87 TALLAWONG ROAD, ROUSE HILL
REVIEW OF PROPOSED REZONING
OPEN SPACE PLANNING REPORT
FINAL REPORT

Client:
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BACKGROUND, PURPOSE AND OBJECTIVES
1. BACKGROUND, PURPOSE AND OBJECTIVES

BACKGROUND
This Open Space Planning Report (OSLR) has been prepared in support of a submission to the Department of Planning and Environment (DP&E) in response to the exhibition of the draft Precinct Plan for Riverstone East (the Precinct), in the North West Priority Growth Area.

The report was commissioned by Tony and Vittoria Concato, owners of the property located at 87 Tallawong Road Rouse Hill (the site), within the Precinct.

Riverstone East Draft Precinct Plan Exhibition
The site is located in the Riverstone East Precinct, in the Blacktown Local Government Area (LGA). The draft Precinct Plan for the Precinct is currently on exhibition for the public to view and comment on until 18 September 2015.

This follows on from a series of earlier workshops and consultations with land owners and other stakeholders in the area, as part of the planning process for both the Cudgegong Road Precinct (also known as Area 20) and Riverstone East.

PURPOSE OF THIS REPORT
Under the Riverstone East Draft Precinct Plan, the site is proposed to be rezoned to RE1 Local Open Space. The purpose of this report is to review the proposed rezoning for the site from an open space planning perspective.

PROJECT OBJECTIVES
The objectives of the report are to
- Review the Indicative Layout Plan for the Precinct with a particular focus on the proposed open space framework.
- Assess the proposed open space framework for the Precinct against the open space planning principles adopted for the Precinct.
- Identify the strengths and weaknesses of the proposed open space framework.
- Identify potential alternative sites for open space, based on best practice open space planning principles and considering the physical constraints within the Precinct.
- Evaluate potential alternative sites and provide recommendations for amending the proposed open space framework for the Precinct.

ADDITIONAL STUDIES
This Open Space Planning Report is one of a series of specialised reports prepared for the site. They form a suite of complementary reports that support the client’s submission to DP&E, in response to the exhibition of the Draft Riverstone East Precinct Plans.

Complementary Studies include
- The “Land Zone and Suitability Advice” report prepared by Barker Ryan Stewart
- The “Review of Acoustic Planning Issues Sydney Metro Northwest Rapid Transit Rail Facility”, prepared by Atkins Acoustics

DOCUMENT REVIEW
The following public exhibition documents were reviewed as part of preparing this report:
- Riverstone East Draft Indicative Layout Plan, Dept. of Planning and Environment, June 2015 (Figure 1)
- Riverstone East – North West Growth centre – Land Zoning Map (Figure 2)
- Riverstone East – North West Growth centre – Development Control Map (Figure 3)
- Riverstone East – North West Growth centre – Residential Density Map (Figure 4)
- Riverstone East – North West Growth centre – Height of Building Map (Figure 5)
- Riverstone East – North West Growth centre – Native Vegetation Protection Map (Figure 6)
- Riverstone East – North West Growth centre – Land Reservation Acquisition Map (Figure 7)
- Riverstone East Land Use and Infrastructure Delivery Plan, Dept. of Planning and Environment, August 2015
- Social Infrastructure Assessment Riverstone East Precinct, Elton Consulting, April 2015
- Biodiversity and Riparian Corridors Assessment Report, Ecological Australia, April 2015
- Water Cycle Management Report Riverstone East, Mott MacDonald, April 2015
- Cudgegong Road Station (Area 20 Precinct) Finalisation Report, Dept. of Planning and Environment, April 2015

PROJECT TASKS
Preparation of this report involved:
- Review of relevant project-related studies and reports including exhibition documents published on the DP&E website.
- Review of the planning context including reports and relevant information regarding planning and developing proposals for adjoining lands, including the Cudgegong Road Precinct, the Riverstone Precinct and the North West Rail Line Rapid Transit Rail Facility.
- Review of the open space framework as proposed by the exhibition documents, based on CLOUSTON’s extensive experience in open space and recreation planning and design.
- An inspection of the site, the Precinct and adjoining precincts within the North West growth Priority Area.
- Identification of strengths and weaknesses of the proposed open space framework.
- An analysis and mapping of constraints in the Precinct.
- Identification of potential alternative open space sites and networks.
**2. THE SITE**

**LOCATION AND CONTEXT**
The site is located at 87 Tallawong Road. The property is also known as Lot 33 in DP 30186. The site is situated in the Riverstone East Precinct (refer Figure 1), in the area designated as the first Stage for release.

