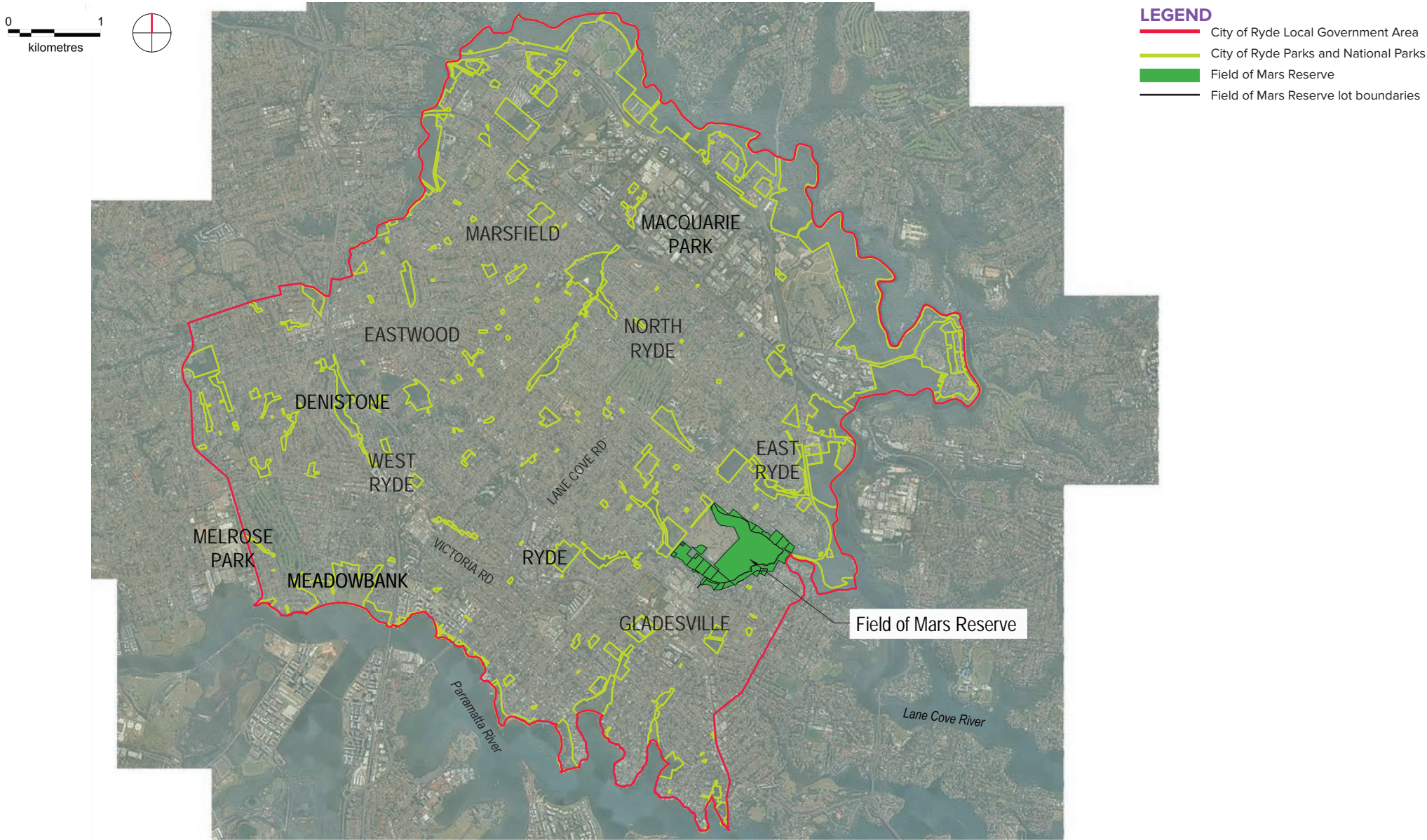
ASPECT GROUP	KEY POINTS / MASTERPLAN OPPORTUNITIES
Access, Use and Circulation	<ul style="list-style-type: none"> • Encourage access to the Reserve via public transport. • Increase access to open space and provide for healthy and active living, enhance recreational use. • Provide visual amenity and public access to foreshores and rivers. • Provide facilities for walkers and cyclists (within the context that bike riding and dog walking are not permissible within the reserve). • Provide for increased and more accessible use, accommodate access and use by all of the community.
Character and Facilities	<ul style="list-style-type: none"> • Protect heritage places and landscapes along with cultural heritage. • Provide an attractive, sustainable and well designed environment. • Improve waste and recycling facilities. • Provide resilient infrastructure. • Potential to increase recreational opportunities particularly within the cleared areas near Pittwater Rd. • Provide facilities for walkers and passive users such as seating, shade and play areas. • Provide facilities for disabled access and improve accessibility to facilities and buildings.
Environment: Flora and Fauna	<ul style="list-style-type: none"> • Protect and manage habitat to provide wildlife refuge. • Conserve local flora and fauna. • Protect the habitat of the rare and threatened species as well as continuing to provide and improve habitat to increase biodiversity. • Protect flora species of conservation significance and protect Endangered Ecological Communities from biodiversity threats as highlighted in the Biodiversity Plan 2016.
Environment: Green Corridors	<ul style="list-style-type: none"> • Assist with the provision of ecological connectivity. • Manage the Reserve within the context of the local green corridors. • Enhance the biodiversity values of the Reserve to assist with the functions of the various connected corridors.
Environment: Stormwater Management	<ul style="list-style-type: none"> • Protect and improve the natural character and ecological integrity of Ryde waterways. • Minimise disturbance to riparian areas. Apply vegetated riparian zone widths as recommended by the NSW Office of Water guidelines, along with allowable activities asset protection, pathways, planting, disturbance, creek crossings and stormwater infrastructure. • Manage stormwater using WSUD principles. • Include proposals for the riparian zones of Buffalo and Strangers Creeks contained within the City of Ryde Riparian Protection and Rehabilitation Management Plan 2013.
Environment: Threats to Biodiversity	<ul style="list-style-type: none"> • Reduce impacts on natural systems. • Consider issues of bushfires, flooding, sea level rise, drought and air quality. • Address threats to biodiversity through environmental design and management and efficient use of resources. • Enhance estuarine communities and identify vegetation under threat of sea level rise and areas into which they can retreat. • Develop the Reserve to reflect the Biodiversity Themes established in the Ryde Biodiversity Plan 2016. • Implement the relevant recommendations of the Flora and Fauna Study 2017. • The Reserve was used for tipping in the areas around the confluence of Buffalo and Strangers Creek and around the Visitors and Education Centres.
Information	<ul style="list-style-type: none"> • Notify park visitors of requirements to exclude cats and dogs. • Notify park visitors of requirements to protect and manage habitat to provide wildlife refuge. • Promote raising awareness amongst the community about the values of local bush. • Foster volunteer community bushcare groups. • Opportunity to display and interpret biodiversity information.



The background of the slide is a close-up photograph of fallen leaves and twigs. The leaves are in various stages of decay, showing colors from light beige and grey to deep browns and oranges. Some leaves have small holes or tears, suggesting insect activity. The twigs are thin and brown, scattered among the leaves. The overall texture is organic and somewhat chaotic.

SECTION 2: Context Analysis

CONTEXT ANALYSIS: Location in the City of Ryde



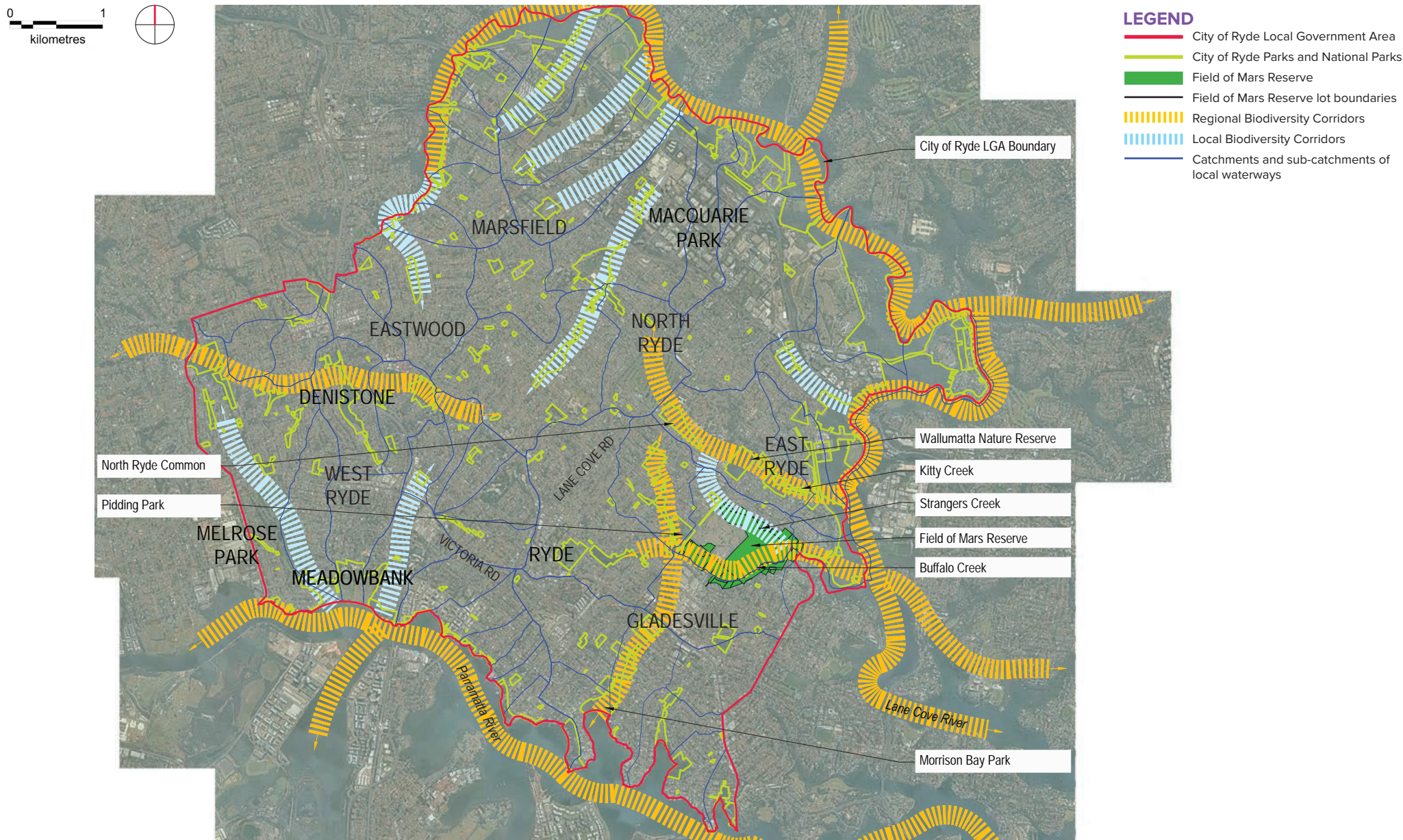
CONTEXT ANALYSIS: Location in the City of Ryde

Notes:

- The Field of Mars Reserve (The Reserve) is located in the suburbs of East Ryde, Gladesville and Ryde, within the City of Ryde local government area.
- The Reserve is located in the East Ward of the City of Ryde.
- Approximately 50 hectares in size, the Reserve is the largest remnant bushland reserve under the care, control and management of the City of Ryde. It provides important links to the wider network of open spaces, parks and National Parks in the City of Ryde.
- Buffalo Creek and Strangers Creek traverse the Reserve and flow into the nearby Lane Cove River, a major tributary to the Parramatta River.
- The Reserve is predominantly surrounded by Low Density Residential land, with a pocket of Light Industrial land and bus transport depot to the south-west.
- The surrounding suburbs of North Ryde, Macquarie Park, Ryde and to a lesser extent Gladesville have some areas of medium to high density residential.
- The nearby suburb of Macquarie Park is identified in the Greater Sydney Commission's North District Plan as strategic priority as an economic, health and education precinct.
- Major shopping centres are located in Macquarie Park and Top Ryde. Smaller town centres are located more locally in Gladesville, North Ryde, East Ryde and Boronia Park.
- Field of Mars Cemetery (not owned or managed by Council) is located immediately to the west of the Reserve. This cemetery is bound by the Field of Mars Reserve on three sides.



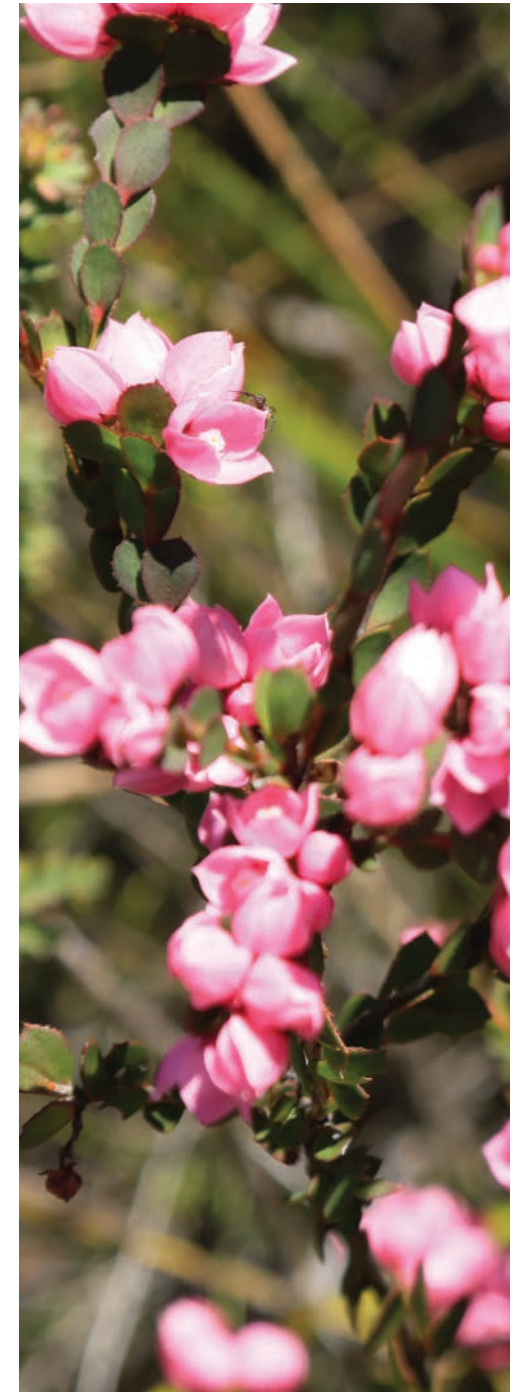
CONTEXT ANALYSIS: Biodiversity and Park Connections in City of Ryde



CONTEXT ANALYSIS: Biodiversity and Park Connections in City of Ryde

Notes:

- Field of Mars Reserve forms part of a continuous vegetated corridor along a section of Buffalo Creek, from it's source to the Lane Cove River. It also contains Strangers Creek, a tributary of Buffalo Creek. The Reserve is the largest remnant bushland reserve in the LGA under the care, control and management of Council (approx. 50ha).
- This plan illustrates the Regional and Local Connectivity Corridors over the whole LGA as identified in Council's *Biodiversity Plan 2016*.
- The Parramatta and Lane Cove Rivers form regional corridors along the southern and part of the eastern boundaries of the LGA.
- The Reserve is an important link within a regional corridor from the Lane Cove National Park on the Lane Cove River regional corridor to the reserves to the west of the site (Pidding, Barton and Burrows Parks) along Buffalo Creek.
- This east/west regional corridor is also linked to the south to Morrison Bay Park via another regional corridor running north/south.
- Further, the park is a link in a local corridor from the Reserve, along Strangers Creek, northwest to the regional corridor along Kittys Creek (a link from the Lane Cove River through Wallumatta Nature Reserve to North Ryde Common to the northwest).
- This large bushland area is an important component in the Buffalo and Strangers Creek catchment and can contribute to improved water quality flowing into the Lane Cove River. The Reserve is part of the wider catchment for Sydney Harbour and thus contributes to the level of water quality and marine life eg fish stocks.
- The Reserve has been established as a *Reserve for Public Recreation and Promotion of the Study and the Preservation of Native Flora and Fauna* (20 June 1975). Council was appointed Trustee of the Reserve on 29 April 1988.
- The Reserve is valued as a significant wildlife refuge. The environmental values of the reserve are paramount and underpin the management protocol for the Reserve.



CONTEXT ANALYSIS: Access



LEGEND

- City of Ryde Local Government Area
- City of Ryde Parks and National Parks
- Field of Mars Reserve
- Field of Mars Reserve lot boundaries
- Creek lines (outside of the Reserve)
- Bus routes (X06, 506, 252, 536 and 538)
- Tier 1 Bicycle Route - Southern Orbital
- Tier 2 Bicycle Route - Interconnecting route
- Shared Off-Road Bike Path
- On-Road Bike Lane
- Informal On-Road Bike Route
- Pedestrian Entry Point (1-14)
- Maintenance Vehicle and Pedestrian Entry Point
- Parking area

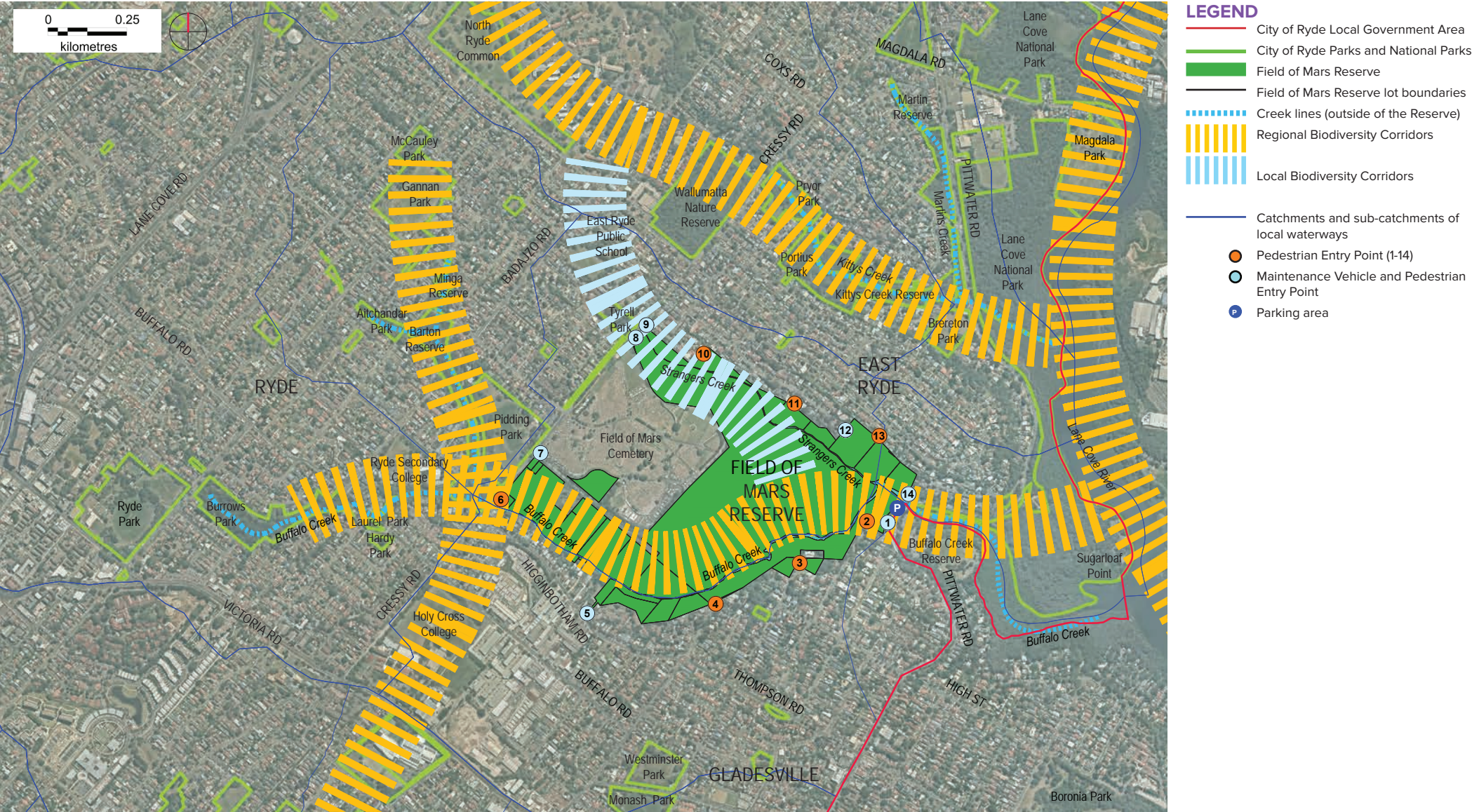
CONTEXT ANALYSIS: Access

Notes:

- Field of Mars Reserve (the Reserve) has a reasonable level of service by public transport, cycle routes and entry points to encourage access by traveling visitors and nearby residents.
- **Bus routes** X06 and 506 with stops along Higginbotham Rd give relative easy access to park entry points 4, 5 and 6 in the south as well as to entry points 8, 9, 10 and 11 along the northern boundary from Moncrieff Dr. Bus routes 252, 536 and 538 give access to entry points 1, 2, 3 and 14 in the east and southeast, though with a walk of less than 1km to the Reserve from set down in High St.
- The **cycle network**, which is a mix of off road bike paths and on road bike lanes and informal routes, provides a direct shared off road bike path from Rene St to the north to High St to the south, along Pittwater Rd, to entry points 1 and 14. However, only informal on road bike routes provide access to entry point 5 on Higginbotham Dr, to entry point 6 on Cressy Rd and to entry point 13 along Moncrieff Dr. The remaining entry points are bike accessible along the road network but not via dedicated bike paths or routes. The 2014 Bike Strategy proposes the Southern Orbital route along Pittwater Rd providing north south connection to the eastern edge of the Reserve and the Interconnecting route along Cressy Rd (NE to SW) giving access to the western side of the Reserve. Whilst bikes are prohibited from the Reserve, there is ample opportunity to provide cycle facilities at Reserve entries to encourage access into the Reserve on foot.
- A sealed parking area located off Pittwater Rd, between entry points 1 and 14, provides for visitors traveling by private vehicle to access the reserve from the eastern edge. Car spaces include 31 plus one accessible space. An off road parking area is located opposite at the Buffalo Creek Reserve. It is possible that overflow parking from this area located in the Hunters Hill LGA uses the parking area at the Reserve. Additional parking is available for bus groups visiting the Reserve further into the Reserve. Little to no nearby on street parking is available at 6, however, plenty of on street parking is available in quiet streets at all other entries.
- The Reserve borders the northeastern, southeastern and southwestern boundaries of the Field of Mars Cemetery from which no formal park entries are provided. Pedestrian entry points are well spaced along the northeastern (8-13), eastern (1 and 14) and southeastern (2-4) edges edge of the Reserve. The southwestern edge of the Reserve is serviced with only 2 entry points (5 and 6). Four entry points (6-9) are available where Cressy Rd meets the Reserve. The many entry points provide easy access for neighbouring residents, though a number of these entry points are not clearly identifiable to varying degrees (10, 11, 12 and 13). Entry point 3 is very confusing, given access is provided along a seemingly private driveway within the road reserve. The Reserve connects to a broader network of walking paths/bush tracks including path to the west along Buffalo Creek, Burrows Park to Ryde Park and tracks to the east through Buffalo Creek Reserve connecting with Lane Cove National Park and Great North Walk. (Refer to Site Analysis: Access and Landscape for a details of on Reserve facilities.)