The site is currently zoned RU4 Primary Production under the Blacktown Local Environmental Plan 2015 (BLEP 2015). It is approximately 1.9 hectares in area.

**DESCRIPTION OF THE SITE**
The site is a rectangular shaped rural lot on the western side of Tallawong Road. It has a road frontage of about 69m and approximately 290m deep, running in a north-east to south-west orientation.

The site currently features a two storey residential dwelling, a large shed and a dam. The majority of the site remains undeveloped pasture. It is mostly cleared but retains a number of mature trees.

Surrounding the site are similarly sized rural lots.

The landscape of the site and surrounding Precinct is generally undulating and consists of a mix of pastures and remnant trees, agricultural uses such as market gardens and poultry farm, rural residential living and stands of native woodland remnants.

The high point of the site is at its north-eastern corner, at Tallawong Road, with an elevation of about 50m AHD. From here the land slopes away towards the south-west. The low point of the site is approximately 40m AHD, resulting in an average slope of about 1:29 across the length of the site.

Along the site’s northern boundary is a minor drainage line, located within the poultry farm at 95 Tallawong Road. The site’s southern boundary follows a minor spur between this drainage line and a small watercourse draining to First Ponds Creek through the property at 67 Tallawong Road.

**FIGURE 1: Site Location (source: DP&E 2015g)**
PLANNING CONTEXT
3. PLANNING CONTEXT

NORTH WEST GROWTH PRIORITY AREA

The site is situated in the Riverstone East Precinct. The Riverstone East Precinct is one of 16 precincts which constitute the North West Growth Priority Area. NWGPA (formerly the North West Growth Centre) - refer Figure 2. The NWGPA is accommodating major residential growth in the Sydney Metropolitan Area and is expected to continue to do so for a further 25 years.

To date, eleven precincts have been rezoned, including the five precincts immediately adjoining the Riverstone East Precinct: the Riverstone, Alex Avenue, Area 20, Box Hill Industrial Estate and Box Hill Precincts.

RIVERSTONE EAST PRECINCT

The Riverstone East Precinct is bound by Windsor Road, First Ponds Creek, Schofields Road and Area 20 (Cudgegong Road Precinct). The Precinct is proposed to be released in three stages. The site is located within Stage 1, bound by Schofields Road, Cudgegong Road, Guntawong Road and First Ponds Creek.

The Riverstone East Precinct is expected to deliver in the order of 5,800 new homes, 1,800 of which will be delivered in Stage 1. This correlates to an approximate population of 5,100 for Stage 1, and 15,900 in total.

RIVERSTONE EAST DRAFT PRECINCT PLAN EXHIBITION

The draft Precinct Plan for the Riverstone East Precinct is currently on exhibition for the public to view and comment on, until 18 September 2015.

Exhibition of the Draft Precinct Plan also includes exhibition of proposed amendments to Area 20. The proposed changes to Area 20 reflect the extension of the North West Rail Link (NWRL) to a new station at Cudgegong Road.

Following announcement of the new rail station, planning for the surrounding town centre was amended and the residential capacity of the Precinct increased from 2,500 to 4,000 dwellings, nearly doubling the originally forecast population (from 6,400 to 12,760). As part of this change, medium density dwellings are now proposed to be located adjoining the Riverstone East Precinct, immediately east of Cudgegong Road.

AREA 20 OPEN SPACE NEEDS

Based on the increase in residential densities now being planned for in Area 20, and corresponding increase in the future population, DP&E has identified a shortfall in open space in the Precinct. This includes the total amount of open space but particularly affects the number of sports fields required.

The shortfall has been identified on the basis of the Growth Centre Development Code (GCDC) requirements for the quantum of open space, and of Blacktown City Council’s (BCC) requirements for sports field provision.

The GCDC requires a minimum of 2.83 hectares of open space per 1,000 people. BCC requires a minimum of one sports field for every 1,850 people. Based on the anticipated Area 20 population of 12,760 people, a minimum of 31.1ha of open space and of 6.9 fields would be required. The Indicative Layout Plan for Area 20 includes 3 sports fields, representing a shortfall of three to four fields.

Precinct Planning for Riverstone East has identified the opportunity to address this shortfall through provision of additional open space in Riverstone East and in proximity to Area 20.

In response, a large number of playing fields are proposed to be provided in the Precinct, including two fields in Stage 1, six fields in Stage 2 and five fields in Stage 3 - refer Figure 20.

NORTH WEST RAIL LINK RAPID TRANSIT FACILITY

The North West Rail Link Rapid Transit Facility (NWRLRTF) will provide a specialised train stabling and maintenance facility for the North West Rail Link.