CONTEXT ANALYSIS: Biodiversity and Park Connections



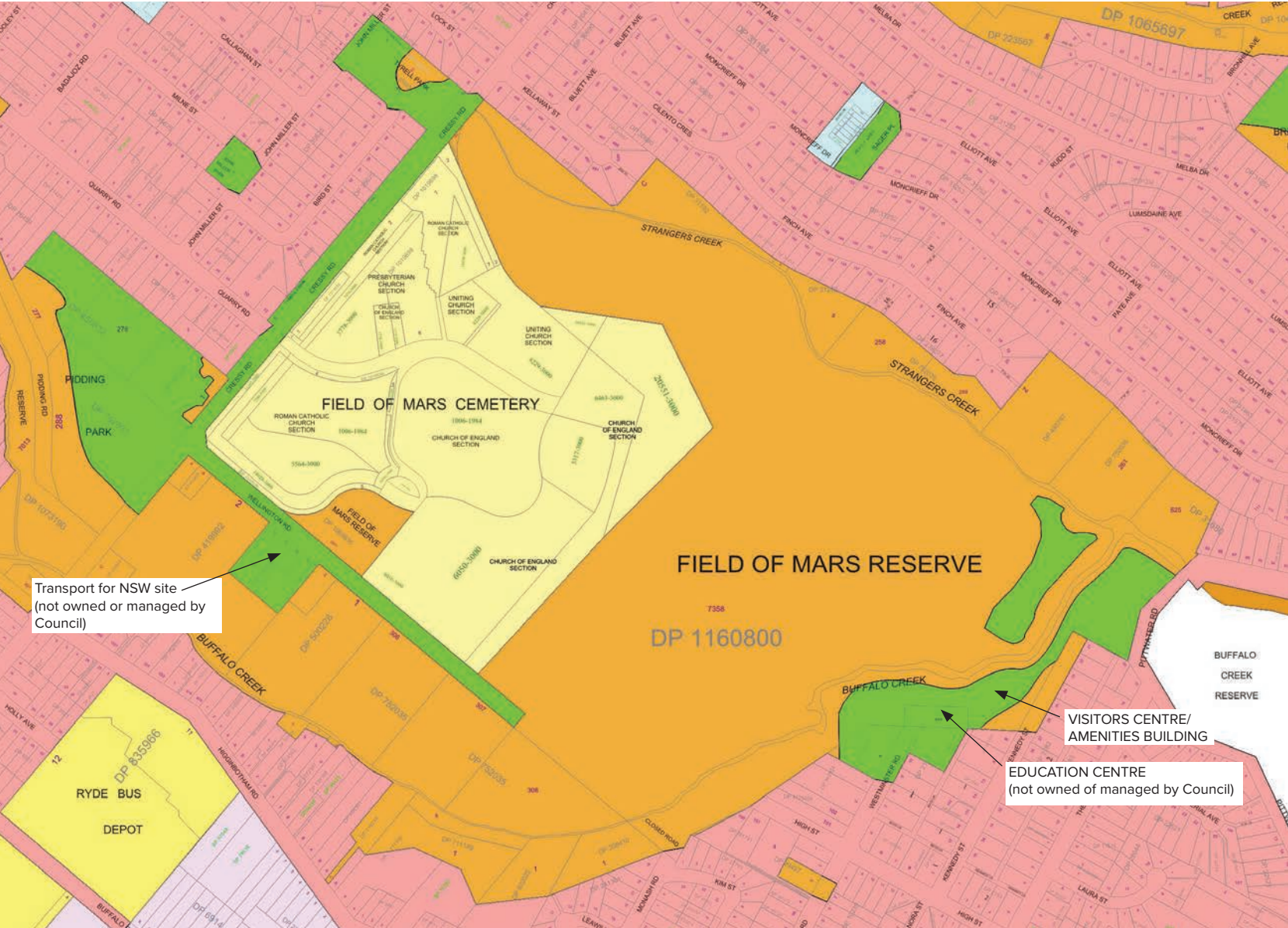
CONTEXT ANALYSIS: Biodiversity and Park Connections

Notes:

- Field of Mars Reserve (the Reserve) is part of a connected series of Biodiversity corridors as identified in Context Analysis: Biodiversity and Park Connections in City of Ryde.
- Regional corridors identified in Council's *Biodiversity Plan (2016)* include:
 - The Lane Cove River to the east of the Reserve, running north to south;
 - The Parramatta River to the south, running northwest to southeast;
 - A link from Lane Cove River to the east, through the Reserve along Buffalo Creek to Burrows Park in the west;
 - A link to the west of the Reserve from Parramatta River in the south to Gannan Park in the north;
 - An additional link along Kittys Creek from Lane Cove River to the east to North Ryde Common in the northwest.
- Local corridors identified include a link from the Reserve along Strangers Creek to link to the Kittys Creek corridor to the north.
- These identified corridors provide a linked web of green space to conserve and protect biodiversity. The Reserve plays a key role in this network.
- The *Biodiversity Plan* identifies the vegetation contained within the Reserve has having a high biodiversity conservation significance. The Plan also indicates that around 50% of the vegetation within the Reserve is exposed to impacts from threats to biodiversity values.
- The *Biodiversity Plan* indicates that at least 50% of the vegetation within the Reserve is considered a very high priority for biodiversity conservation, with pockets marked as a high priority and the core area north of Buffalo Creek as moderate.



CONTEXT ANALYSIS: LEP2014 Zoning



LEGEND

ZONES:

- B1 Neighbourhood Centre
- E2 Environmental Conservation
- IN2 Light Industrial
- R2 Low Density Residential
- RE1 Public Recreation
- SP1 Special Activities
- SP2 Infrastructure

CONTEXT ANALYSIS: LEP2014 Zoning

Notes:

- Field of Mars Reserve (the Reserve) is variously owned by City of Ryde (Council), NSW Department of Planning, Industry and Environment, and Transport for NSW. In 1975 the Reserve was formally established as a Reserve for Public Recreation and Promotion of the Study and the Preservation of Native Flora and Fauna, with care, control and management devolving upon City of Ryde under the Local Government Act 1975.
- The bulk of the Reserve is zoned E2 Environmental Conservation under Council's Local Environmental Plan 2014. The objectives of this zone are:
 - To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
 - To prevent development that could destroy, damage or otherwise have an adverse effect on those values.
- Pockets of RE1 Public Recreation occur in the level areas in the east of the Reserve (outside of the bushland areas) including the land on which the Education Centre is located. The objectives of this zone are:
 - To enable land to be used for public open space or recreational purposes.
 - To provide a range of recreational settings and activities and compatible land uses.To protect and enhance the natural environment for recreational purposes.
- The Reserve is surrounded by R2 Low Density Residential.
- The adjacent land of Field of Mars Cemetery (lands not owned or managed by Council), which the Reserve wraps around to the west, is zoned SP1 Special Activities.
- The adjacent closed portions of Cressy Rd and Wellington Rd are zoned RE1 Public Recreation.

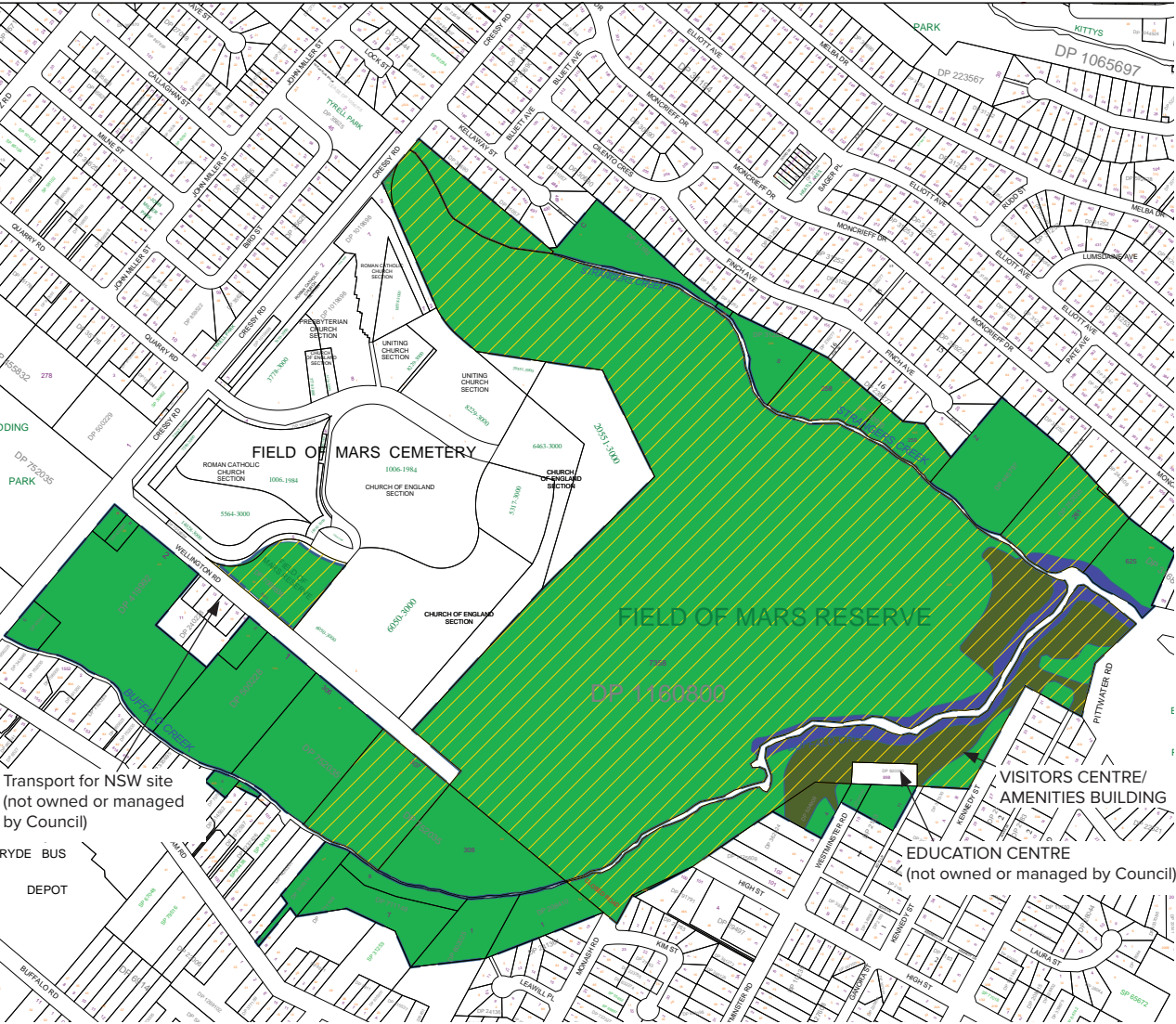




A close-up photograph of a dark-colored bird, possibly a crow or raven, perched on a light brown tree branch. The bird's feathers are dark and glossy, with some lighter, patterned feathers visible on its wing. The background is a dense thicket of green leaves and branches, some of which are out of focus. A semi-transparent purple rectangular box is overlaid on the upper right portion of the image, containing white text.

SECTION 3: Site Analysis

SITE ANALYSIS: Land Categorisation (2023)



LEGEND

- General Community Use
- Natural Areas - Bushland
- Natural Areas - Escarpment
- Natural Areas - Foreshore
- Natural Areas - Watercourse
- Natural Areas - Wetlands
- Parks
- Sportsgrounds
- Park Boundary
- Crown Land

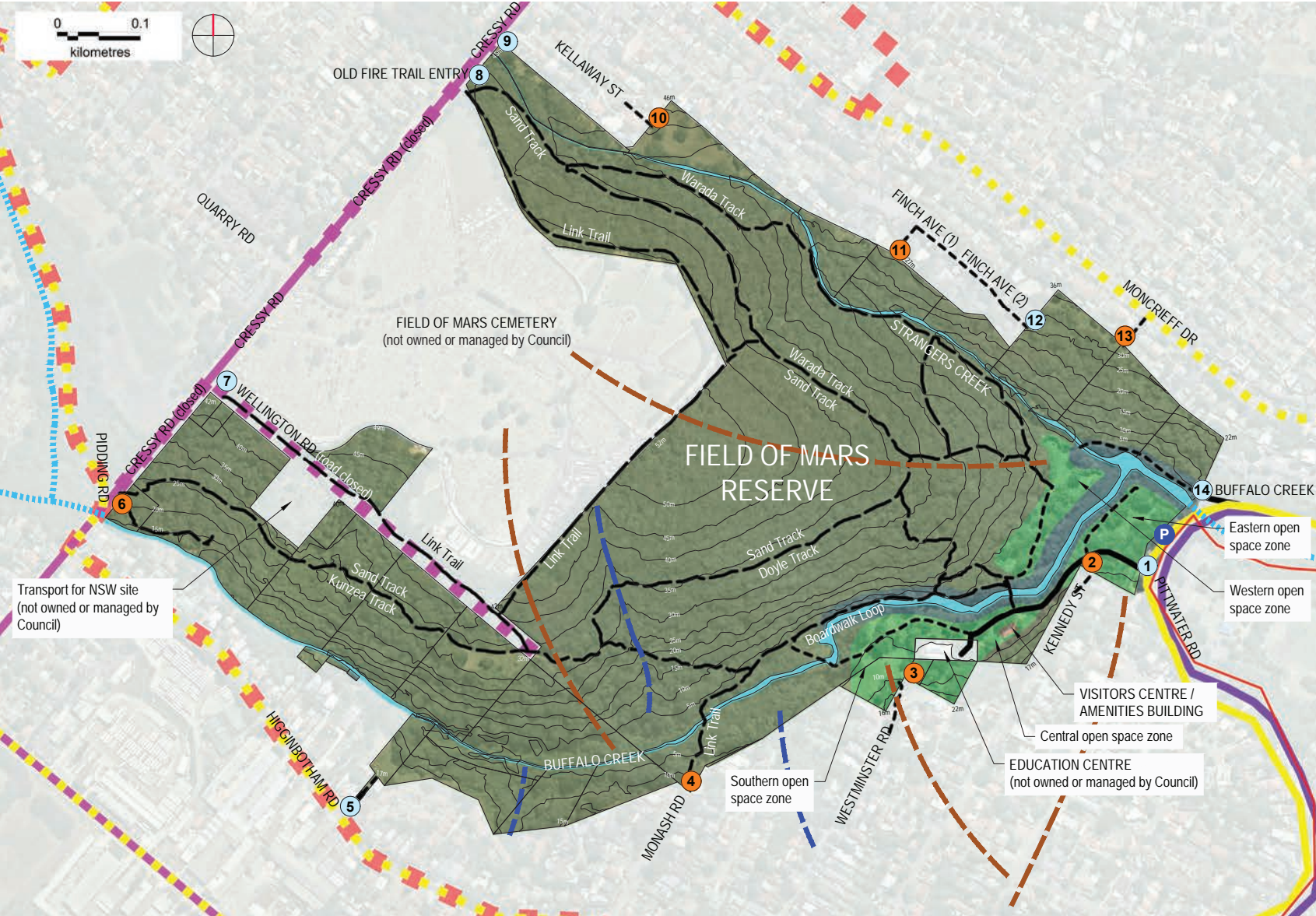
SITE ANALYSIS: Land Categorisation (2023)

Notes:

- Under the *Crown Lands Act 2016* (CLM Act) Council managers must assign to Crown lands under their management one or more land categories of community land as identified in the *Local Government Act 1993* (LG Act) (refer to the Legend on this map).
- Activities and management must occur in accordance with the prescribed core objectives of the nominated land categories as illustrated on this plan. The bulk of the Reserve is categorised as *Natural Area*, which is broken down further into subcategories of *Bushland*, and *Wetland*. Essentially, in relation to *Natural Areas*, the objectives include to conserve and maintain the biodiversity and land; to undertake regeneration; and to allow community use that does not adversely impact on the land.
- Small portions on the eastern side of the Reserve are categorised as *Park*. The objectives listed for *Park* categorisation include facilitate recreational, cultural, social and educational pastimes and activities; provide for passive activities; and develop the land to facilitate these objectives.
- Field of Mars Reserve is visited by members of the general community as well as students from primary, secondary and tertiary institutions across Sydney.
- Within the Reserve is located the Field of Mars Education Centre (operated by the NSW Department of Education) which provides the opportunity for fieldwork, environmental education and education for sustainability to visiting students. This facility, whilst located within the Reserve boundaries, is not owned or managed by Council and not located on land owned by Council and thus is not subject of this Plan.
- A Visitors Centre and Amenities Building is located within the Reserve to the east of the Education Centre and is owned and managed by Council. The Visitors Centre is operated by volunteers of the Ryde Hunters Hill Flora and Fauna Preservation Society (RHHFFPS) generally on weekends. The Visitors Centre provides environmental information about the Reserve and offers guided walks through the bushland. The land on which the Centre is located is categorised as *Park* which is consistent with the objectives listed above to meet the current and future needs of the local community and of the wider public.



SITE ANALYSIS: Access and Landscape



LEGEND

City of Ryde Local Government Area

Field of Mars Reserve lot boundaries

Creek lines within the Reserve

Creek lines (outside of the Reserve)

Contours (5m interval)

Pedestrian Entry Point (1-14)

Maintenance Vehicle and Pedestrian Entry Point

Parking area

ACCESS / TRANSPORT

Existing bush walking tracks

Existing parkland tracks and board walks and entry tracks / paths

Existing vehicle access

Bus routes
(X06, 506, 252, 536 and 538)

Southern orbital Tier 1 route
(2014 Ryde Bicycle Strategy)

Tier 2 Interconnecting route
(2014 Ryde Bicycle Strategy)

Shared Off-Road Bike Path

On-Road Bike Lane

Informal On-Road Bike Route

Closed / unformed roads

LANDSCAPE SETTING & TERRAIN

Bushland area

Parkland (grassed area with shelters)

Creeks with adjacent wetlands

Ridge lines

Gullies (also follow creek lines)

Eastern open space zone

Western open space zone

Central open space zone

Southern open space zone

Visitors Centre / Amenities Building

Education Centre
(not owned or managed by Council)

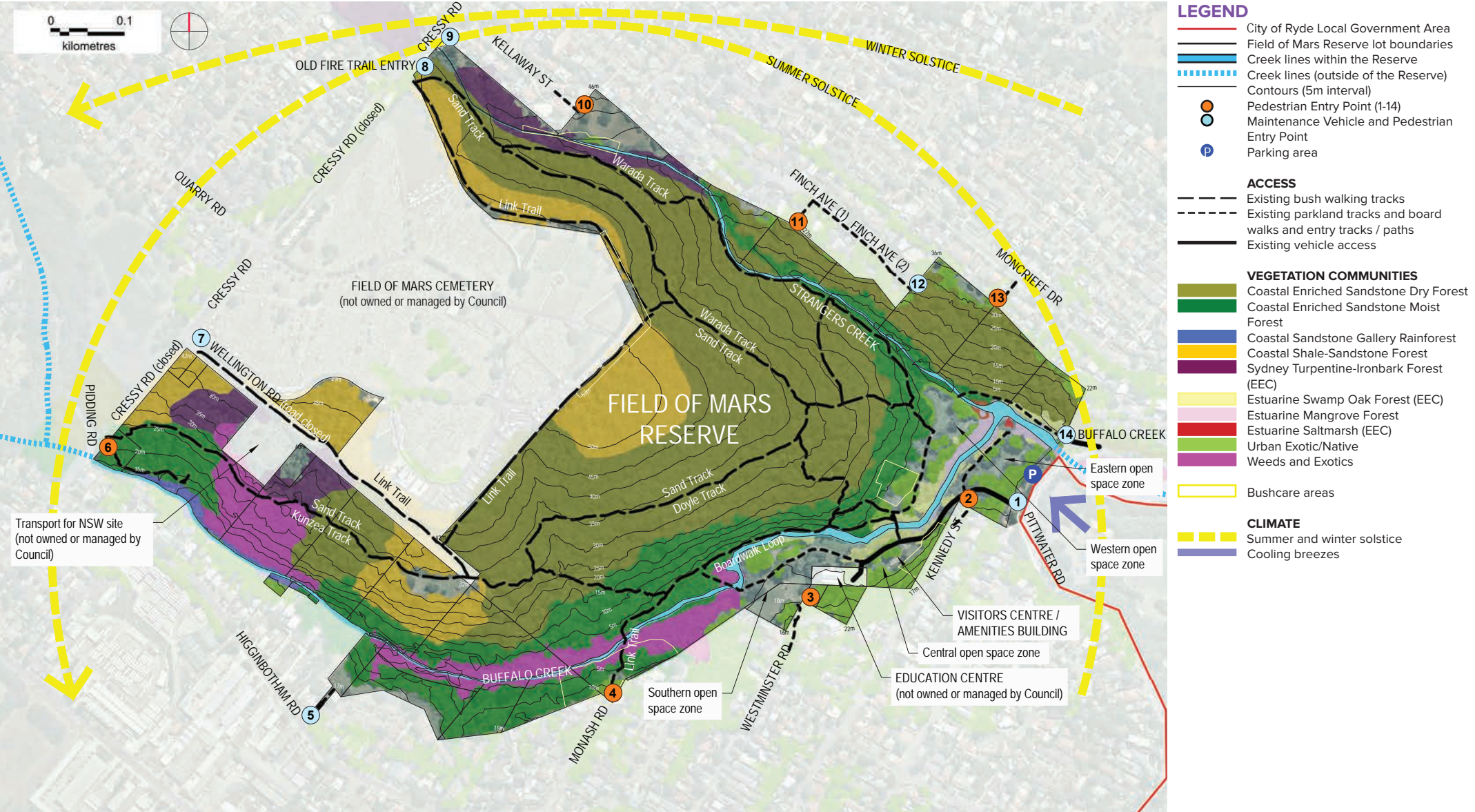
SITE ANALYSIS: Access and Landscape

Notes:

- Field of Mars Reserve (the Reserve) includes steep slopes with limited open level areas. The steep slopes discourage a proliferation of tracks which in turn limits the incursions into bushland areas and loss of biodiversity. A high proportion of bushland area is available for wildlife refuge.
- Multiple entry points around the perimeter of the Reserve give good access to pedestrian park users and immediate access to bushland areas. The Reserve, however, is closed to bike riders and dog walkers due to its wildlife refuge status. Multiple entry points are difficult to monitor in terms of controlling entry to the Reserve by unauthorised park users.
- The only public vehicle entry (1), is via a roundabout on the bend on Pittwater Rd (south of the Buffalo Creek road crossing), a traffic black spot. Active transport links have been improved at this entry by the recently opened shared path for bikes and pedestrians on Pittwater Rd. This entry provides public access to the sealed parking area located on the eastern boundary of the Reserve and service access to the Reserve.
- Additional service vehicle access can be gained via entries 5 (from the south off Higginbotham Rd), 7 (from the west onto the closed Wellington Rd), 8 and 9 (from the northwest off Cressy Rd), 12 (from the north off Finch Ave) and 14 (east off Pittwater Rd - just north of entry 1).
- Vehicle access (authorised vehicles) to the Education Centre is gained via entry 1 through a lockable vehicle gate located west of the car park, along the internal access way past the Visitors Centre/Amenities Building to the eastern side of the Education Centre.
- An internal bus drop off/pick up/turning area is located on the Reserve below Kennedy St entry 2. Another lockable vehicle gate, for maintenance access to the eastern open space zone is located adjacent to the internal bus turning area.
- The Visitors Centre, operated by the Ryde Hunters Hill Flora Fauna Preservation Society, is an older building which includes amenities. Access to the disabled toilet at the Visitors Centre is across the grass from the unsealed access way.
- Facilities and access around the Reserve are not fully accessible. Access from the disabled car space in the on-site parking area is available to the adjacent park area via a short path but then across the grass. Few of the other park entries are all accessible and few of the walking tracks or footpaths other than the boardwalk loop are all accessible.



SITE ANALYSIS: Environment



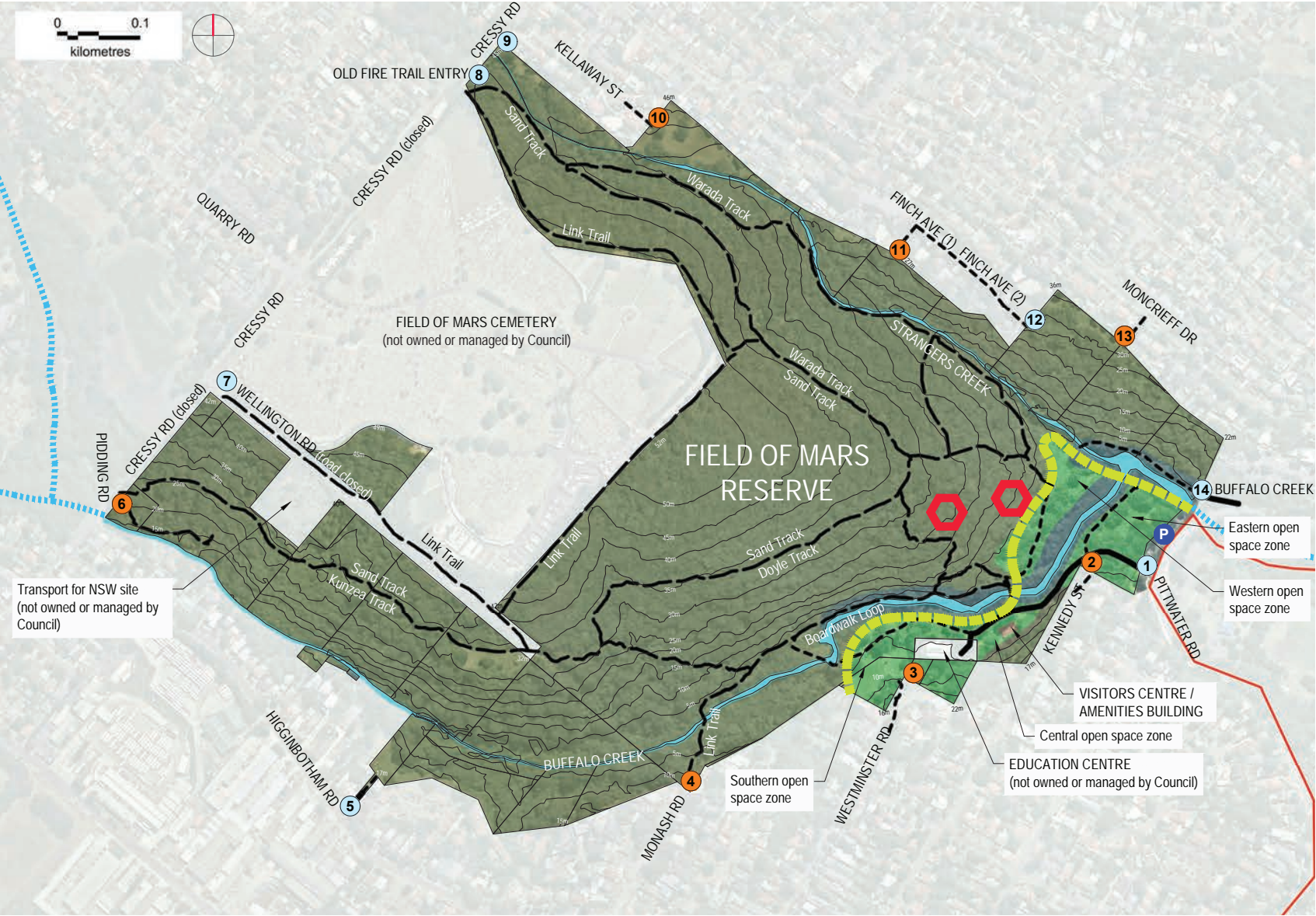
SITE ANALYSIS: Environment

Notes:

- Field of Mars Reserve (the Reserve) contains at least seven (7) vegetation community types (refer to the Legend on this page), three (3) of which are identified as *Endangered Ecological Communities* (EEC) including *Sydney Turpentine-Ironbark Forest*, *Estuarine Swamp Oak Forest*, and *Estuarine Saltmarsh*. The Reserve also contains rare flora and threatened fauna species (as identified under various government legislation).
- The Reserve represents an intact transition of ecological communities from upper Shale areas to lower wetland areas.
- Threats to biodiversity include weed species invading the area particularly the saltmarsh, impacts at the Reserve edges from adjacent activities and neighbouring properties, increased stormwater runoff and nutrients from adjacent areas impacting on water quality and siltation of the creeks, lack of fire at a suitable interval, general weed invasion, dumping particularly of greenwaste, unmanaged recreational use eg informal tracks, bike riding, domestic pets and introduced fauna, control of vehicles, development and infrastructure works.
- The Reserve is a Wildlife Refuge under the *NPWS Act 1974*. The Reserve is nominated as a Wildlife Protection Area under the *Companion Animals Act 1998* (CAA). Cats and dogs are excluded from the Reserve at all times (even if leashed) (Category 1 under the CAA).
- Riding of any type of bike is also prohibited within the Reserve.
- Buffalo Creek flows east to the Lane Cove River, from the reserve under the bridged Pittwater Rd and through Buffalo Creek Reserve.
- Vegetation along Buffalo Creek is a mixture of exotics and native species (urban plantings) and weeds.
- A number of volunteer bushcare groups operate in the Reserve and include volunteers from the surrounding area.
- The Reserve contains predominantly southwest to southeast facing slopes. Northeast forested slopes occur above Strangers Creek and behind the Visitors Centre and the Education Centre and along the southern edge of the Reserve.
- Northeast to northwest slopes are exposed to more sun throughout the year.
- The existing bushland vegetation moderates climate extremes. Cooling breezes blowing west from the Lane Cove River are baffled by the forest vegetation.



SITE ANALYSIS: Usage



LEGEND

City of Ryde Local Government Area

Field of Mars Reserve lot boundaries

Creek lines within the Reserve

Creek lines (outside of the Reserve)

Contours (5m interval)

Pedestrian Entry Point (1-14)

Maintenance Vehicle and Pedestrian Entry Point

Parking area

Existing bush walking tracks

Existing parkland tracks and board walks and entry tracks / paths

Existing vehicle access

LANDSCAPE SETTING

Bushland area

Parkland (grassed area with shelters)

USE

Division between Bushland zone and Parkland Zone

Generators of activities - both in the Bushland and Parkland zones

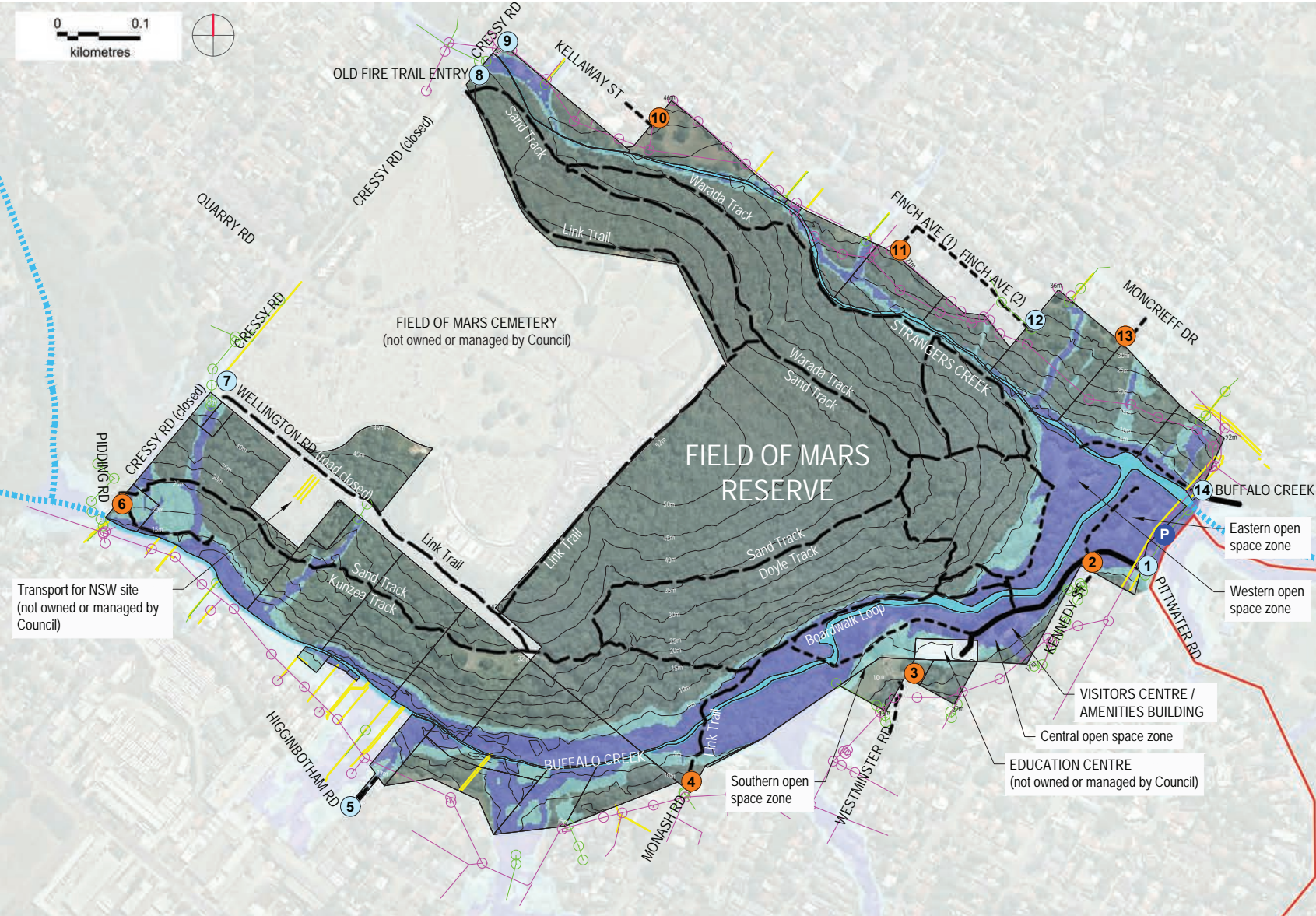
SITE ANALYSIS: Usage

Notes:

- The use of the Reserve is divided into two distinct areas. The bushland area over the sloping ground and along the creeks, and the parkland area located southwest of Strangers Creek between the base of the steeply sloping bushland area and the eastern boundary. A small portion of bushland area is located within the parkland, adjacent to Kennedy St on the eastern boundary, but contains no walking tracks or facilities.
- Allowable bushland activities include walking for pleasure, recreation, exercise and / or education, individually, in groups or as part of an organised guided tour. Some walkers however bring dogs into the Reserve and others ride bikes (BMX, motor and others). Both activities are prohibited and both are considered threats to biodiversity.
- Activities within the parkland area include picnicking, relaxing and participation in Education Centre and Visitor Centre organised activities. The attraction of the Reserve for such activities is the natural environment setting and the opportunity to connect with and learn about the bush.
- There is no on site pathway lighting, vehicle access gates are locked overnight and the public toilets operate during day light hours only. These factors discourage use of the Reserve after dark.
- The Reserve provided a significant food source to past indigenous inhabitants of the area, the Wallumedegal people. The creeks, moist gullies and tall forest were a rich source of food. Evidence of past use includes shell middens, rock outcrops and engravings. Protection of the environment and the cultural heritage is integral to the management process.
- Non indigenous use of the area began in the late 1700's with the granting of parcels of land for farming, though some too small to be effective, which saw the establishment of the Field of Mars Common in the early 1800's. By 1887 the Reserve was established for Public Recreation though use as a source of building and domestic materials for local residents and for grazing of cattle continued.
- The Reserve was a refuge for the community during the Depression. In the 1960's a local community group opposed the use the Reserve for a proposed waste tipping site. The Reserve was established as a wild life refuge in the 1970's.
- Some unauthorised and illegal uses within the Reserve (eg. use of bikes, access by domestic animals, vandalism, dumping and lighting of fires) are ongoing threats to the protection of the environment.



SITE ANALYSIS: Flood Prone Land and Utilities



LEGEND

- City of Ryde Local Government Area
- Field of Mars Reserve lot boundaries
- Creek lines within the Reserve
- Creek lines (outside of the Reserve)
- Contours (5m interval)
- Pedestrian Entry Point (1-14)
- Maintenance Vehicle and Pedestrian Entry Point
- Parking area

ACCESS

- Existing bush walking tracks
- Existing parkland tracks and board walks and entry tracks / paths
- Existing vehicle access

FLOOD RISK

- Medium to high risk of flooding
- Low risk of flooding

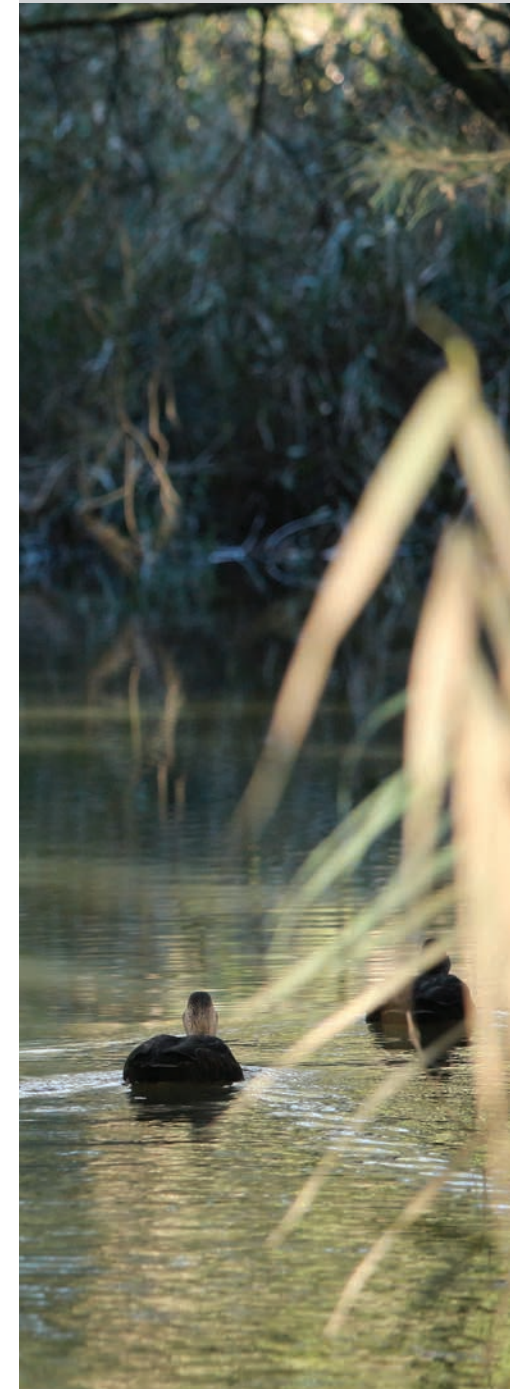
UTILITIES

- Easements for drainage, access and services
- Sewer mains and pits
- Stormwater conduits and pits

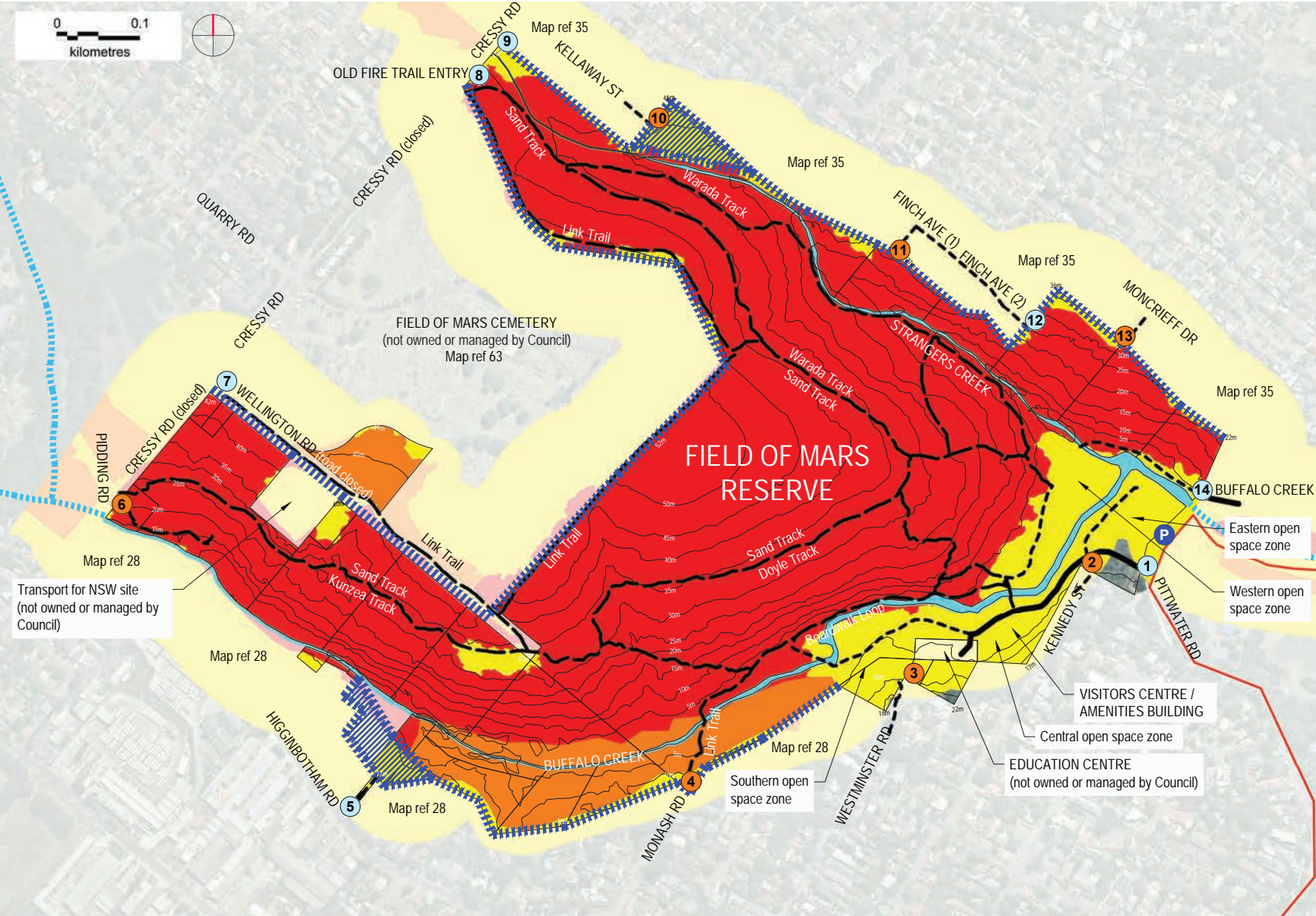
SITE ANALYSIS: Flood Prone Land and Utilities

Notes:

- The potential for medium to high risk flooding threatens much of the low lying level parkland areas of the Field of Mars Reserve (the Reserve), including the car park in Pittwater Rd, the Visitor Centre / Amenities Building, the lower reaches of Strangers Creek and Buffalo Creek. Broader flooding is considered a low risk. Drainage / stormwater outlets located on the boundaries of the Reserve contribute to flooding risk.
- Surrounding street stormwater systems are piped to outlets at the edge of the Reserve which in turn flow overland into the Reserve. These outlets are a source of contaminants and weed propagules and pose a threat to bushland health and creek/river system health.
- A sewer main running through the northeast section of the Reserve is a potential source of contamination due to potential leaks. Overflow sites have previously occurred in the Reserve adjacent to the cemetery and in a residential area upslope of the Pittwater Rd entry.
- A large diameter elevated viaduct carrying the sewer main (sited in an easement) traverses the Reserve on the Pittwater Rd frontage. The viaduct divides the Reserve from the parking area located on Pittwater Rd. The elevated viaduct tends not to impact on the amenity of the Reserve, as planting to the west of the alignment screens the pipe and columns from users in the Reserve.
- Several easements are sited from the adjacent residential areas southwest and northeast of the Reserve (for drainage). Two easements are sited along the southeastern boundary.
- The Transport for NSW site (a past contaminated site) is a potential source of contaminants in stormwater runoff.