The facility is proposed for a site bounded by Tallawong Road, Schofields Road and First Ponds Creek in the Schofields and Rouse Hill localities.

The facility will have capacity for 20 automated, metro trains, providing stabling for up to 45 trains and maintenance facilities for 76 trains. This will eliminate the need for extended empty running at the start or end of the day.

Trains would be stored in the stabling facility outside peak periods and between the last service and the first service the next day. Track and crossovers would connect the eastern end of the stabling yard with the main running lines near Cudgegong Road Station.

The stabling area would operate 24 hours per day, seven days a week.

The site would be a secure area and include:

- Internal roads
- Train stabling area
- Train wash
- A number of buildings including for wheel lathe machinery, maintenance, administration, operations control and a power station
- Staff car park
- Landscaping

A key requirement for the stabling facility is a large flat area for its operation.

The approved design of the Facility is shown in Figures 3 and 4.
DRAFT PRECINCT PLAN
SUMMARY OF KEY PROPOSALS
The Draft SEPP maps published as part of the Riverstone East Draft Precinct Plan propose the following major outcomes for the site:

- The majority of the site is proposed to be rezoned RE1 Local Open Space (refer Figure 5).
- A small portion along the south-western boundary of the site is proposed to be rezoned to SP2 Local Drainage (refer Figure 5).
- A number of surrounding properties are also proposed to be rezoned RE1 Local Open Space, including the properties at 83, 77 and 67 Tallawong Road, the property at 6 Oak Street, and portions of the properties at 95 and 103 Tallawong Road and 34 Oak Street (refer Figure 5).
- Parts of the site are flood prone, including land along the south-western and north-western boundaries identified as ‘flood prone and major creeks land’ (refer Figure 6). It is noted that the proposed Drainage Strategy outlined in the “Water Cycle Management Report” will make the site essentially flood free - refer Figure 7.
- The majority of land surrounding the site is proposed to be rezoned to R3 Medium Density Residential, with a permitted building height of up to 12m (4 storeys), and up to 25 dwellings per hectare (refer Figures 8 and 9).
- The south-western portion of the site has been identified as a ‘Native Vegetation Retention Area’. It forms part of a native vegetation corridor linking Tallawong Road to First Ponds Creek (refer Figure 10).
- Tallawong Road and the newly proposed Clarke Street will comprise the two major roads linking north-west to south-east through the Precinct. They are proposed to be classified as sub-arterial roads (refer Figure 5 and 11).
4. DRAFT PRECINCT PLAN

FIGURE 6: Development Control Map showing Flood Prone Land (source: DPIE 2015)

FIGURE 7: Post Development Flood Level - 1 in 50 Year Flood (source: Mott MacDonald 2015)
4. DRAFT PRECINCT PLAN

FIGURE 8: Residential Density Map (source: DP&E 2015c)

FIGURE 9: Height of Building Map (source: DP&E 2015k)
4. DRAFT PRECINCT PLAN

FIGURE 10: Native Vegetation Protection Map (source: DP&E 2015n)

FIGURE 11: Land Reservation Acquisition Map (source: DP&E 2015l)
4. DRAFT PRECINCT PLAN

INDICATIVE LAYOUT PLAN

The Indicative Layout Plan (ILP) for Stage 1 of the Riverstone East Precinct (refer Figure 1) proposes an employment zone along Schifflies Road. This will be separated from the remainder of Stage 1 by the rail stabling yards of the North West Rail Link Rapid Transit Facility.

North of the yards a large area of open space is proposed. It consists of a riparian corridor along a tributary to First Ponds Creek, a remnant of Cumberland Plain Woodland south of the creek corridor and a double playing field that straddles the site at 87 Tallawong Road.

Medium density residential development consisting of townhouses, terraces or low-rise apartments are proposed to surrounding the open space area, taking advantage of the relative proximity to Cudgegong Road Station. Opposite the park, a community centre is proposed to be located on the eastern side of Tallawong Road.

Along First Ponds Creek, a major open space and stormwater and drainage management corridor is proposed (also refer Figure 7). It extends to the Alex Avenue Precinct to the south, providing a green link between the Precincts.

The First Ponds Creek open space corridor is separated from residential development by the newly proposed Clarke Street. The exception is one small medium density area in the northern part of the Precinct, opposite St Albans Road and Westminster Street in the Riverstone Precinct.

The remainder of Stage 1 largely consists of low density residential areas, with the exception of medium residential development that is proposed along Guntawong Road.

PROPOSED OPEN SPACE FRAMEWORK

The basis for the design of the proposed open space framework is provided in the “Social Infrastructure Assessment, Riverstone East Precinct” report (SIAR), prepared by Elton Consulting for DP&E.