SITE ANALYSIS: Bushfire Prone Land



LEGEND

City of Ryde Local Government Area

Field of Mars Reserve lot boundaries

Creek lines within the Reserve

Creek lines (outside of the Reserve)

Contours (5m interval)

Pedestrian Entry Point (1-14)

Maintenance Vehicle and Pedestrian Entry Point

Parking area

ACCESS

Existing bush walking tracks

Existing parkland tracks and board walks and entry tracks / paths

Existing vehicle access

BUSHFIRE RISK (within the Reserve)

Category 1 vegetation

Category 2 vegetation

Buffer Zone

Asset Protection Zones (draft 2021)

BUSHFIRE RISK (outside of the Reserve)

Category 1 vegetation

Category 2 vegetation

Buffer Zone

ASSETS (map ref) as per Hunters Hill, Lane Cove, Parramatta, Ryde BFM Bush Fire Risk mapping (draft 2021):

28: Field of Mars Residential Area (2) with a very high risk level rating, 2A priority, proposed treatment strategies T41, T58 and T60.

35: Field of Mars Residential Area (1) with a very high risk level rating, 2A priority, proposed treatment strategies T41, T58 and T60.

63: Field of Mars Cemetery with a high risk level rating, 3A priority, proposed treatment strategies T83, T84 and T86.

64: Field of Mars Environmental Education with a high risk level rating, 3A priority, proposed treatment strategies T83 and T84.

105: Field of Mars Visitors Centre with a medium risk level rating, 4 priority, proposed treatment strategies T119.

SITE ANALYSIS: Bushfire Prone Land

Notes:

- Much of the bushland area within the Field of Mars Reserve (the Reserve) is classed as Category 1 vegetation (considered to be high risk for bushfire). The low lying parkland area is zoned buffer and the bushland south of Buffalo Creek is Category 2 (considered a lower bushfire risk than Categories 1 and 3). Buffer zones are nominated around the Category 1 (100m wide) and Category 2 (30m wide) zones of vegetation.
- Asset Protection Zones (APZs) (draft 2021) are nominated along the Reserve boundary to the cemetery, along the northeastern boundary and along part of the southern boundaries where bush located on the Reserve abuts adjacent residential areas. Protected assets are included in the legend on this map along with risk level, priority and proposed treatment to manage the risk.
- Treatments Strategies include:
 - T41 - Hazard Reduction - Land Management Zone Field of Mars - fuel loads to be managed by LGA (FRNSW).
 - T58 - Community Education - annual letter with key bushfire safety by Council.
 - T60 - Hazard reduction - maintain APZ - by Council and AusGrid.
 - T83 - Preparedness - undertake annual maintenance roster by private groups.
 - T84 - Hazard Reduction - undertake mechanical and / or prescribed action by LGA (FRNSW)
 - T86 - Hazard Reduction - maintain APZ by Council.
 - T119 - Hazard Reduction - undertake mechanical and / or prescribed action by LGA (FRNSW).
- The Reserve abuts Cressy Rd along it's unformed sections and these sections are grassed easements. The southwestern boundary of the Reserve is formed by Buffalo Creek.
- The Education Centre and Visitors Centre/Amenities Building area located within the Buffer zone. Access to these sites for emergency vehicles passes through the Buffer zone. These buildings are located within 50m of Category 1 vegetation and are at risk in a bushfire event.
- Access to other areas of the Reserve for bushfire fighting are limited. There are effectively vehicle entry points along the closed Wellington Rd (7), at the northwest corner off Cressy Rd (8 and 9), off Pittwater Rd from both the northern and southern ends on the eastern boundary (1 and 14), off the end of Finch Ave (12) and off Higginbotham Rd midway along the southwest boundary. A fire trail is located around the common boundary between the Field of Mars Cemetery and the Reserve. Lack of adjacent road boundaries limits access for fire fighting.
- Potential new areas of regeneration or forest planting must consider the impacts of bushfire hazard particularly if occurring in the parkland zone.



SITE ANALYSIS: Images - Entry Points



Reserve identification sign on Pittwater Rd at the entry to the car park which gives access to entry 1 (a unique sign on the Reserve - metal)



Car park located at Reserve entry off Pittwater Rd with lockable gate entry, 33 car spaces plus an accessible space. The sewer viaduct and screen planting divide Pittwater Rd from the remainder of the Reserve.



Entry 1 Pittwater Rd, lockable vehicle gate and gap for pedestrian access, gives entry onto internal access way to Visitors Centre / Amenities Building, Education Centre and the track network.



Entry 2 (Kennedy St) gives access via a flight of steps to the internal access way (at the bus turning area) and onto the track network (parking in quiet street available).



Entry 3 (Westminster Rd) access is gained along what appears to be a private driveway then via a flight of steps to the southwest of the Education Centre (parking in quiet street available).



Entry 4 (Monash Rd) access is gained across a grassed nature strip then via a flight of steps into the Reserve onto the track network (parking in quiet street available).



Entry 5 (Higginbotham Rd) access is gained via a lockable vehicle gate onto the asset protection zone (parking in the busy street available). There is no gap for pedestrian access.



Entry 6 (Pidding and Cressy Rds) gives pedestrian access to the bush track network (very little adjacent street parking available).



Entry 7 (on Cressy Rd) access onto Wellington Rd (closed road) via a lockable vehicle gate with a gap for pedestrian access then onto the bush track network (parking in quiet street available).



Entry 8 (Old Fire Trail off closed portion of Cressy Rd) for service and emergency vehicles with gap for pedestrian access onto the bush track network (parking available in quiet street near entry 9).



Entry 9 (Cressy Rd) for service and emergency vehicles with gap for pedestrian access on asset protection zone (parking available in quiet street).



Entry 10 (Kellaway St) pedestrian access is gained via a flight of steps along a concrete paved easement to the asset protection zone (parking in quiet street available).



Entry 11 (Finch Ave 1) pedestrian access is gained via a flight of steps to the asset protection zone (parking in quiet street available).



Entry 12 (Finch Ave 2) vehicle access is gained via a removable bollard along with pedestrian access down a concrete paved driveway to the asset protection zone (parking in quiet street available).



Entry 13 (Moncrieff Dr) pedestrian access is gained via a flight of steps to the asset protection zone (parking in quiet street available)

SITE ANALYSIS: Images - Facilities



Visitors Centre / Amenities Building is setback from the internal access way. A dated park map, cairn, memorial stone and commemorative plaque are located nearby.



Visitors Centre / Amenities Building, aging clinker brick building with metal roof, with a meeting room, kitchen and store. Public toilets (male / female / accessible) via external access during daylight hours.



The accessible toilet on the southwest side of the Visitors Centre / Amenities Building is separated from the internal access way by a grassed area (access does not comply with accessible requirements).



The eastern side of the Education Centre (not owned or managed by Council).



The grassed open space north of the Education Centre (not owned or managed by Council) located within the Field of Mars Reserve.



The boundaries of the land on which the Education Centre is sited (not owned or managed by Council) are formed by the gum trees to the west of the building and the planting area to the north.

SITE ANALYSIS: Images - Open Space Zones



The eastern open space zone is located west of the car park off Pittwater Rd and bounded by Buffalo Creek to the west and north. The area contains 2x sheltered picnic settings and a path along the creek.



Western open space zone west off Buffalo Creek and sited at the base of the bushland covered slope in which the bush track network is located. A path links back to the Visitors Centre / Amenities Building.



The southern open space zone located west of the Education Centre and south of Buffalo Creek and sited within Field of Mars Reserve (includes one seat).

SITE ANALYSIS: Images - Paths and Tracks



Internal access way from entry 1 (Pittwater Rd) near parking and bus turning area gives connection to Visitors Centre / Amenities Building and Education Centre.



All accessible path from the car park off Pittwater Rd to the eastern open space zone gives non compliant access onto grass. A sheltered picnic setting is located nearby.



Compacted earth / gravel path along Buffalo Creek in the eastern open space zone (looking south). Terminates at a viewing point over the wetlands with habitat information signage in poor condition.



Boardwalk and bridge across Buffalo Creek, located near the beginning of the boardwalk loop - see Visitors Centre in background (does not comply with accessible requirements.)



Compacted earth / gravel path linking the track head to the bushland tracks back to the boardwalk loop and Visitors Centre / Amenities Building.



Compacted gravel path from southern end of the internal access way to the beginning of the boardwalk loop (at its southern crossing of Buffalo Creek). Viewing platform with overgrown view of creek.



Entrance to the Warada Track at the Western Open Space Area - via stepped access in a compacted gravel path.



Track head of Kunzea Track at entry 6 (Pidding and Cressy Rds).



A trample track across the grassed western open space zone is from this informal crossing of Strangers Creek (in disrepair) (likely from entry 12 - Finch Ave 2) (intended for closure and removal).

SITE ANALYSIS: Images - Vegetation Impacts



Encroachment of weeds (including kikuyu) into the wetlands area - Estuarine Mangrove and Estuarine Saltmarsh (EEC)



Weeds such as Privet border the western open space zone.



Weeds infesting the waterways of Buffalo Creek.



Western open space zone with play building materials provided under the Casuarinas.

SITE ANALYSIS: Images - Signage



A variety of signs ring the Reserve - the *Field of Mars Reserve* at entry 1 (Pittwater Rd) and adjacent to the car park.



The sign for the *Field of Mars Environmental Education Centre* at entry 1 (Pittwater Rd) and adjacent to the car park.



Typical 3 sided metal ordinance sign located at several entries to the Reserve including entries 1, 2, 6 (though marks Pidding Park), 9, 10 (at lower end of pathway - not visible from Kellaway St), 11, 12, 13 and 14.



Typical Field of Mars Reserve map sign, indicates track network (details of walk duration, grade and landscape), 'where the visitor is' and prohibited activities (at entries 3, 4, 6, 7, 8 & internal access way).



Typical track head sign, routed painted timber, located at entries 6 and 8, at the Warada Track head (from the western open space zone) and on junctions on the boardwalk track and track network.



Sign that indicates the Reserve is a *Wildlife Protection Area and Wildlife Refuge*. Located at entries 1, 2, 3, 4, 6, 7, 8, 9, 11, 12 and 14



Bikes prohibited sign located at entry 6.

SITE ANALYSIS:
Images - Signage



Typical environmental information signage (etched metal plate) located in the southern open space zone overlooking Buffalo Creek (now concealed by vegetation).



Environmental information signage (etched metal plate) addressing ways to improve stormwater management, located on the internal access way below entry 2.



Environmental information signage (etched metal plate) located in the eastern open space zone overlooking the confluence of Buffalo and Strangers Creek.



Environmental information signage (etched metal plate affixed to a rock) located in the western open space zone at the Warada Track Head.



Out of date site map information sign (etched metal plate) located near the Visitors Centre.



A unique environmental information sign (painted metal) describing stormwater management, located between entries 8 and 9 at the head of Strangers Creek, isolated by fencing (difficult to access to read).



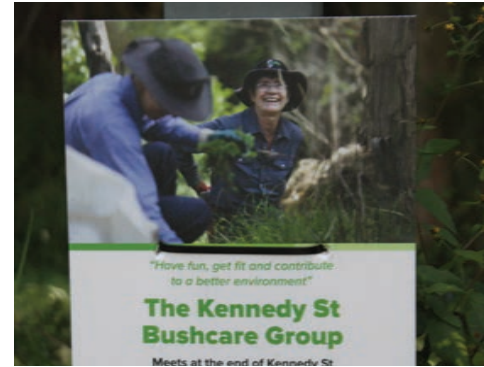
Sign that indicates no dogs allowed onto the Reserve, located inside entry 14.



Routed unpainted timber track way finding sign located at the Warada Track Head (off the western open space zone).



Routed treated timber track way finding sign located on the boardwalk loop.



Typical Bushcare Group sign located at entries 4 and 10 and near the Visitors Centre.



A photograph of a forest stream with large, moss-covered tree trunks in the foreground. The water is calm, reflecting the surrounding greenery. A purple banner with white text is overlaid on the upper part of the image.

SECTION 4: Masterplan

MASTERPLAN: Design Strategy



LEGEND

- City of Ryde Local Government Area
- Field of Mars Reserve lot boundaries
- Creek lines within the Reserve
- Creek lines (outside of the Reserve)
- Contours (5m interval)
- Pedestrian Entry Point (1-14)
- Maintenance Vehicle and Pedestrian Entry Point
- Parking area

ACCESS

- Existing bush walking tracks
- Existing parkland tracks and board walks and entry tracks / paths
- Existing vehicle access

ASPECTS TO ADDRESS:

Access, Use and Circulation:

- Upgrade all entry points to improve visibility, information and access
- Create pedestrian links to track network
- Link with all abilities access
- Passive amenity improvements
- Improve way-finding signage
- Creek crossing - boardwalk bridge
- Creek crossing - culvert
- Creek crossing - natural / in-situ rock

Environment:

- Establish and maintain riparian vegetated zones, enhance and expand estuarine plant communities and provide buffer planting
- Expand bushland areas
- Strengthen pedestrian links and environmental values within the green corridor
- WSUD bio-retention zone

MASTERPLAN: Design Strategy

ACCESS, USE AND CIRCULATION:

- Upgrade all entry points to encourage and attract more visitors to the Reserve and to improve visibility – improvements to include uniform signage, way finding signage, track surface upgrades, increased all abilities access where possible and secure bike racks.
- Formalise or close informal / trample tracks as required, upgrade all tracks to meet standards, utilise managed asset protection zones to provide pedestrian access.
- Link the park zones, car park and Visitors Centre with all abilities access. Provide an all abilities loop through the bushland as possible. Provide additional dedicated accessible spaces within the car park.

CHARACTER AND FACILITIES:

- To increase recreational use and to attract more visitors, given the Reserve is a level 1 open space area in the Council area, provide for informal recreation activities in the park zone to support play, picnicking, and walking for exercise (within the context of the flooding issues) as well as upgrading the bushland tracks.
- Provide waste facilities to encourage recycling.
- Upgrade all abilities access to the Visitors Centre and accessible toilet.
- Maintain the bushland setting, intensify efforts to control weeds, undertake plantings of indigenous species in the park zone.
- Address Climate Change through provision of shade (planted and structural), selection of plant species (consider long term viability and adaptability to rising temperatures), selection of materials (high albedo reading to reduce heat island effect), provision of drinking water stations and by minimising carbon in the process.
- Provide attractive facilities and diverse opportunities to enjoy the Reserve.
- Facilitate school and community nature and environmental education and activities in the Reserve. To maintain the wildlife refuge values of the Reserve

the Centre should operate in daylight hours only. The Environment Centre (not located on Reserve land but enclosed by the Reserve) also plays a significant role in environmental education.

ENVIRONMENT – FLORA AND FAUNA:

- Avoid directing activities to areas with rare or threatened species or plant communities. Provide access if required to ensure avoidance of impacts on natural systems.
- Maintain existing areas of bushland and increase footprint to ensure protection of core areas.
- All new plantings to be endemic species only, consistent with existing plant community types.
- Undertake staged and on going program of exotic and weed species removal and replacement plantings to maintain habitat options for local fauna.

ENVIRONMENT – GREEN CORRIDORS:

- Improve connections to and from adjacent areas to ensure safe and easy pedestrian access.
- Extend weed free biodiverse bushland plant communities to the boundaries of the Reserve where adjacent to the next link in the green corridors.
- Ensure the riparian corridors are weed free to avoid downstream transference of weed propagules.

ENVIRONMENT – STORMWATER MANAGEMENT:

- Apply vegetated riparian zone widths, 20m each side for Buffalo Creek and 10m each side for Strangers Creek. Undertake weed removal, new plantings and bank stabilisation as proposed in the *City of Ryde Riparian Protection and Rehabilitation Management Plan 2013*.

ENVIRONMENT – THREATS TO BIODIVERSITY:

- To protect from impacts from neighbouring properties use asset protection zones to buffer encroachments and to define boundaries.
- Manage stormwater by implementing WSUD devices as noted in the *Lane Cove River Coastal Zone Management Plan 2013* (bioretention system in

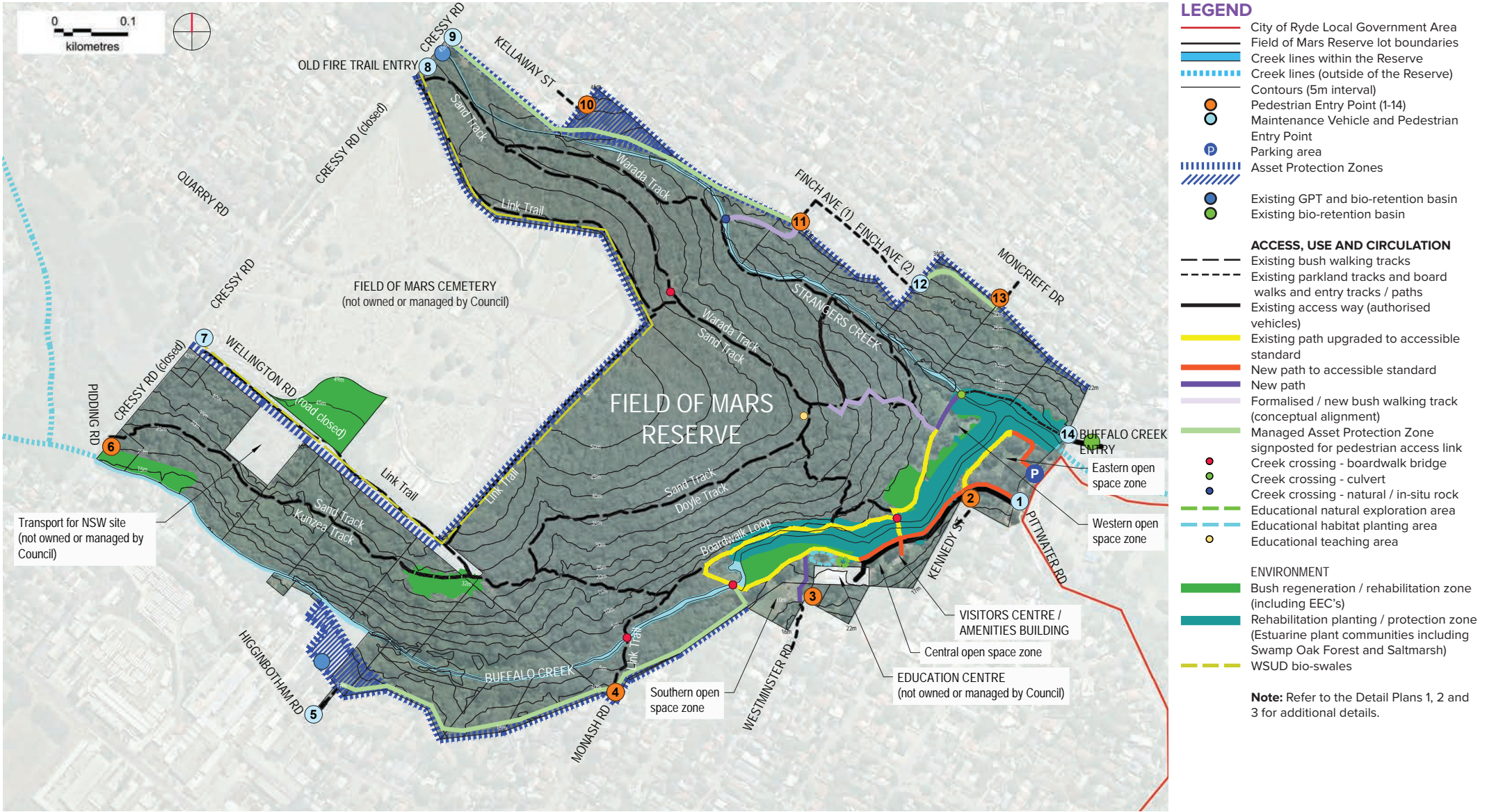
association with the existing wetlands off Higginbotham Rd). Further, manage stormwater outlets located on the Reserve boundaries to protect the environment from erosion, nutrient overload and weed invasion.

- Enhance existing estuarine plant communities through weed control and supplementary plantings, protect from disturbance and impacts, identify areas to which they can retreat during the process of sea level rise. Potential loss of open space within the park zone.
- Extend plantings in the park zone to buffer existing EEC communities without compromising user safety or bushfire risk.

INFORMATION:

- Provide uniform entry signage to include Reserve name and map, 'where you are' (entry ID), available walks, attractions and activities in the Reserve, allowable and prohibited activities, and exclusion of dogs, cats and bikes.
- Provide information at entries in relation to threats to biodiversity including responsible pet ownership, stormwater management, responsible fertiliser use, avoidance of encroachment and responsible green waste management.
- Provide interpretive signs throughout the Reserve about the role of the wildlife refuge, neighbour and visitor responsibilities, local flora and fauna, local natural systems and functions, Aboriginal and non-Aboriginal heritage and culture specific to the Reserve and upgrade and unify way finding signage throughout the Reserve.
- Provide signage to encourage Council supported volunteer bushcare activities.

MASTERPLAN



Refer to *Masterplan: Information for details of the Masterplan*

MASTERPLAN: Information

ACCESS, USE AND CIRCULATION:

Entry Points:

- Retain all existing entry points. Provide site specific signs to inform Reserve users of site facilities and 'where they are' as well as details of permitted and non-permitted activities. Signs to be displayed in a prominent position relative to the adjacent street or public footpath. Signs to be consistent with Council's standard. Indigenous welcome and acknowledgments to be included on signage.
- All entry points to be upgraded to acceptable track head standard with paving, pathways and steps as required.
- Provide secure cycle parking racks at entry points positioned on / near regional cycle routes.
- Provide way finding signage from Westminster Rd to the existing steps to the Reserve at entry 3.
- Provide way finding signage in Cressy Rd from entry 9 to entry 8 to encourage access to the Reserve via the Sand Track.
- Provide way finding signage for connectivity between Moncreiff Dr, entry 13, entry 12, Finch Ave and entry 11.
- Provide a pedestrian opening at the vehicle gate at entry 5.
- Formalise or close informal tracks as required and upgrade retained tracks. Refer to Park zone paths and Bush walking tracks below for details.
- Improve arrival experience at main site entry, site frontage (Pittwater Rd) and along the access way with place making elements such as definition native plantings and signage.

- Investigate pedestrian safety improvements and strengthen walking route connectivity:
 - Across Pittwater Rd between Field of Mars Reserve, Buffalo Creek Reserve (Hunters Hill Council) and onwards to Lane Cove National Park (National Parks and Wildlife Service).
 - Cressy Rd near entries 6 and 7 and onwards along Buffalo Creek to Burrows Park and Ryde Park.
 - Cressy Rd near entries 8 and 9.

Existing car park:

- Provide dedicated accessible parking bays in the existing parking area off Pittwater Rd. Locate to access existing and proposed accessible pathways.
- All existing service gate locations to be retained.

Vehicle access:

- Maintain the internal access way from Pittwater Rd as a one lane width, for use by authorised vehicles only.
- Upgrade the internal access way to a consistent finish to improve amenity of the area, accessibility and to reduce contaminants into the stormwater runoff.
- Vehicle access to internal access way to be restricted to authorised vehicles via gates to the west of the car park and west of the bus turning area. Access way gates to be considered for future upgrade to key and remote electronic operation.
- Main car park gate to remain (open sunrise – sunset) to restrict evening use, campervans and illegal dumping.
- Facilitate site access for maintenance and emergency purposes (as required).

- Upgrade maintenance access at entry 12 and from entry 14 and creek crossing point (culvert) to western open space zone.
- Facilitate Education Centre groups arrivals/ departures from Pittwater Rd by way of improved bus drop off/pick up area and turning circle (capacity up to maximum of three buses). Ensure the width of the access way from entry 1 to the bus turning area is sufficient for two passing buses. Investigate alternative bus layover area (off-site) in close proximity to the Reserve.

Park zone paths:

Incorporate accessible design principles:

- Provide an accessible path in combination with the upgrade of the internal access way (authorised vehicles) to provide access from the public car park off Pittwater Rd to the Visitors Centre / Amenities Building (accessible toilet) and Education Centre.
- Provide a new accessible path from the accessible car parking in the car park off Pittwater Rd through the eastern open space zone. This path will be routed around the perimeter of the eastern open space zone and connect to the existing path along the eastern side of Buffalo Creek (which is to be upgraded to accessible path standard). Accessible path connections to be provided to the picnic shelters in the eastern open space zone.
- Upgrade the existing Boardwalk loop track to accessible path standard to provide a return loop from the Visitors Centre / Amenities Building.
- Upgrade and extend the path between the Boardwalk loop and western open space zone to accessible path standard.
- Investigate pedestrian safety and traffic calming improvements to strengthen walking route connectivity.

MASTERPLAN: Information

ACCESS, USE AND CIRCULATION continued:

Park zone paths continued:

Western open space zone:

- Provide a new compacted path across the grassed area, to link the existing track from entry 14. Improve entry 14, track and culvert creek crossing to the western open space zone to also facilitate maintenance access.

Southern open space zone:

- Provide a new path from entry 3 to the Boardwalk loop in line with the existing desire line / informal track across the grassed area.

Bush walking tracks:

- Upgrade existing bushland walking tracks as required to Australian Walking Track Grading System (Grade 2 or Grade 3 dependent on prevailing slope).
- Provide pedestrian access link and wayfinding signage between entries 3, 4 and 5 along the managed asset protection zone to link to the bushland track network.
- Upgrade steps and link walking track from entry 4 to the Boardwalk loop. Ensure full width crossing of wet areas on approach to the Boardwalk loop.
- Formalise the existing informal track and provide new bush walking tracks from entry 11 to link to the Warada Track. Investigate appropriate option to cross Strangers Creek via natural creek crossing with insitu rock.
- Provide pedestrian access link and wayfinding signage between entries 9, 10 and 11 along the managed asset protection zone to link to the bushland track network.
- Signpost the managed asset protection zone from entry 13 to entry 12 for pedestrian access.

- Improve quality and drainage of existing track from entry 14 to Strangers Creek, including creek crossing point (culvert) for bushwalking and maintenance access.
- Provide track improvements to the eastern section of the Warada track (near the track head from the western open space zone) to address erosion issues.
- Provide track connectivity in conjunction with clearly define creek crossing points (structural and natural).
- Provide new tracks within the context of reducing negative impacts on natural systems. Avoid providing new tracks within EEC plant communities or through areas with known presence of rare and endangered species.
- Close the short, dead end section of track from entry 6 to Buffalo Creek and return to a bushland area.
- Facilitate in-field teaching and educational opportunities along the bush tracks in defined areas.
- Provide educational and interpretive signage along walking tracks to highlight local flora, fauna, natural/ environmental characteristics of the Reserve, site history and local indigenous information.
- Investigate the use of track counters on some tracks to quantify the level of track usage.

- Supplementary plantings around the car park and Pittwater Rd site frontage with endemic species without impinging on traffic and safety sight lines.
- Consider revegetating the grass area and remove weeds on the southern side of the internal access way from the viaduct.

Visitors Centre / Amenities Building:

- Link accessible parking in the car park to the Visitors Centre / Amenities Building (with accessible toilet) and the Boardwalk loop.
- Council to give future consideration to investigate / review the condition and improved functionality of the existing building for greater community environmental education purposes. Consideration to be given to land stability, flood mitigation measures, potential climate change measures and other environmental improvements.

CHARACTER AND FACILITIES:

Landscape Setting:

- Maintain and enhance the bushland setting through ongoing bush regeneration works, weed control and ongoing replacement of exotic species with endemic species according to identified plant communities.
- Provide shade (planted and structural) to improve amenity.

MASTERPLAN: Information

CHARACTER AND FACILITIES continued:

Park facilities:

- In the eastern open space zone provide formal and structured picnic area. New picnic shelters to have tables to accessible design standards with connection to accessible path.
- Provide filtered water station near Visitors Centre / Amenities Building.
- In the western open space zone provide materials / items to allow for educational natural exploration. Provide natural measures to discourage entry into EEC plant communities. Provide a naturalistic area for quiet contemplation. Area also suitable for informal and unstructured picnics.
- In the southern open space zone (west of the Education Centre), integrate informal rocks/ sandstone blocks for active recreation, informal seating and teaching circles. Maintain good sight lines for supervision of students during lunch and/ or breaks. Area also suitable for informal and unstructured picnics. Integrate educational natural exploration and educational habitat planting areas in the vicinity of the Education Centre. Include natural shade opportunities.
- In the central open space zone (between the Education Centre and the Visitors Centre / Amenities Building) provide delineation to separate from the access way. Area also suitable for informal and unstructured picnics.

ENVIRONMENT:

Flora and Fauna:

- Maintain and protect the existing footprint of bushland and where possible facilitate opportunities to expand bushland areas.
- Strengthen biodiversity corridors onsite and connections with surrounding area.
- Regenerate and/or revegetate bushland in the areas located:
 - Southwest of the western open space zone.
 - Southwest of the end of Wellington Rd (Pamplins block).
 - Northeast of Wellington Rd (enclosed on three sides by the Field of Mars Cemetery).
 - Southeast of entry 6 (near Pidding Rd entry).
- Protect, manage and monitor the saltmarsh areas within the Reserve:
 - Regenerate the plant communities alongside the saltmarsh communities to provide a buffer from activities within the open grassed areas.
 - Provide natural exploration and active play opportunities in open space zones, ensuring these are located outside endangered ecological communities and environmentally sensitive areas such as Estuarine Swamp Oak Forest, Saltmarsh and Mangrove Vegetation Communities.
 - Regenerate, supplementary plantings within the saltmarsh and undertake weed removal.
 - The proposed accessible path to the perimeter of the eastern open space zone will provide protection to the saltmarsh from mower and brush cutter maintenance of the open grassed area and encroachment of exotic grass species.

- The existing internal access way provides a boundary to the plant communities along Buffalo Creek. Remove exotic grassed areas between the access way and Buffalo Creek and regenerate Estuarine Swamp Oak Forest.
- Regenerate Estuarine Swamp Oak Forest plant community between the existing footpath located in the southern open space zone below the Education Centre and the saltmarsh located on the creek line of Buffalo Creek.
- Undertake a staged and ongoing program of exotic and weed species plant removal and replacement with native plantings to maintain habitat options for local fauna.
- All new planting to be endemic species only, consistent with existing plant community types. Include mid-story and understory species.
- Provide signage to highlight the Reserve's Wildlife Protection Zone status and non—permitted activities which can result in detrimental impacts on the flora and fauna.

Green Corridors:

- Strengthen biodiversity values of bushland within the Reserve to better link with adjacent green/ biodiversity corridors through weed removal and control and supplementary planting of endemic species.
- Manage riparian corridors to avoid downstream spread of weed propagules through weed removal and control, supplementary planting of endemic species and bank stabilisation works.

MASTERPLAN: Information

ENVIRONMENT continued:

Stormwater Management, Water Sensitive Urban Design (WSUD) and Litter Reduction Strategies:

- Manage and enhance vegetated riparian zone widths for Buffalo Creek and Strangers Creek through weed removal and control, supplementary planting of endemic species and bank stabilisation works.
- Maintain existing GPTs, trash racks and bioretention basin within the Reserve. Manage stormwater by implementing WSUD devices as noted in the Lane Cove River Coastal Zone Management Plan 2013 (bioretention system in association with the existing wetlands off Higginbotham Rd). Recommend future consideration by Council for additional upstream measures to be implemented in the surrounding catchment area to provide improved stormwater and environmental outcomes within the Reserve.
- Manage stormwater outlets located on the Reserve boundaries to protect the environment from erosion, nutrient overload and weed invasion by implementing WSUD devices such as gross pollutant traps, trash racks and / or planted swales.
- Investigate and integrate WSUD measures (such as swales and planted areas) between the cemetery and Field of Mars Reserve to reduce external nutrient impacts on the Reserve. Recommended to be contained within the defined Asset Protection Zone.
- Where appropriate, investigate and integrate general WSUD principles around access way, paths, open space zones, car park and surrounding road network.

- Include filtered water station to reduce single use plastic bottles onsite.
- Provide educational and interpretive signage in relation to stormwater management, WSUD and litter reduction strategies.

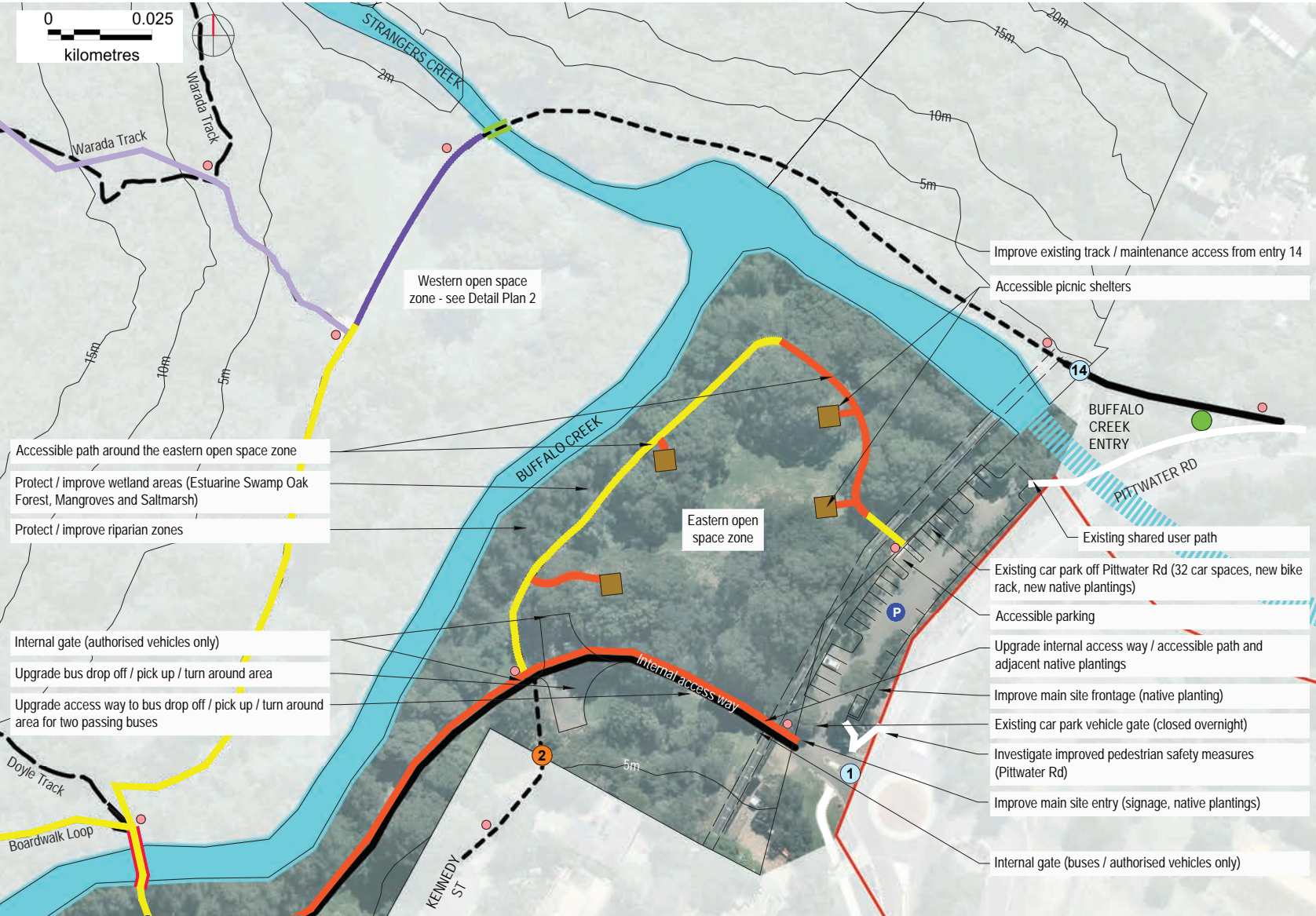
Climate Change and Resilience Planning:

- Ensure asset protection zones (APZs) are defined and maintained in accordance with the adopted Bush Fire Risk Management Plan. Ensure weeds and garden escape plantings are removed from the APZs and from along the bush edge of the APZs. Manage APZs to minimise weed propagules are not washed into the Reserve bushland areas. Where appropriate include native vegetated edge to define APZ width, provide WSUD outcomes, reduce weeds and litter from entering the Reserve and decrease informal tracks.
- Investigate and integrate progressive upgrade of infrastructure (as required) within the context of rising sea levels, flooding and climate change.
- Recommend future consideration by Council for flood management and mitigation strategies within the Reserve, upstream and the surrounding catchment area.
- Select plant species, from the existing plant lists, known to have a broad climatic tolerance range to tolerate future predicted climatic conditions. Useful tools include www.climatechangeinaustralia.gov.au and www.ala.org.au
- Identify upstream areas into which estuarine plant communities will retreat during sea level rise.
- Minimise the use of carbon in all processes and materials selection.

INFORMATION:

- Interpretive signs to be provided throughout the Reserve about the role of the wildlife refuge, neighbour and visitor responsibilities, local flora and fauna, local natural systems and functions, Aboriginal and non-Aboriginal heritage and culture specific to the Reserve.
- Consistent way finding signage to be provided on accessways, tracks and paths.

DETAIL PLAN 1: Eastern Open Space Zone

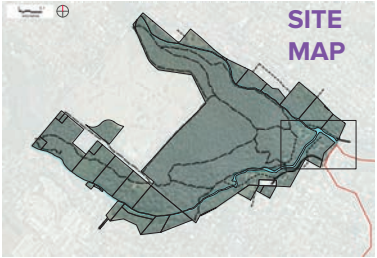


LEGEND

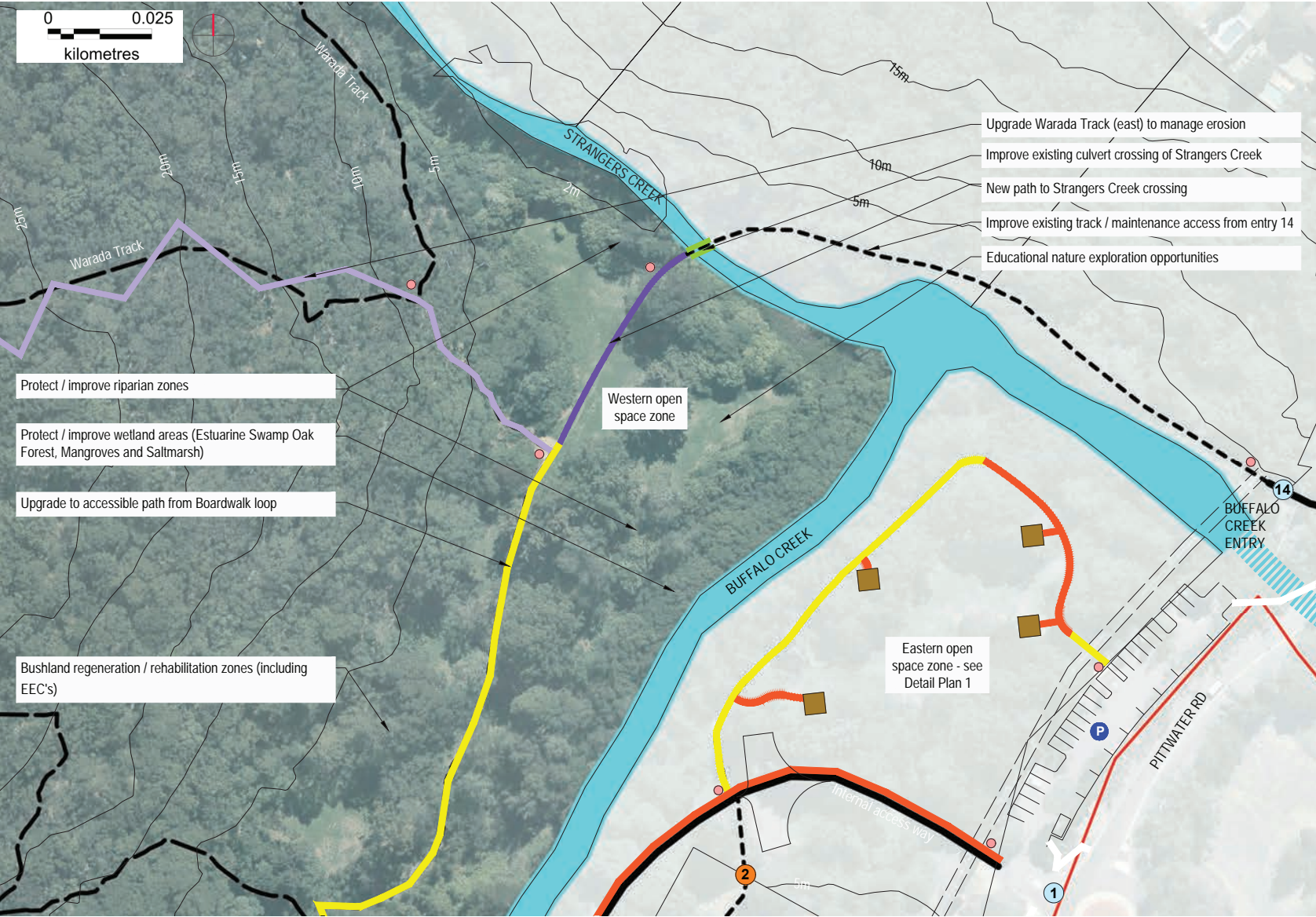
- City of Ryde Local Government Area
- Field of Mars Reserve lot boundaries
- Creek lines within the Reserve
- Creek lines (outside of the Reserve)
- Contours (5m interval)
- Pedestrian Entry Point (1-14)
- Maintenance Vehicle and Pedestrian Entry Point
- Parking area
- Existing bio-retention basin

ACCESS, USE AND CIRCULATION

- Existing bush walking tracks
- Existing parkland tracks and board walks and entry tracks / paths
- Existing access way (authorised vehicles)
- Existing path upgraded to accessible standard
- New path to accessible standard
- New path
- Formalised / new bush walking track (conceptual alignment)
- Creek crossing - boardwalk bridge
- Creek crossing - culvert
- Accessible picnic shelters
- Way finding signage