The SIAR outlines the open space and other social infrastructure requirements of the precinct, based on the anticipated future population. The report summarises the guiding documents and parameters that inform both the quantum and design of the open space system.

The Key documents are:
- State Environmental Planning Policy (Sydney Regional Growth Centres) 2006 (Growth Centres SEPP)
- NSW Government ‘Recreation and Open Space Planning Guidelines for Local Government’ 2010

Open Space Planning Principles

The following provides a more detailed list of the key principles for open space planning from the relevant background documents.

- **Integration and Co-location**
  - Integrate public open spaces into the urban structure.
  - Provide an interconnected network of open spaces.
  - Co-locate recreation opportunities with other community and commercial services to maximise the accessibility and convenience of social, cultural and community facilities and services to form a focal point.

- **Multi-use**
  - Facilitate efficient use of resources by maximising opportunities for joint, shared or multiple-use of open space.
  - Create opportunities for the optimal use of land and environmental resources.
  - Integrate stormwater management and water sensitive urban design with networked open space.
  - Retain existing stands of remnant vegetation and associate them with passive recreational facilities.

- **Enable land to be used for open space or recreation purposes where this is consistent with the protection of natural and cultural heritage values.**
- **Access and Equity of Access**
  - Locate open space within the centres and neighbourhoods and avoid pressure to existing open space systems in surrounding areas.
  - Ensure equity of provision across the LGA and ease of access for all members of the community to both active and passive recreation:
    - Local parks should be located within 400-500m walking distance of most residents.
    - Local sports parks should be located within 1km of most residents.
  - Create and links between bushland, natural area reserves, parks and waterways.
- **Timely Delivery**
  - Facilitate the timely provision of community facilities and services.
- **Quality and Quantity**
  - Facilitate the provision of public open space of an appropriate quality and quantity to meet the needs of future communities.
  - Provide a diverse mix of open spaces designed to cater for a range of uses and activities.
  - Provide sportsgrounds within a hierarchy, consistent with the aim of developing Blacktown as the sporting capital of Western Sydney.
- **Safety and Security**
  - Provide public open space that is pleasant, safe and usable both during daytime and at night.
  - Enhance safety by maximising surveillance.
  - Provide good, but unobtrusive, access.

These principles reflect a wide range of adopted State and local government policies. They are generally consistent with currently accepted best practice in planning for open space provision.
4. DRAFT PRECINCT PLAN

ASSESSMENT OF ILP AGAINST OPEN SPACE PLANNING PRINCIPLES

In order to determine the suitability of the open space framework proposed in the Riverstone East ILP, the framework has been assessed against the open space planning principles outlined in the SIAR. This has highlighted a number of benefits as well as short-comings of the proposed open space framework.

Benefits of the Proposed Open Space Framework

The ILP proposed for Stage 1 of the Riverstone East Precinct reflects the above open space planning principles as follows:

- Proposed open space areas along First Ponds Creek are inter-connected.
- The open space network is large enough to provide a link to Second Ponds Creek and the Area 20 Town Centres.
- The open space network provides green continuous (and potential pedestrian-cyclist) links to adjoining suburbs and release areas including the Alex Avenue Precinct and Riverstone.
- The open space network delivers the appropriate quantum of open space.
- While much of the proposed open space network is located at the edges of the Precinct, open space is generally provided within the accepted 400m zone from most homes. (Note: actual walking distances may vary depending on the final street layout.)
- Proposed open space integrates multiple uses including active and passive recreation, stormwater and riparian corridor management and native vegetation protection.
- Much of the proposed open space network is fronted onto the public road system, making it easily accessible.

Shortcomings of the Proposed Open Space Framework

The following is a summary of areas in which the ILP proposed open space network could be improved when measured against the open space planning principles of the SIAR:

- The proposed location of the open space link between Oak Street and Tallawong Road and adjoining the NWRLRTF results in poor integration with the surrounding urban structure.
- The proposed re-construction and channelisation of the southern tributary as Channel CF49 offers limited aesthetic and recreation benefit to the adjoining open space. The proposed channel profile including steep embankment slopes and channel depth have the potential to create a safety hazard.
- Risk management measures such as fencing may result in poor integration with adjoining open space, reducing the potential multi-use benefits such as would be achieved with a more natural watercourse.
- The majority of open space is concentrated along the edges of the Precinct, and peripheral relative to residential areas. The majority of residents would have to cross major roads to access open space including the sub-artrial Clarke Street and the local collector Tallawong Road. With a width of 35m and 20m respectively, these roads would provide a major barrier to pedestrian movement.
- The peripheral location of much of the open space limits the potential user catchment and reduces passive surveillance with potential flow-on effects on safety and security.
- The proposed community centre is separated from open space by a major collector road, removing the potential for activities to spill over into the parklands.
- There is limited diversity of public open space, with the vast majority of open space associated with riparian corridors. Conversely, much of the open space is linear in character, limiting its flexibility to accommodate different uses.
- There is no major open space associated with the Village Centre and higher density precinct along Guntawong Road.
- The major open space in Stage 1 is proposed between Oak Street and Tallawong Road in the southern part of the Precinct. It features two sports fields. No road is proposed along its southern edge, reducing access and passive surveillance, with potential implications for safety and security in this part of the park.
- The location of the major open space and local sportsfields adjoining the NWRLRTF reduces the potential catchment of the park. Better land use and open space and recreation planning outcomes would be achieved if the park where surrounded by a predominantly residential catchment.
- The major local park and sportsfields adjoining the NWRLRTF approved plans for the facility indicate that the site will be substantially elevated above the parklands. The only building along the interface between the two land uses will be a substation.
- By nature of its use, this building will generate limited activity. The building is substantially set back from the site boundary. Together with the significant level change between the NWRLRTF and the proposed open space, little passive surveillance of the parklands will be achieved.

SUMMARY

While the open space network proposed in the Exhibition ILP for the Precinct demonstrates a degree of consistency with the adopted open space planning principles, there are also a number of areas where the network falls short or could be further improved, in particular in terms of open space integration with surrounding land uses.

The following section provides an assessment of potential alternative outcomes.

FIGURE 12: Cross section of proposed sub-arterial road - Clarke Street (source: DP&E 2015e)

FIGURE 13: Cross section of proposed collector road - Tallawong Road (source: DP&E 2015e)
4. DRAFT PRECINCT PLAN

FIGURE 14: Proposed Creek Reconstruction showing Design Profile (source: Mott MacDonald 2015)
ALTERNATIVE OPEN SPACE FRAMEWORK
5. ALTERNATIVE OPEN SPACE FRAMEWORK

SITE SELECTION CRITERIA

The criteria for the selection of alternative sites for open space would consist of the open space planning principles identified in the SIAR, as well as a number of criteria regarding physical suitability and site constraints.

Open Space Planning Principles

The selection of alternative sites for open space would be based on the open space planning principles identified in the SIAR and discussed above. The key principles are:

- Integration and Co-location
- Multi-use
- Access and Equity of Access
- Timely Delivery
- Quality and Quantity
- Safety and Security

An alternative open space network would need to deliver a similar open space system that achieves an equal or improved quantity, multi-use, level of connectedness and shapes suitable for the development of active recreation and sports facilities.

Based on these criteria, the assessment of the ILP has identified a number of additional opportunities for the open space system to perform better. They are:

- Provide significant open space in locations easily accessed from residential areas.
- Locate open space to maximise the residential population within the 400m walking catchment - refer Figure 15: Ideal Distribution of Open Space.
- Locate open space to eliminate the need to cross major roads, to maximise safety and ease of access for all. This is consistent with the principles of providing play spaces that are safe and convenient, to assist childhood development.
- Locate open space to maximise passive surveillance from surrounding land uses.
- Integrate facilities for broader community use in the design of the major local open space. These include the potential to include a multi-use community room in the design of any club house or change rooms associated with the sports fields. This would enable activities or events to be held in or spill over into the parklands.
- Realise greater integration with other community infrastructure such as the services offered by the Village Centre on Guntawong Road.
- Provide a larger open space in proximity to high density residential areas in the Guntawong Road Village Centre.

Physical Site Selection Criteria

There are a number of physical constraints which must be considered when selecting alternative sites for open space. In particular relocation of the proposed double sports fields requires careful site selection. The following factors will need to be considered:

Topography

DPME has advised that in the selection of sites for sports fields, steepness of the site has been a key factor. The slope of the site will need to be limited to ensure a level playing field can be created. The site proposed for the sports fields in the ILP has an average slope of approximately 1:30. Alternative sites should therefore be of a similar or flatter slope.

Flooding

Open space areas will need to be essentially flood free. Flood prone land is not considered acceptable as public open space by Blacktown City Council.

Size

Consistent with Blacktown City Council’s standards, a minimum area of 4.5 hectares is required to accommodate a double sports field and ancillary infrastructure such as parking.

Access

The site should have at least two street frontages to maximise access.