DETAIL PLAN 2: Western Open Space Zone



LEGEND

City of Ryde Local Government Area

Field of Mars Reserve lot boundaries

Creek lines within the Reserve

Creek lines (outside of the Reserve)

Contours (5m interval)

Pedestrian Entry Point (1-14)

Maintenance Vehicle and Pedestrian Entry Point

Parking area

ACCESS, USE AND CIRCULATION

Existing bush walking tracks

Existing parkland tracks and board walks and entry tracks / paths

Existing access way (authorised vehicles)

Existing path upgraded to accessible standard

New path to accessible standard

New path

New / formalised bush walking track (conceptual alignment)

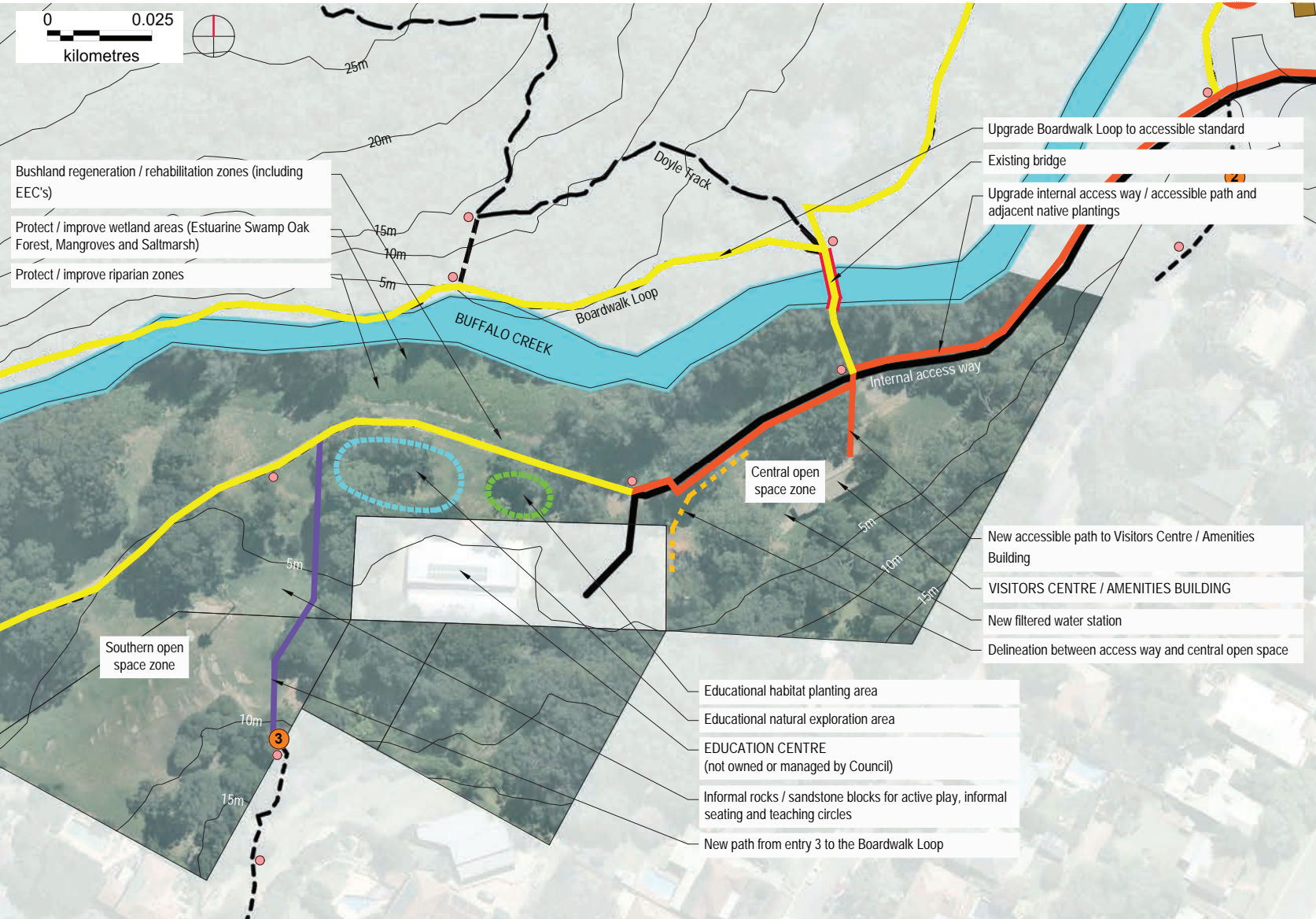
Creek crossing - culvert

Accessible picnic shelters

Way finding signage

52

DETAIL PLAN 3: Central and Southern Open Space Zones

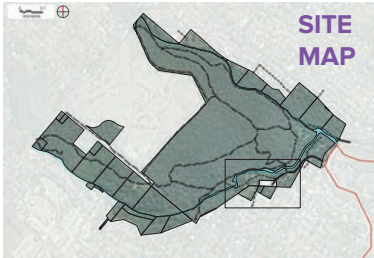


LEGEND

- City of Ryde Local Government Area
- Field of Mars Reserve lot boundaries
- Creek lines within the Reserve
- Creek lines (outside of the Reserve)
- Contours (5m interval)
- Pedestrian Entry Point (1-14)
- Maintenance Vehicle and Pedestrian Entry Point
- Parking area

ACCESS, USE AND CIRCULATION

- Existing bush walking tracks
- Existing parkland tracks and board walks and entry tracks / paths
- Existing access way (authorised vehicles)
- Existing path upgraded to accessible standard
- New path to accessible standard
- New path
- Creek crossing - boardwalk bridge
- Way finding signage

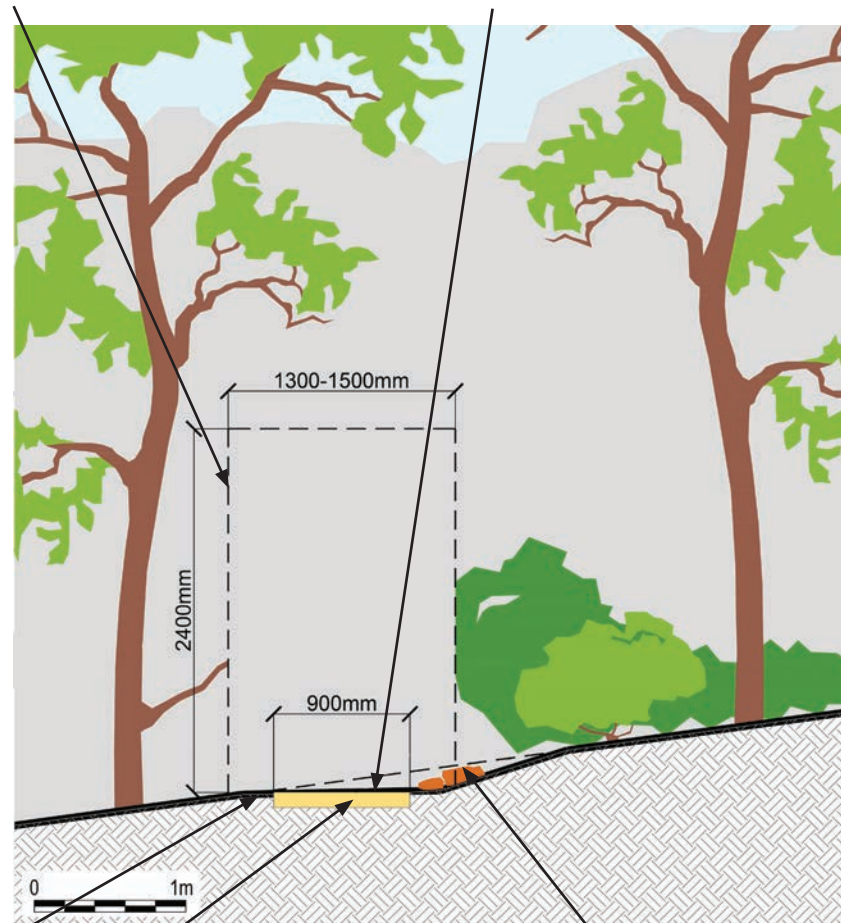


GRADE 2 TRACK

Cross Section

Track corridor - clear a nominal 200-300mm beyond defined track surface (minimum 1.3 to 1.5m wide at shoulder height) and 2.4m high. Clear of trees, over hanging branches and intruding vegetation.

Modified or hardened track surface, 900mm or more wide, generally even surfaced with 1:50 cross fall (2% or 1.15%), well maintained with few obstacles and minimal intrusions.



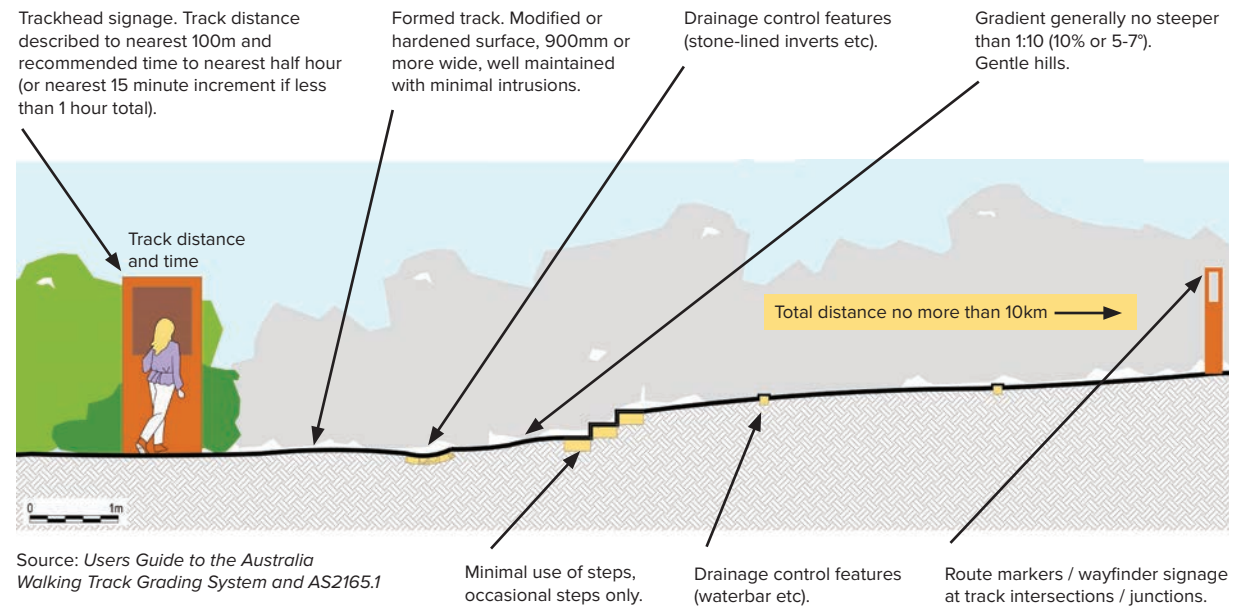
No windrow or rill along track margins.

- Track:
- Track benched into cross slope, up-slope batter at natural angle of repose;
 - Excavate site material, as necessary, to remove organic matter and larger stones. Replace in-situ material (or fill) and compact to 90% as hardened track surface;
 - Larger roots cut or covered to provide level track surface with few if any trip hazards.

Rocks removed (or cut flush) to provide level track surface, and randomly placed along track margins (or up-slope of track on benched sections).

Long Section

Users need no previous experience and are expected to exercise normal care regarding their personal safety (AS2165.1). Suitable for most ages and fitness levels.



Source: *Users Guide to the Australia Walking Track Grading System and AS2165.1*

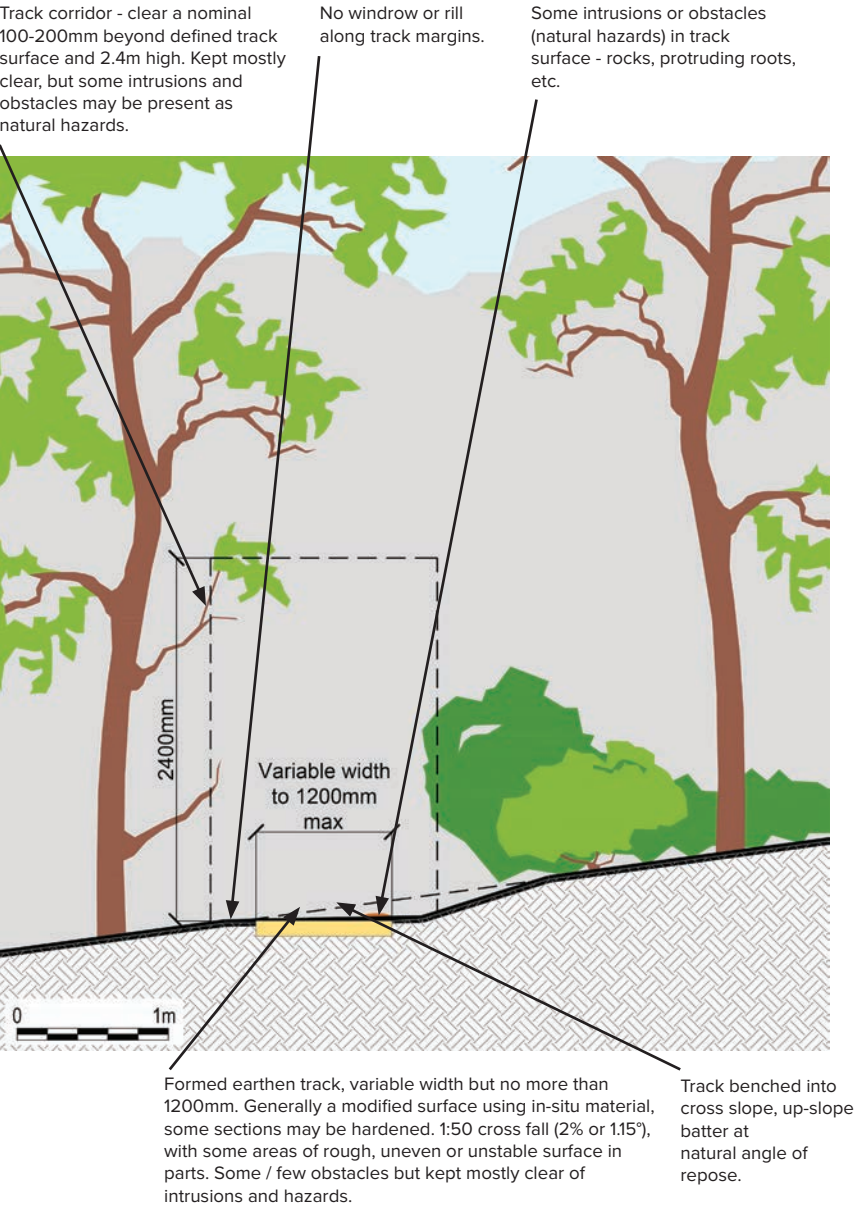
Minimal use of steps, occasional steps only.

Drainage control features (waterbar etc).

Route markers / wayfinder signage at track intersections / junctions.

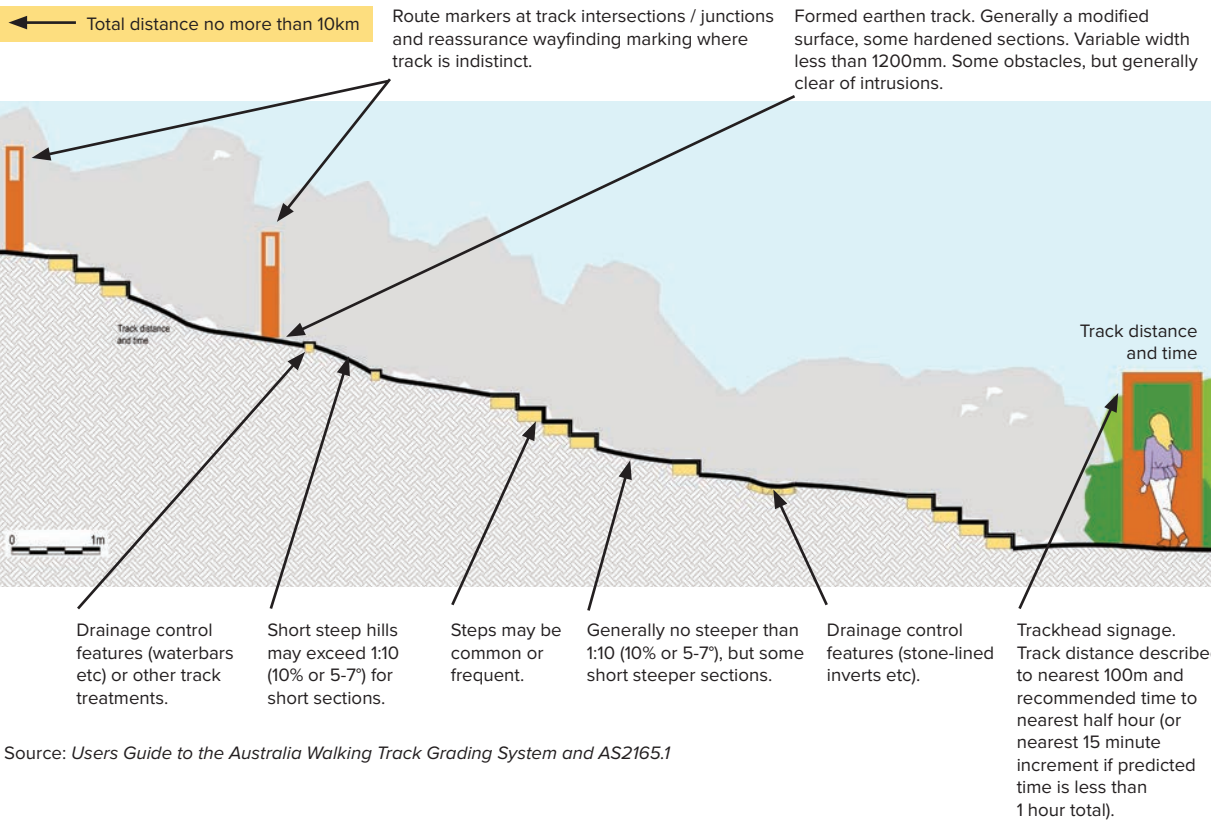
GRADE 3 TRACK

Cross Section



Long Section

Suitable for most ages and fitness levels. Some bushwalking experience recommended but minimum level of specialised skills required. Walkers may encounter natural hazards (steep slopes, rough / unstable surfaces and minor water crossings) and are responsible for their own safety.



Source: Users Guide to the Australia Walking Track Grading System and AS2165.1

MASTERPLAN: Precedent Images

Entry Treatments



Replace all existing entry signs with a single totem based on the style of the existing Reserve sign on Pittwater Rd, a corten steel blade.



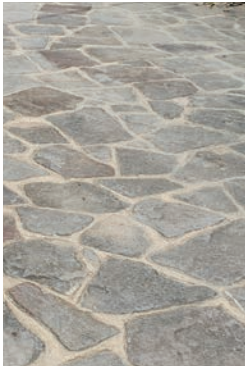
Affix printed aluminum panels to display site map, location, permissible activities, wild life refuge status, walking tracks, biodiversity values, bushcare groups. Investigate options for interchangeable panels.



Present totem signs in a landscaped setting, provide endemic plantings, rebuild steps and pave entry paths to a standard treatment



Replace existing steps with sandstone steps and provide hand railings.



Provide sandstone paving at entries as required to improve amenity and path function.



Provide bike racks to facilitate secure storage at entries to deter bike entry to the Reserve.

Park Furniture



Replace existing shelters with metal and timber structures.



Provide wheelchair accessible picnic settings to each picnic shelter.



Provide accessible seats to match picnic table settings.



Provide filtered a water station to reduce the use of plastic bottles.



In the southern open space zone integrate informal rocks / sandstone blocks for active recreation, informal seating and teaching circles.

MASTERPLAN: Precedent Images

Signs

Reserve signage to be based on the existing sign on Pittwater Rd - using a corten steel blade on which sign boards are affixed.

Affixed printed aluminum panels to display site map, location, permissible activities, wild life refuge status, walking tracks, biodiversity values, bushcare groups. Options for interchangeable panels to be investigated. Sign palette to include:

- Large totem (2m+ high) at all entries
- Way finding totems (1m high) at track junctions
- Interpretive signs (<1m high) at key locations (existing signs to be removed)



Reserve signage to be based on the existing sign on Pittwater Rd - using a corten steel blade on which sign boards are affixed.



Totem signs to include site map, location, permissible activities, regulatory information, wildlife refuge status, bushcare groups, biodiversity values, responsibilities of users.



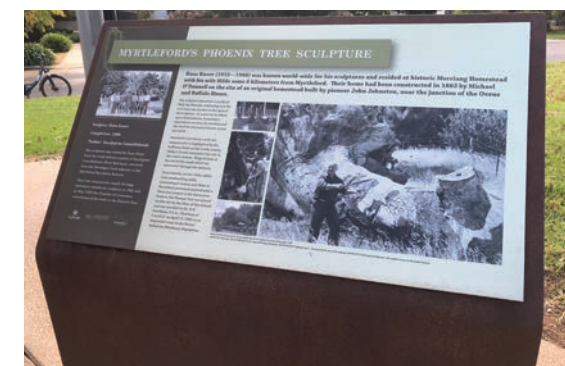
Way finding signage to include track direction, distances and Reserve attractions and facilities affixed to a corten steel blade.



Way finding signage (example only).



Existing interpretive signs to be replaced – printed aluminum panels, affixed to corten steel low height blades, to provide information about indigenous site and local flora and fauna, the role of the Reserve, means to protect the environment, Heritage and cultural values, and stormwater management.



Example of a sign board affixed to a corten steel blade.

MASTERPLAN: Precedent Images

Nature Exploration



Provide materials for natural play.



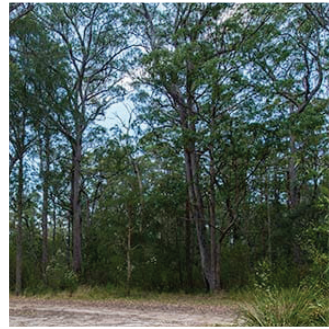
Encourage investigation and recording of the natural environment.



Encourage access to the bush.



Encourage closer inspection of nature.



Provide outdoor education learning areas.

Edge management



Vegetation area management - sandstone blocks to mark extent of mown areas.



Vegetation area management - logs to mark extent of mown areas.

MASTERPLAN: Precedent Images

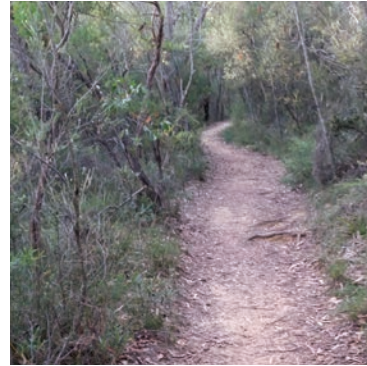
Bushland Tracks Grade 2

Recommended characteristics:

- Track corridor width of 1500mm with height of 2400mm free of small trees and overhanging branches
 - Track width of 900-1500mm wide
 - Gradient is generally no steeper than 1:10
 - Generally a modified or hardened track surface
 - Minimal use of steps
 - Track is well maintained with minimal intrusions
 - Track head signage and route markers at intersections
 - Users need no previous experience and are expected to exercise normal care regarding their personal safety / suitable for most ages and levels of fitness
 - Time to walk track noted in 15-30 minute increments
- (Reference - *Users Guide to the Australian Walking Track Grading System*)

Precedent images show suitable examples of:

- Surface finish
- Simple step and run treatment
- Creek / drainage line crossings
- Drainage treatments



Track features - typical grade 2 track.



Track features - compacted earth (organic matter free) or gravel.



Track features - stone flagging where pavement hardening or infill is required.



Track features - use natural rock platforms for stepping and infill with site stone to create a traffic-able track.



Track features - landing tread stone to armour track and prevent wearing from use.



Track features - sleeper step and runs with sand or compacted fill treads.

MASTERPLAN: Precedent Images

Bushland Tracks Grade 2 continued...



Track features - stepping stone creek crossing.



Track features - stormwater management using a stone gutter / box drain.



Track features - stormwater management using a drain cut into insitu rock.



Track features - stormwater management using a stone lined invert.



Track features - stormwater management using a sleeper water bar.

MASTERPLAN: Precedent Images

Bushland Tracks Grade 3

Recommended characteristics:

- Track corridor width of 1500mm with height of 2400mm free of small trees and overhanging branches
- Track width of 900mm but variable to 1200mm
- Gradient may exceed 1:10 for short sections but is generally no steeper than 1:10
- Steps may be common
- Formed earthen track, few obstacles. Generally a modified surface, sections may be hardened
- Track head signage and route markers at intersections and where the track is indistinct
- Users need no bushwalking experience and a minimum level of specialist skills. Users may encounter natural hazards such as steep slopes, unstable surfaces and minor water crossings. They are responsible for their own safety.
- Time to walk track noted in 15-30 minute increments.

(Reference - *Users Guide to the Australian Walking Track Grading System*)

In addition:

- Deviate track alignments to avoid long sections of downhill runs / provide stormwater management treatments to manage water

Precedent images show suitable examples,

in addition to those shown for Grade 2 tracks, of:

- Track surfaces
- Step treatments
- Drainage line crossings



Track features - typical grade 3 track with compacted earth surface.



Track features - passable access across insitu rock.



Track features - rock steps through rocky outcrops



Track features - stone step and runs with compacted fill treads.



Track features - steps cut into insitu rock.



Track features - infill stone flagging and rock leveling to create a passable track over insitu rock outcrops.

MASTERPLAN: Precedent Images

Bushland Tracks Grade 3 continued...



Track features - use natural rock platforms to create a traffic-able track.



Track features - stepped path at an angle to the slope to manage drainage flows.



Track features - rock lined box drain / gutter.



Track features - mesh deck panel across minor drainage line.



Track features - stepping stones across minor drainage line.

MASTERPLAN: Precedent Images

Accessible Paths / Tracks

Accessible paths and tracks:

Characteristics:

- Grades in accordance with the AS1428 series.
- Ramps graded no steeper than 1:14 are suitable for a person in a wheelchair.
- Broad, hard surfaced path suitable for wheelchair use.
- Track width is 1200mm or more wide, well maintained with minimal intrusions.
- With track head signage and route markers at intersections.
- Users need no previous experience and are expected to exercise normal care regarding personal safety.
- Time to walk track noted in 15-30 minute increments.
- Steps allowed only with alternate ramp access.



Accessible boardwalk and creek crossing with kick rails.



Accessible park path of crushed sandstone or compacted gravel with timber edge boards.

Informal Access



Informal access across managed asset protection zones with way finding signage to guide the route.

MASTERPLAN: Precedent Images

Vegetation Types



Saltmarsh (EEC) found along the creek lines in low lying areas to be protected and regenerated with species typically occurring in this vegetation type.



Estuarine Mangroves found along the creek lines in low lying areas to be protected and regenerated with species typically occurring in this vegetation type.



Estuarine Swamp Oak Forest (EEC) found along the creek lines in low lying areas to be protected and regenerated with species typically occurring in this vegetation type.



Coastal Enriched Sandstone Moist Forest found adjacent to creek lines in low lying areas and at the toe of the slopes to be protected and regenerated with species typically occurring in this vegetation type.



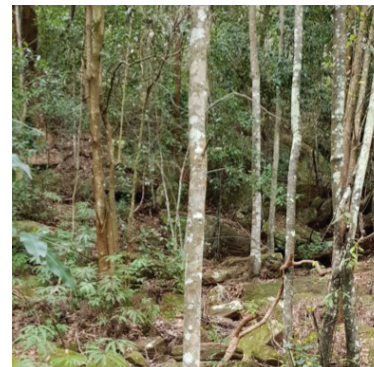
Coastal Enriched Sandstone Dry Forest found over much of the Reserve on sandstone slopes, to be protected and regenerated with species typically occurring in this vegetation type.



Coastal Shale-Sandstone Forest found across the upper slopes, to be protected and regenerated with species typically occurring in this vegetation type.



Sydney Turpentine-Ironbark Forest (EEC) found in pockets on the upper slopes, to be protected and regenerated with species typically occurring in this vegetation type.



Coastal Sandstone Gallery Rainforest, a small pocket along the upper reach of Buffalo Creek, to be protected and regenerated with species typically occurring in this vegetation type.

MASTERPLAN: Precedent Images

Stormwater Management

WSUD devices to manage stormwater:

- Trash racks
- Gross pollutant traps (GPT)
- Bio retention basins
- Planted strips
- Planted bio swales
- Rock lined swales



Existing trash rack and bio retention basin at the head of Strangers Creek.



Planted strip of vegetation between access way or paved areas and native vegetation to provide stormwater filtration.



Planted bio retention swales located at stormwater outlets, adjacent to infrastructure such as the car park, along Reserve boundaries and between paved surfaces and creek lines.



Rock lined headwalls and drainage lines to stormwater water outlets to manage erosion, before flowing to planted bio swales.



Useful grass species for mown areas in place of exotic grass species - *Microleaena stipoides* - Weeping Grass.



Typical wetland / bio retention plant species - *Carex appress* - Common Sedge. (Photo - bluedale.com.au)



Typical wetland / bio retention plant species - *Ficinia nodosa* - Knobby Club Rush.

SECTION 5: Implementation Plan



PROJECT IMPLEMENTATION PLAN

FIELD OF MARS RESERVE MASTERPLAN - IMPLEMENTATION PLAN

MASTERPLAN AREA	MASTERPLAN ELEMENT/UPGRADE	ASPECT	PRIORITY FOR IMPLEMENTATION
Eastern Open Space Zone	Upgrade picnic facilities and accessible path connections.	Facilities & Circulation	High
Main Entry/car park	Accessible car parking spaces	Access	High
Visitors Centre/Amenities building	Upgrade accessible toilet and accessible path connection from access way.	Facilities & Circulation	High
Wellington Rd	Bush regeneration/rehabilitation zone	Environment	High
Near Entry 6	Bush regeneration/rehabilitation zone and decommission dead-end track	Environment	High
Internal Access Way	Upgrade to accessible standards and for authorised vehicles	Access & Circulation	High
Boardwalk Loop & Western Open Space Zone	Upgrade to Boardwalk and path to accessible standards. New path from creek crossing culvert through Western Open Space Zone.	Circulation	High
Internal Access Way	Delineation between access way and Central Open Space Zone	Access & Circulation	High
Internal Access Way	Upgrade bus drop off/pick up area and turning circle.	Access	High
Internal Access Way	Upgrade vehicle gates to key and remote operations.	Access	High
Tracks	Walking trail audit and review of track/loop names undertaken	Circulation	High
Whole of site	Develop Signage Strategy	Circulation & Education	High
Main Entry (entry 1)	Upgrade with signage, place making elements and plantings to improve arrival experience	Access	High
Secondary Entry (entry 14)	Upgrade secondary entry point, maintenance access and creek crossing culvert	Access & Maintenance	High
Secondary Entries (entries 2 – 13)	Upgrade secondary entry points, signage and cycle racks where adjacent to cycle routes.	Access	High
Southern Open Space Zone	Upgrade informal seating and outdoor educational opportunities.	Facilities & Education	High
Entries 9 – 10 and Entries 12-13 / Tracks	Formalisation of pedestrian access on APZs.	Circulation	High
Main Entry/car park	Cycle racks.	Access	High

PROJECT IMPLEMENTATION PLAN

MASTERPLAN AREA	MASTERPLAN ELEMENT/UPGRADE	ASPECT	PRIORITY FOR IMPLEMENTATION
Central Open Space Zone	Filtered water station	Facilities	High
All Walking Tracks	Upgrade all existing walking tracks to Grade 2 or 3	Circulation	High/Medium
Secondary Entry (entry 3) / Track	New path from entry 3 to the Boardwalk Loop.	Circulation	High/Medium
Secondary Entry (entry 11) / Track	New path from entry 11 and Strangers Creek crossing to Warada Track	Circulation	High/Medium
Whole of site	Upgrade wayfinding signage	Circulation	High/Medium
Whole of site	Upgrade track head signage	Circulation	High/Medium
Warada Track	New track alignment to address existing erosion issues.	Circulation	High/Medium
Tracks	Provide teaching opportunities along the tracks including break out spaces.	Circulation & Education	High/Medium
Pittwater Rd	Investigate pedestrian safety and traffic calming measures	Access	High/Medium
Pidding Rd/Cressy Rd	Investigate pedestrian safety and traffic calming measures	Access	High/Medium
Whole of site	Upgrade interpretive signage	Education	Medium
Western Open Space Zone	Bush regeneration/rehabilitation zone	Environment	Medium
Southern Open Space Zone	Bush regeneration/rehabilitation zone	Environment	Medium
Off-site and whole of site	Upgrade connectivity to adjacent off-site walking routes	Access	Medium
Whole of site	Provide WSUD devices to manage stormwater at the perimeter of the Reserve.	WSUD	Medium/Low
Whole of site	Implement WSUD device in association with adjacent wetlands as per Lane Cove River Coastal Zone Management Plan 2013.	WSUD	Medium/Low
Entries 4 – 5 to Boardwalk / Track	Formalisation of pedestrian access on APZs	Circulation	Low
Visitors Centre / Amenities Building	Council to give future consideration to investigate / review the condition and improved functionality of the existing building for greater community environmental education purposes. Consideration to be given to land stability, flood mitigation measures, potential climate change measures and other environmental improvements.	Facilities & Education	Low
Whole of site	Incorporate WSUD devices to manage stormwater when undertaking improvement works	WSUD	Ongoing
Whole of site	Protect and enhance the existing EEC's - through weed control, replanting and edge definition protect and improve the saltmarsh areas and the adjacent Estuarine Swamp Oak Forest.	Environment	Ongoing
Whole of site	Undertake ongoing weed control and endemic species plantings / reinforce biodiversity corridor links particularly within the riparian zones / reinforce all EEC communities plant profiles.	Environment	Ongoing
Whole of site	Undertake weed control and native species planting within the riparian zone of Buffalo Creek	Environment	Ongoing
Whole of site	Undertake weed control and native species planting within the riparian zone of Strangers Creek	Environment	Ongoing

A background photograph showing several people in a natural, brushy environment. One person on the left wears a blue bucket hat with a gold 'R' and a blue and white plaid shirt. Another person in the center wears a blue long-sleeved shirt. A third person on the right wears a blue bucket hat and a blue and yellow shirt. A fourth person on the far right is partially visible, wearing a dark shirt. The scene is filled with dry grass, twigs, and green foliage.

SECTION 6: References

REFERENCES: Relevant Acts and Strategic Documents

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>NPWS Act 1974</i>	The Field of Mars Reserve (the Reserve) is nominated as a Wildlife Refuge.	Important to protect and manage habitat to provide wildlife refuge.	Environment / Information
<i>Companion Animals Act 1998 (CAA)</i>	The Reserve is designated as a Wildlife Protection Area where dogs and cats are excluded at all times (Category 1 under the CAA).	Important to notify park visitors of requirements to exclude cats and dogs.	Information
<i>Greater Sydney Region Plan - A Metropolis of Three Cities 2018</i>	The Reserve falls within the area of the Eastern Harbour City. It does not fall within the economic corridor from the Sydney CBD to Macquarie Park, nor the health and education precinct of Macquarie Park to the north, Rhodes to the SW or St Leonards to the east. The main train links are sited to the north of the Reserve, from the CBD to Macquarie Park, and south, from the CBD to Parramatta. There are no local light rails links. (Effectively the local area to the Reserve is serviced by buses.) The vision of the Plan is driven by four drivers - infrastructure and collaboration, liveability, productivity and sustainability. Relevant to the reserve are the directions to value green spaces and landscape, use resources wisely and adapt to a changing world.	Opportunity to enhance the bushland, use resources efficiently and effectively and plan for change eg Climate.	Environment
<i>Sydney Green Grid 2017</i>	The report addresses <i>Green, Hydrological, Ecological and Recreational Grid</i> opportunities across Sydney. The Reserve falls within the North District and is nominated as local open space. It is located away from the proposed Urban Renewal Corridors, which are sited to the west (from Ryde to Epping) and to the east (from Chatswood to Hornsby), and the Priority Precincts and Growth Centres of Epping and Macquarie Park to the north. The strategy promotes increasing access to open space and providing for healthy and active living. The report promotes minimising disturbance to riparian areas, the protection and improvement of the natural character, ecological integrity, visual amenity and public access to foreshores and rivers. Further, the connecting of bio diverse areas to provide ecological connectivity. The report promotes raising awareness amongst the community about the values of local bush and fostering community bushcare groups. The report highlights protection of heritage places and landscapes along with cultural heritage. The Kittys Creek corridor, located north of the Reserve, is mentioned as an important cross connection from the Lane Cove River to Ryde Hospital.	Considered in the Sydney Region as a local park. Implement values promoted by the report.	Environment / Access / Information
<i>Planning Ryde Local Strategic Planning Statement 2020 (LSPS)</i>	<p>The LSPS sets the vision for 20 years. The document effectively provides a vision, challenges, targets, priorities and actions for several focus areas. The main relevant vision is the establishment and maintenance of green corridors of which the Reserve is contained within two, Buffalo Creek to the Lane Cove River and Strangers Creek to North Ryde Common. Relevant targets include:</p> <ul style="list-style-type: none"> • Increase the proportion of the population within 400m of public open space greater than 1,500m² in size; • Council's public domain upgrades and program will be based on identified priorities and audits; • Local flora and fauna will be effectively conserve; <p>Relevant priorities include:</p> <ul style="list-style-type: none"> • Encourage walking and cycling for recreational purposes, provide facilities for pedestrians and cyclists; • Prioritise liveability through an attractive, sustainable and well designed environment; • Protect and enhance the cultural heritage (including places with natural heritage significance); • Protect and enhance Aboriginal cultural heritage; 	Manage the Reserve within the context of the local green corridors. Conserve local flora and fauna. Provide facilities for walkers and cyclists (within the context that bike riding is not permissible within the reserve). Provide an attractive, sustainable and well designed environment.	Environment / Access

REFERENCES: Relevant Acts and Strategic Documents

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>Planning Ryde Local Strategic Planning Statement 2020 (LSPS) cont'd</i>	<ul style="list-style-type: none"> • Ensure public spaces are well used and enhance local identity; • Provide accessible open space to service population needs; • Ensure open space can be shared and enjoyed by all; • Protect and enhance bushland, biodiversity, environmentally sensitive waterways, scenic and cultural landscapes; • Reduce carbon emissions and manage energy, water and waste efficiently; • Protect and improve the health and enjoyment of the City of Ryde's waterways; • Provide waste and recycling infrastructure that is designed to ensure safety, efficiency and accessibility of waste, reuse and recycling services, and that does not compromise the public domain; • Adapt to the impacts of urban and natural hazards and climate change; 	Provide for increased and more accessible use. Improve waste and recycling facilities.	Access / Facilities
<i>Our Vision for Ryde 2028 Community Strategic Plan 2018</i>	Under several aspirations, Council plans, amongst a suite of intentions, to design places for people, provide sustainable planning and design, enhance recreational spaces, protect natural environments, reduce impacts on natural systems, provide resilient infrastructure, improve access and reduce the travel footprint, and improve community connectedness.	Accommodate access and use by the community.	Access
<i>Ryde Resilience Plan 2030</i>	The plan nominates the following relevant goals for a Resilient Ryde - energy, water and resource security, adaptation to climate change, protection of sustainable natural systems, transport connecting the community, and improved health and well being. For water security, stormwater management and water sensitive urban design (WSUD), efficient use of water and water quality feature. For climate change, management of bushfires, flooding, sea level rise, drought, and air quality is raised. For natural systems, the plan highlights the importance of managing bushland and natural areas. For transport Council is pursuing active options particularly developing an extensive bike network. For health and wellbeing Council is addressing social inclusion, volunteering and safety.	Manage stormwater using WSUD principles. Consider issues of bushfires, flooding, sea level rise, drought and air quality.	Environment
<i>City of Ryde Disability Inclusion Action Plan 2017</i>	To ensure more inclusion the plan includes the following actions amongst many: <ul style="list-style-type: none"> • Incorporate more accessible parking (beyond compliance) (1h); • Improve public domain signage to assist people with disability (1j); • Improve disabled access in parks (2c); 	Provide facilities for disabled access.	Access / Facilities
<i>City of Ryde Integrated Open Space Plan 2012</i>	<p>The Plan reviews current provision of open space in the Council areas and notes that:</p> <ul style="list-style-type: none"> • <i>Field of Mars (Reserve) is the largest single open space in the City at 49 Ha;</i> • <i>Improvements such as the boardwalk at Field of Mars (Reserve) has helped accessibility, but for an open space of its size it offers few other public amenities that reflect its importance;</i> • <i>Field of Mars (Reserve) is the most significant natural and recreation corridor in the City. Steep local topography in the Buffalo Creek Valley is a barrier to north-south access in the suburb, but conversely the open space forms a very important link as a natural and recreational corridor between the Lane Cove River, the Great North Walk and Top Ryde.</i> • <i>While the Field of Mars (Reserve) is first and foremost a bushland open space there are cleared areas, particularly close to Pittwater Road that would meet passive recreation needs without compromise to its integrity.</i> <p>The Plan identifies the Reserve as a Level 1 open space. Level 1 sites are considered to be large in size, or can accommodate large community activities or have a unique landscape setting and are considered a regional attraction.</p>	Potential to increase recreational opportunities within the cleared areas near Pittwater Rd.	Facilities

REFERENCES: Relevant Acts and Strategic Documents

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>City of Ryde Integrated Open Space Plan 2012</i> (cont'd)	<p>Conclusions made on current participation included:</p> <ul style="list-style-type: none"> • <i>highest participation across the City is in informal activities placing an emphasis on the need for all parts of the City to cater for walking, bushwalking, cycling and informal open space uses (eg. runabout, play, picnics, BBQs, etc);</i> • <i>the high level of social considerations for participation in leisure and recreation activities should be reflected in park design (ample seating, places to meet, plenty of shade, play opportunities).</i> <p>The demands and needs analysis identified amongst other conclusions:</p> <ul style="list-style-type: none"> • <i>unstructured recreation, especially walking, aerobics, cycling and swimming account for the highest level of physical activity participation in the City;</i> • <i>the natural environment is of high importance to the residents of the City;</i> • <i>seniors consider problems of gaining access to open space as their major concern (transport and distance to local open space);</i> • <i>factors that may change demand (and thus must be considered as changing needs) include climate change, the demography of new residents and communities, changing trends in recreation preference and changing economic conditions;</i> • <i>the capacity of existing parks requires to be extended if current recreation and leisure needs are to be better met;</i> • <i>a strategic approach to developing an extensive network of recreational and natural corridors will need to be addressed if the demand for walking, cycling and bushwalking needs are to be met, the natural values of the City are to be enhanced and access to local, district and regional open space is to be improved.</i> <p>The Plan includes an <i>Open Space Structure Plan</i> that identifies the Reserve as one of five principal bushland reserves and sited within a principal recreational link from Lane Cove River to the west to link with a north south link. The included <i>Recreational Corridor Network Plan</i> indicates that the Kunzea Walk along Buffalo Creek and the Stranger Creek Walk form pedestrian links within the corridor from Lane Cove River to Ryde. The implementation plan proposes, amongst a suite of actions, for open space to extend the capacity of existing open space as a priority, improve parking provision and efficiency eg use street parking where possible, integrate open space into the Ryde walking network, improve accessibility to open space and facilities, provide links to adjacent open space, provide wayfinding signage, that bushland reserves <i>conserve, integrate and enhance natural values into their recreational use and appreciation</i>, implement WSUD with respect to creeks, upgrade creeks, incorporate climate change adaptation solutions especially for flooding issues in the Reserve, interpret Aboriginal and non Aboriginal cultural heritage, provide for diversity and address landscape setting and character.</p>	Provide facilities for walkers and passive users such as seating, shade and play areas.	Facilities
<i>Sport and Recreation Strategy 2016-2026</i>	<p>The strategy identifies the Reserve as a Natural Area of unique ecological value that is maintained with minimal human intervention and is protected because of its significant ecological value for the Ryde Community. Possible recreation activities identified include bushwalking, running, Bushcare Programs, bird watching and provision of picnic areas. It goes on to note that <i>increased recreational use of natural areas and bushland will required careful management and control to minimise harm to the habitat value of the City's natural areas</i>. Proposed relevant actions include improving access links to open space and improving accessibility to and in picnic areas and to existing buildings.</p>	Increase recreational opportunities without causing impacts on the natural environment.	Environment / Facilities