Default provision standards

- Land/Dryland (4.5 ha)
- Basic Park (1.5 ha)
- Liner and Linkage
- 2 LGA District (4.5 ha - other community land)
- Registered Park (0.5 ha)
- 400m buffer
- 1 km buffer
- 2 km buffer
- 5 km buffer

FIGURE 15: Ideal distribution for passive local open space (left) and active local open space (source: SGS Economics and HM Leisure Planning 2010)
5. ALTERNATIVE OPEN SPACE FRAMEWORK

Integration with Natural Systems
Integration with natural systems such as the drainage system or protection of native vegetation is a desirable outcome consistent with multi-use objectives.

Equity of Open Space Distribution
Equity of access to open space is a key open space planning requirement. Individual open space areas in the network should be distributed to maximise safe and equitable access for the whole community. Locations that would require the majority of local residents to cross major roads are regarded less favourable for this reason.

Equitable distribution of open space is particularly important for sportsgrounds. Blacktown City Council has identified that there is a high demand for sport, as well as an anticipated growth in participation in physical activity. Equity in provision across the municipality is therefore an important consideration, to provide good access to all residents both within and beyond the Precinct.

Proximity To Other Community Infrastructure
Integration of open space with other community infrastructure is desirable and consistent with multi-use objectives. It is noted that the current location of the community centre falls short of realising this objective. While it is located opposite the proposed open spaces, it is separated from the park by a major road, eliminating the potential for activities to spill over into the park.

It is further noted that the SIAR does not support the proposed location of the community centre on Tallawong Road. It identifies it as inconsistent with both Council’s own location criteria, as well as with best practice location criteria. The SIAR recommends that a more suitable location would be within the Area 20 Town Centre.

Delivery and Funding
The SIAR has identified that existing Section 94 Contribution Plans will have limited capacity to fund the open space, in particular recreation infrastructure required within the open space.

Selection of sites for open space that are currently in government ownership may have the potential to reduce the open space acquisition cost, making more funds available to establish open space areas within the network to a high standard consistent with the identified community needs.

SITE ANALYSIS
The site analysis is comprised of a series of maps that analyse the Precinct in terms of its potential to meet the physical site selection criteria, as outlined below. This is followed by a composite map that highlights areas within the Precinct that meet a large number of criteria. They would be suitable alternative sites for open space, in particular active open space.

Topography
Based on the existing topography of Stage 1 of the Precinct, the most suitable sites would be sloping at 1 in 30 or flatter. Areas with a gradient of 1 in 30 or flatter are generally located along First Ponds Creek, as well as along existing drainage lines and local high points in the topography - refer Figure 16.

Suitably large areas
Based on the existing subdivision pattern, approximately three contiguous lots would be required to realise a 4.5 hectare large park, the minimum required for a local sports park. Given that the road layout on the ILP is not fixed, the layout of the majority of Stage 1 would be able to be adjusted to accommodate a park of this size.

Integration with Natural Systems
Areas adjoining either or both riparian and drainage corridors or native vegetation remnants with environmental or conservation values are suitable for achieving integration or multi-use.

Figure 17 shows native vegetation remnants identified as having moderate to high conservation value (note: area shapes have been simplified). There are a large number of such remnants in the Precinct, offering considerable flexibility in terms of co-location with open space.

Figure 18 highlights those parts of the Precinct identified as Riparian Protection Areas. They are based on the Office of Water stream classification system. For the lower order streams it requires 20m measured from the top of the bank.

Riparian Protection Areas form an integral part of the proposed drainage system. These areas are generally located along natural drainage lines. Areas adjoining these corridors offer potential for integration with riparian corridors.

Figure 19 shows the extent of flooding post development, based on the proposed Water Cycle Management Plan. It indicates the parts of the Precinct that remain flood free during a major event that triggers a flood evacuation response.

Distribution
The analysis reviews the distribution of open space as shown on the ILP, as well as open space already planned for in adjoining precincts, namely Riverstone, Alex Avenue and Area 20.

Inclusion of adjoining precincts in the analysis provides an overview of the degree of equity of open space distribution not just within the Precinct, but within the context of the surrounding municipality.

The distribution reviews the location of open space against generally accepted distances from open space to most residences, namely (also refer Figure 19):
- 1km from active sport fields
- 400m from any type of open space

Note: for the purposes of developing an alternative open space framework the open space proposed on the site has not been included in distribution mapping.

Active Open Space
As discussed above, Area 20 has been identified as having a shortfall in open space in general, and of sports fields in particular. It was further identified that precinct planning for Riverstone East represents an opportunity to address this shortfall.

However, the analysis of the distribution of sports fields indicates that the vast majority of residents in Area 20 are located within 1km of the sports fields that will be provided between Rouse Road and Second Ponds Creek - refer Figure 20. The analysis has however identified a significant gap in sport field provision in the eastern part of the Riverstone Precinct. In this area residents are located considerably further than the recommended 1km from local active open space. This represents a major gap in access to sports fields - refer Figure 20. The Riverstone East Precinct represents an opportunity to address this and restore equity of access to sports fields.

Passive Open Space
The analysis shows that all residents in the Precinct are located within 400m of open space - refer Figure 21. However, many residents would have to cross major roads to access major open space, namely Tallawong Road and Clarke Street. As a collector and sub-arterial road respectively, they are likely to represent a significant barrier to accessing open space. This is inconsistent with the principles of safe access.

The map shows that enlarging the currently proposed small park at 131 and 135 Tallawong Road to provide a more significant local open space would address this concern.

Alternatively, a large open space in or near the centre of the area bound by the NWRLRTF, Tallawong Road, Gunnetawon Road and Clarke Street would provide a flexible open space resource that would be centrally located within the Precinct, offering equity of access, while eliminating the need to cross major roads.

Proximity To Other Community Infrastructure
Based on best practice location criteria, the current location of the community centre as shown on the ILP is not supported. The SIAR identifies the most suitable location for the community centre in the Area 20 town centre.

If the community centre were to be relocated, the analysis shows that opportunities for integration of open space with community infrastructure in the Riverstone Precinct exist near the Gunnetawon Road Village Centre, or in proximity to nominated school sites.
5. ALTERNATIVE OPEN SPACE FRAMEWORK

FIGURE 16: Slope Analysis (source: DP&E 2015g)

FIGURE 17: Map showing areas of high to moderate ecological value, indicating potential for integration with natural systems (source: DP&E 2015g and Ecological Australia 2015)
5. ALTERNATIVE OPEN SPACE FRAMEWORK

FIGURE 18: Riparian Protection Areas, showing potential for integration with natural systems (source: DP&E 2015e and 2015g)

FIGURE 19: Flood response map, showing post-development extents of flooding (hatched areas represent emergency assembly areas) (source: DP&E 2015g and Mott MacDonald 2015)
5. ALTERNATIVE OPEN SPACE FRAMEWORK

FIGURE 20: Distribution of active open space, showing areas outside acceptable distances to sportsfields (source: DP&E 2015a, 2015g, 2015i)

Shading indicates areas within 1km of active open space.

Note: actual walking distances may be greater based on road layout.

Indicates gap in distribution/inequality in access to active open space.
5. ALTERNATIVE OPEN SPACE FRAMEWORK

FIGURE 21: Distribution of open space

- Indicates suitable sports field site
- Area with greatest potential to rectify inequity in access to sports fields
- Catchment area accessible by the majority of residents without the need to cross major roads
- Shading indicates areas within 400m of open space
- Note: actual walking distances may be greater based on road layout

FIGURE 22: Composite constraints map showing potential sites for sports fields
5. ALTERNATIVE OPEN SPACE FRAMEWORK

ALTERNATIVE SITES
A composite map overlay of the analysis maps identifies a number of alternative sites for open space in general, and for a local active open space in particular — refer Figure 22.

The alternative sites have been highlighted because they meet several of the site selection criteria discussed above, including open space planning principles and physical site selection criteria. They also have the potential to compensate for the gap in sportsfields provision in the Riverstone Precinct.

All alternative sites are located within the Stage 1 release area of the Riverstone East, in order to maintain the quantum and timing of open space delivered as part of Stage 1. Figure 23 shows the location of the alternative sites highlighted on the ILP.

The following provides an overview of the identified alternative sites, as well as of their respective benefits.

Site 1
Site 1 is located on government-owned land in Guntawong Street, near the corner with Clarke Street — refer Figure 24 and 28. Two alternative sports field locations have been identified within this lot: Site 1a and Site 1b.

Site 1a is located east of Clarke Street, and north of the existing drainage line. It would adjoin high density residential areas along Guntawong Road.

Site 1b is located between First Ponds Creek and the proposed extension of Clarke Street. It is south of the existing drainage line and would adjoin proposed high density residential areas along the proposed extension of Clarke Street.

Benefits of Site 1a and 1b
- Both sites feature a gently sloping topography with an average fall of less than 1 in 30, measured over the length of a sports pitch (100m).
- Both sites would provide open space in close proximity to the Guntawong Road Village Centre and high density residential development.
- Both sites would be co-located with riparian corridors, integrating stormwater management and the drainage system with open space.
- Open space would be located in areas of moderate to high archaeological potential, on a property with known Aboriginal Heritage Sites, offering potentially greater scope for protection — refer Figure 27.
- The land is already in government ownership, potentially reducing land acquisition costs.