REFERENCES: Relevant Acts and Strategic Documents

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>City Of Ryde Bicycle Strategy 2014</i>	<p>Addresses the progressive upgrade of bicycle facilities to meet active transport and recreational needs of the community. The strategy prioritises the development of selected sections of the Regional Routes identified in <i>Sydney's Cycling Future</i> (NSW government's bicycle transport policy dated 2013). Relevant routes to the Reserve include:</p> <ul style="list-style-type: none"> the Southern Orbital Tier 1 route RR05 which passes the Reserve to the east along Pittwater Rd. It links North Ryde to Gladesville. Partially completed with a shared off road bike path provided in Pittwater Rd, adjacent to the Reserve, from High St (south) to Renee St (north); Tier 2 interconnecting routes: <ul style="list-style-type: none"> RR09 along Higginbotham Rd to the south of the Reserve linking Eastwood to Hunters Hill. Currently an informal on road route; RR04 along Cressy Rd to the west of the Reserve linking North Ryde to Tennyson Point. Not available at present (an informal on road bike route is located further to the west along Badajzo Rd). <p>An additional informal on road bike route is available to the NE of the Reserve along Moncrieff Dr.</p>	Opportunity to provide entry facilities for the secure parking of bikes to encourage access to the Reserve via cycle routes.	Access / Facilities
Transport NSW	<p>Bus routes around the Reserve occur along:</p> <ul style="list-style-type: none"> Thompson Rd / Higginbotham Rd to the south; Pidding Rd / Badajzo Rd to the west; Twin Rd / Moncrieff Dr to the north; routes run along Pittwater Rd to High St which is south of the Reserve. 	Opportunity to encourage access to the Reserve via public transport.	Access / Information
<i>Ryde Biodiversity Plan 2016</i>	<p>Field of Mars Reserve (the Reserve) is located within the Buffalo Creek Corridor, a regional corridor, linking Burrows Park, located to the west, to Lane Cove River, located to the east. The Reserve is also located within the Strangers Creek Corridor, a local corridor linking Field of Mars to North Ryde Common to the north. The Buffalo Creek Corridor is linked to a north south regional corridor running from Minga Reserve to the northwest, south to Morrison Bay Park on the Parramatta River (another regional corridor running NW / SE). The Strangers Creek Corridor connects to the Kittys Creek corridor, running SE to NW, north of the Reserve. Kittys Creek is linked to the Lane Cove River to the east (another regional corridor running north / south). The Reserve is identified as <i>High Biodiversity Conservation Significance</i>. A high proportion of the Reserve is considered to have <i>Very High biodiversity conservation priority</i> (approximately 50%). The remainder of the Reserve to have rankings of <i>High</i> and <i>Moderate</i>. A significant portion of the Reserve is considered to have a ranking of <i>High</i> with regards to <i>threats to biodiversity</i> (approximately 50%). Threats include weed species invading the area particularly the saltmarsh, impacts at the Reserve edges from adjacent activities and neighbouring properties, increased stormwater runoff and nutrients from adjacent areas impacting on water quality and siltation of the creeks, lack of fire at a suitable interval, general weed invasion, dumping particularly of greenwaste, unmanaged recreational use eg informal tracks, domestic pets and introduced fauna, control of vehicles, development and infrastructure works.</p> <p><i>Biodiversity Themes</i> identified in the Plan include:</p> <ul style="list-style-type: none"> Protecting and managing Ryde's native vegetation; Restoring waterways and surrounding environments; Linking corridors and improving connectivity; Managing reserves to promote biodiversity and community interaction; and, Protecting urban habitat. 	Opportunity to enhance the biodiversity values of the Reserve to assist with the functions of the various connected corridors. Opportunity to address threats to biodiversity through environmental design and management. Opportunity to develop the Reserve to reflect the <i>Biodiversity Themes</i> established in the <i>Ryde Biodiversity Plan</i>	Environment

REFERENCES: Flora and Fauna

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>City of Ryde Flora and Fauna Surveys 2017 (Terry's Creek Kitty's Creek Field of Mars Reserve Buffalo Creek tributaries)</i>	<p>A study of vegetation changes on a number of creeklines in the Council area including Field of Mars Reserve between 2007 and 2017. The Reserve contains rare flora and fauna along with 298 identified native species and 81 introduced species. Species listed under the Bonn Convention, species listed as vulnerable in NSW, and species listed federally as vulnerable. The highest faunal diversity is found on the south side of the Reserve between Wellington Rd and Buffalo Creek. The area is wetter and weedier than other portions of the Reserve but provides more shelter and complex habitat niches. Buffalo Creek as it flows downstream and becomes more estuarine supports a different suite of birds. The Reserve includes a thriving Long-nosed Bandicoot population, a diversity of microbats including threatened species, resident breeding pairs of Powerful Owls and Brown Goshawks and a rich variety of small sedentary and migratory birds. Threatened plant species include <i>Epacris purpurascens var purpurascens</i> (recorded 2017), and <i>Pimelea curvifolia var curvifolia</i> (recorded 2007). Both storm flows along the creek and past fires have caused changes to the vegetation over time. Despite a history of disturbance, the Reserve retains a high level of resilience, with large areas of intact bush, suggesting a high level of native seed in the soil. Recommendations of the study include:</p> <ul style="list-style-type: none"> • No whole of reserve burns only mosaic burns allowing for corridors for native fauna to escape along with avoidance of burns in areas with sedentary species, avoid using fire in known breeding areas; • Educate adjacent residents about responsible pet ownership; • Educate and inform bushcare volunteers and Reserve visitors about local native flora and fauna species, habitat and biodiversity; • Retain hollow bearing trees for habitat, isolate with fencing as required, otherwise harvest hollows and retain or supplement with nesting boxes; • Undertake staged removal of woody weeds combined with re-vegetation planting of diverse range of species for habitat, roosting and food, particularly in the area between Wellington Rd and Buffalo Creek; • Exclude poison feral animal controls; • Isolate known breeding areas from noise; • Control lighting to avoid impacts on fauna populations sensitive to light, retrofit existing lighting to comply; • Plant early flowering species along disturbed edges of vegetation to encourage nectivore activity. 	Important to protect the habitat of these rare and threatened species as well as continuing to provide and improve habitat to increase biodiversity. Opportunity to implement the relevant recommendations of the Flora and Fauna Study 2017.	Environment
<i>Sydney Metro CMA Vegetation Mapping SMCMA (OEH 2013)</i>	The Reserve contains several Forest Plant Communities representing an intact transition from upper Shale areas to lower wetland areas. Two of the forest communities are endangered ecological communities (EECs) - <i>Sydney Turpentine-Ironbark</i> and <i>Estuarine Swamp Oak</i> . Additional plant communities include Estuarine Saltmarsh (EEC), Urban exotic / natives, and Weeds and exotics	Opportunity to protect EEC communities from biodiversity threats as highlighted in the <i>Biodiversity Plan 2016</i> . Opportunity to display and interpret biodiversity information.	Environment / Information
<i>City of Ryde Native Plants of the Ryde District 2005</i>	This report identifies a list of 20 Plants of <i>Particular Conservation Significance</i> for the Reserve at Appendix 3.	Opportunity to protect flora species of conservation significance.	Environment

REFERENCES: Water Management

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>Guidelines for riparian corridors on waterfront land 2012</i>	The Guideline identifies the width of the riparian corridor under the Strahler System. Buffalo Creek within the Reserve is a watercourse type 2nd order and Strangers Creek is 1st order. NSW Office of Water recommends, for a 1st order watercourse type, a vegetated riparian zone (VRZ) with a width of 10m each side of the creek channel, for 2nd order creek, it recommends 20m each side of the creek channel. Further recommendations include maintaining or establishing fully structured native vegetation to the requisite widths, minimising disturbance to the VRZ, minimising the number of creek crossings (road), locating infrastructure outside of the VRZ, and treating stormwater runoff before discharging into the VRZ. Allowable activities within the VRZ for both stream orders include offsetting for non riparian corridor uses eg asset protection zones, cycleways and paths (maximum 4m wide footprint in the outer half of the VRZ), detention basins (online or within the outer half of the VRZ and not for water quality treatment), stormwater outlets and essential services and road crossings. In addition stream realignment is allowable for 1st order streams.	Apply vegetated riparian zone widths as recommended along with allowable activities.	Environment
<i>Lane Cove River Coastal Zone Management Plan 2013</i>	The Plan provides guidance on future actions within the estuary of Lane Cove River and its catchment in order to achieve long term balanced environmental sustainability. A suite of actions are proposed to address water quality, climate change, aquatic and riparian habitat, foreshore protection and estuary health monitoring and evaluation and apply to the four local councils including City of Ryde. Bushcare programs and sediment and development controls are ongoing actions. High priority actions relevant to the Reserve include creation and enhancement of estuarine wetland communities, bushland rehabilitation and restoration, establishment and support of local bushcare groups, identification of vegetation likely to be under threat with sea level rise and support current monitoring programs. Medium priority actions relevant to the Reserve include monitoring estuarine vegetation communities re climate pressures, comply with environmental best practice, implement WSUD solutions, identify communities at risk from fire, identify foreshore areas required for retreating estuarine communities, liaise with Sydney Water to improve sewer infrastructure, educate the community about adaptation to sea level rise, control invasive pest plants and animals, retrofit WSUD devices, maintain WSUD devices, control fertiliser use. Low priority actions relevant to the Reserve include prevent aquatic diseases and pest, use City of Ryde's WSUD principles within the catchment and replace stormwater pipes with better designed solutions. The Plan cites relevant actions from other reports including for the Reserve catchment a bioretention system to complement the existing wetland in Buffalo Creek catchment to treat a catchment area of approximately 28ha (CoR1). Appendix F includes a water quality review report which notes the existing features within the Reserve - a bioretention basin at the head of Strangers Creek in Cressy Rd, a WSUD wetland off Higginbotham Rd, bushcare sites within the Reserve, and a water quality and biological monitoring site located within the western open space zone. It also notes predicted sea level rise to 2.3mAHD.	Opportunity to enhance estuarine communities and to identify vegetation under threat of sea level rise and areas into which they can retreat. Include proposal to include a bioretention system in association with the nearby existing constructed wetland. Potential loss of open space within the park zone.	Environment
<i>Lane Cove Estuary Saltmarsh Site Assessments 2010</i>	The Report details results of a site survey of saltmarsh in the Reserve. Generally considered to be in good condition in 2010 with the upstream areas below the Educational Centre to be fair only. The boardwalk has improved conditions by isolating saltmarsh from access. Issues include fires from vandalism; high nutrient and sediment loads from urban runoff into Buffalo Cree; debris deposition from tidal flushing; and weed propagules in the system. Noxious wees are present - Asparagus Fern, Blackberry and Tradescantia. Bushland regeneration, targeted weeding, and supplementary planting is proposed to manage the issues along with the introduction of stormwater upstream measures.	Opportunity to implement measures designed to improve the quality of the saltmarsh areas.	Environment

REFERENCES: Water Management

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>City of Ryde Riparian Protection and Rehabilitation Management Plan 2013</i>	<p>The document provides a suite of restoration strategies and treatments for the creeks within the Council area of Ryde. Field of Mars Reserve falls within the middle of Buffalo Creek's catchment and provides bush to buffer the creek from the impacts of the Field of Mars Cemetery. Strangers Creek joins Buffalo Creek just upstream from Buffalo Creek's tidal limit, and drains the other side of the cemetery. Buffalo Creek has significant noxious weed infestations through much of the riparian zone. Works proposed by this report for Buffalo Creek include :</p> <ul style="list-style-type: none"> • BC6 and BC7 (south of Pidding Rd / Cressy Rd) - control noxious and woody weeds and vines, and undertake stability planting using <i>Coastal Sandstone Gallery Rainforest</i> species; • BC8 (upstream of the boardwalk loop) - control noxious and woody weeds and vines, and undertake stability planting using <i>Sydney Turpentine Ironbark Forest</i> or <i>Coastal Sandstone Gallery Rainforest</i> species as appropriate, undertake bush regeneration weed control, and stabilisation of creek banks as required; • BC9-11 (from south of the boardwalk loop to Strangers Creek) - control noxious and woody weeds and vines, and undertake stability planting using <i>Sydney Turpentine Ironbark Forest</i> or <i>Coastal Sandstone Gallery Rainforest</i> species as appropriate, undertake bush regeneration weed control, control groundcover weeds, infill plant for diversity and install interpretive signage along the boardwalk; <p>Works proposed for Strangers Creek include:</p> <ul style="list-style-type: none"> • STR1 (southeast of Cressy Rd to south of Kellaway St entry 10) - control noxious and woody weeds and vines, undertake bush regeneration weed control, and undertake infill planting using <i>Sydney Turpentine Ironbark Forest</i>, <i>Coastal Shale Sandstone Forest</i> or <i>Coastal Sandstone Gallery Rainforest</i> species as appropriate; • STR2 (from south end of STR1 to Buffalo Creek) - control noxious and woody weeds and vines, undertake stability planting using <i>Coastal Enriched Sandstone Sheltered Forest</i> species, undertake bush regeneration weed control, clear vegetation from bush track, monitor bank stability. 	Identify required works on the Masterplan.	Environment
<i>Ryde WaterInfo - Maps and Information</i>	<p>This interactive online facility provides information such as the location of existing WSUD devices:</p> <ul style="list-style-type: none"> • a gross pollutant trap (GPT) and bioretention basin at the head of Strangers Creek between entries 8 and 9; • a GPT and bioretention basin off Higginbotham Rd (to the west of entry 5); • a bioretention basin near entry 14 to treat stormwater prior to entering Buffalo Creek. <p>Also that Strangers and Buffalo Creeks are non perennial stream types.</p>	Noted	Environment
<i>Water Quality Monitoring Report 2018/2019</i>	<p>Water quality testing undertaken in 2018/2019 in the Buffalo Creek catchment occurs at 2 sites near Burrows Park (upstream of Buffalo Creek) and at a third site off Higginbotham Rd south of the Reserve recorded a rapid riparian assessment score of Good (up from Fair in 2017/2018). Recommendations of the Report include continue GPT maintenance and rubbish removal.</p>	Noted	Environment
<i>Stormwater Drainage Upgrade, Mars Lane, Gladesville 2020</i>	<p>Includes the provision of a low mound plus improvements to an existing rock lined channel flowing into the Reserve from Mars Lane to a energy dissipation / sediment basin (rock lined and planted with native grass species).</p>	Noted	Environment

REFERENCES: Reserve Management and History

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>Field of Mars An Early History 2019</i>	<p>1804: Establishment of the Fields of Mars Common - used for housing stock, source of timber, charcoal factory.</p> <p>1874: Field of Mars Common Resumption Bill</p> <p>1887: Dedication of 85 acres as Field of Mars Reserve - by 1967 that was reduced to 70 acres. The Reserve continued to be used as a source of timber and for swimming and recreation and by squatters.</p> <p>1950s: <i>non putrescible garbage was dumped on the left bank of Buffalo Creek just upstream from Pittwater Road near the confluence of Strangers Creek and Buffalo Creek and an additional 4.8 hectares (12 acres) on the right bank was gazetted in 1955 for use as a rubbish depot. [In 1987, this was identified as the Reserve's Pittwater Road entrance and carpark and the general area where the Visitor Centre and Environmental Education Centre were located].</i> The tip was closed in 1959.</p> <p>1965/66: proposal to pipe Buffalo Creek and create rubbish dump to depth of 50 feet (1964 the Army prepared to use the site as a simulated minefield but Council withdrew permission following a residents protest).</p> <p>1966: activism by (East Ward) Anti Tip Action Committee, Ryde-Hunters Hill Flora and Fauna Preservation Society and local residents to halt tipping activities.</p> <p>September 1966: <i>Council resolved: That the Ryde/Hunters Hill Flora & Fauna Association (sic) be advised that Council agrees to their development of the Field of Mars Park as a flora and fauna sanctuary ...</i></p> <p>1969: <i>4.8 (12 acres) hectares of land on the right bank of Buffalo Creek which was gazetted as a rubbish depot was revoked and re-reserved for public recreation.²⁴ This brought it up to 82 acres, close to its original size.</i></p> <p>1972: it was proposed that the boundaries of the Reserve be extended to <i>include the land south-west of Wellington Road and north-east of Stranger's Creek owned by the Crown, the Council and the State Planning Authority (SPA).</i></p> <p>1972: Visitors Centre opened</p> <p>1973: the crown land noted at 1972 was added to the Reserve and the land under the SPA was placed under the care, control and management of Ryde Council.</p> <p>1974: part of the Field of Mars Cemetery was added to the Reserve along with part of Wellington Rd.</p> <p>1975: Draft Plan of Management prepared by the Ryde-Hunters Hill Flora and Fauna Preservation Society.</p> <p>1975: proclaimed a Wildlife Refuge under the NPWS Act 1974.</p> <p>1975: gazetted as a reserve for 'Public recreation and promotion of the study and preservation of native flora and fauna.'</p> <p>1977: Plan of Management adopted by Council and NPWS.</p> <p>1988: establishment of the Field of Mars Studies Centre.</p> <p>1988: all lots consolidated under the Crown Lands Act - 50.39ha.</p> <p>1990: Draft Plan of Management prepared (not adopted by Council).</p> <p>1996: Plan of Management prepared.</p>	Noted	Information

REFERENCES: Reserve Management and History

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>Field of Mars Reserve Plan of Management 2009</i>	The objectives of the current Plan indicate that <i>the Reserve will be used for low impact, environmental recreation that includes bush walking, bird watching and environmental education. The preservation and restoration of natural features and wildlife habitat corridors will take precedence over other uses. The inclusion of low impact facilities, such as seating, picnic seating, picnic shelters and interpretation signage etc., which enhance enjoyment and understanding of the unique features of the Reserve will be located and maintained in appropriate locations. Carparking and entry gates will be located on the perimeter of the Reserve. Illegal and damaging activities, such as bike riding and dog walking will be actively discouraged and Council will maintain appropriate fire breaks and fire protection zones to protect surrounding properties. Council will encourage neighbours to the Reserve to recognise their responsibility in the ongoing sustainable management of the Reserve.</i> The Plan provides a suite of prioritised actions to support the objectives. The Visitors Centres role is to conserve and preserve the environmental values of the Reserve, promote community awareness of the natural systems and encourage community involvement.	Bike riding and dog walking within the Reserve are prohibited.	Access, Use, Facilities Environment, Information
<i>City of Ryde Mapping</i>	Aboriginal heritage (sites have been noted along both Buffalo and Strangers Creeks) Asset Protection Zones Bushcare areas Bushfire Prone Land (identifies category of vegetation and associated buffers) Flood Risk Land Categorisation (current) LEP 2014 Zoning Walking Track Map	All noted data (except for the Aboriginal heritage sites) is mapped in the Site Analysis mapping portion of this Masterplan Report.	Access, Use, Circulation, Environment, Information
<i>City of Ryde Bushcare</i>	Volunteer Bushcare work occurs at a number of sites within the Reserve: <ul style="list-style-type: none"> • The bushland area NW of Kennedy St (near entry 2) (4th Saturday); • The area sited SW of the western open space zone (north of the boardwalk downstream crossing of Buffalo Creek (3rd Monday); • A strip along the northern side of Strangers Creek south of Kellaway St (entry 10); • An area SE of Buffalo Creek at the Monash Rd entry (4) (every Tuesday); • Off Finch Ave (3rd Sunday). 	Noted	Environment

REFERENCES: Track Standards / Photo credits

DOCUMENT	KEY POINTS	MASTERPLAN OPPORTUNITIES	ASPECT GROUP
<i>Users Guide to the Australian Walking Track Grading System</i> (Dept of Sustainability and Environment - Victorian Government)	Based on <i>AS2156.1 - 2001 Walking Tracks - Classification and Signage</i> - for Grade 2 tracks the following is indicated: <ul style="list-style-type: none"> • Gradient is generally no steeper than 1:10 • Generally a modified or hardened track surface • Minimum track width of 900mm wide • Track is well maintained with minimal intrusions • With track head signage and route markers at intersections • Users need no previous experience and are expected to exercise normal care regarding their personal safety / suitable for most ages and levels of fitness • Time to walk track noted in 15-30 minute increments • Minimal use of steps 	Noted	Access, Use, Circulation
	Based on <i>AS2156.1 - 2001 Walking Tracks - Classification and Signage</i> - for Grade 3 tracks the following is indicated: <ul style="list-style-type: none"> • Gradient may exceed 1:10 for short sections but is generally no steeper than 1:10. • Formed earthen track, few obstacles. Generally a modified surface, sections may be hardened. • Track width is variable and less than 1200mm wide. • With track head signage and route markers at intersections and where the track is indistinct • Users need no bushwalking experience and a minimum level of specialist skills. Users may encounter natural hazards such as steep slopes, unstable surfaces and minor water crossings. They are responsible for their own safety. • Time to walk track noted in 15-30 minute increments. • Steps may be common. 	Noted	Access, Use, Circulation.
Photo credits	Photos have been sourced from: <ul style="list-style-type: none"> • City of Ryde • Field of Mars Environmental Education Centre • NPWS - NSW • NPWS - Tasmania • Bluedale • Botton + Gardiner • Interpretive Design • Leda • Total Earthcare • Robin Buchanan • Alan Ginns • Pam Fletcher 	Noted	N/A