A potential shortfall in Section 94 contributions has been identified in the SIAR, together with limited opportunities to raise additional funds. This limits the funds available to develop open space and recreation facilities. Savings on land acquisition offer the opportunity to direct limited available funds to develop open space to a higher standard, including local sporting facilities.

Land ownership transfers may also be more easily achieved to match the timing of development of the Precinct, to ensure open space and recreation infrastructure is available to future residents in a timely fashion.

Site 1a - Additional Benefits
- Offers the opportunity for integration of open space with remnants of moderate to high conservation value.
- Is located between Tallawong Road and Clarke Street, making it easily and safely accessible from residential neighbourhoods that comprise the bulk of the Precinct.

Site 1b - Additional Benefits
- Would provide open space in close proximity to high density residential development along the proposed Clarke Street extension.
- May hold potential for shared use with the public school on the opposite side of First Ponds Creek, in the Riverstone Precinct.

Site 1b Disadvantages
A potential drawback of Site 1b is its location south of Clarke Street. This will make it less accessible from the bulk of residential areas which are located in the area bound by Clarke Street, the NWRLRTF, Tallawong Road and Guntawong Road.

There is an opportunity to address this through modifications to the road alignment currently shown for the proposed extension of Clarke Street. Shifting the alignment further south would enable the Site to be located north of Clarke Street, with improved access from residential areas.

Site 2
Site 2 is located on government-owned land in Tallawong Road, near the corner with Winston Avenue. A potential sports field has been identified within this lot.

Benefits of Site 2
- Both sites feature a gently sloping topography with an average fall of less than 1 in 30, measured over the length of a sports pitch (100m).
- Both sites would provide open space in close proximity to the Guntawong Road Village Centre and high density residential development.
- Both sites would be co-located with riparian corridors, integrating stormwater management and the drainage system with open space.
- Open space would be located in areas of moderate to high archaeological potential, on a property with known Aboriginal Heritage Sites, offering potentially greater scope for protection — refer Figure 27.
- The land is already in government ownership, potentially reducing land acquisition costs.

A potential shortfall in Section 94 contributions has been identified in the SIAR, together with limited opportunities to raise additional funds. This limits the funds available to develop open space and recreation facilities. Savings on land acquisition offer the opportunity to direct limited available funds to develop open space to a higher standard, including local sporting facilities.

Land ownership transfers may also be more easily achieved to match the timing of development of the Precinct, to ensure open space and recreation infrastructure is available to future residents in a timely fashion.

Site 2 - Additional Benefits
- Offers the opportunity for integration of open space with remnants of moderate to high conservation value.
- Is located between Tallawong Road and Clarke Street, making it easily and safely accessible from residential neighbourhoods that comprise the bulk of the Precinct.
5. ALTERNATIVE OPEN SPACE FRAMEWORK

Site 2
Site 2 is located at 121 and 125 Tallawong Road, in the centre of the proposed Stage 1 release area - refer Figure 25. It has been identified as a suitable location for a park in the ILP.

As an alternative site for a major local open space, the proposed open space shown on the ILP would be enlarged to provide a more significant open space resource. This should be large enough to provide a diversity of local recreation facilities and infrastructure to meet a wide range of needs, including formal active recreation and sports fields.

Benefits of Site 2
- The site has a gently sloping topography, with an average fall of less than 1 in 30, measured over the length of a sports pitch (100m).
- Offers the opportunity for integration of open space with remnants of moderate to high conservation value.
- The site is centrally located at the heart of the major residential precinct, allowing maximum from residential neighbourhoods that comprise the bulk of the Precinct, that is from within the area bound by Clarke Street, the Northern Western Line Rail Link track, Tallawong Road and Guntawong Road.
- The location between Tallawong Road and Clarke Street makes it easily and safely accessible including by children living in residential neighbourhoods.
- Unlike the majority of the open space system, the site is located on a ridge top. It would add variety to the open space system by providing parks in different landscape settings.

Site 3
Site 3 is located at 14-28 Oak Street, just north of Gordon Road - refer Figure 26.

- The site has a gently sloping topography, with an average fall of less than 1 in 30, measured over the length of a sports pitch (100m).
- Offers the opportunity for integration of open space with remnants of moderate to high conservation value.
- Is located between Tallawong Road and Clarke Street, making it easily and safely accessible from residential neighbourhoods that comprise the bulk of the Precinct.
- Locate open space in areas of moderate to high archaeological potential, offering potentially greater scope for protection - refer Figure 27.

Site 3 Disadvantages
A potential drawback of Site 3 is its location relative to the NWRLRTF. This will make it less accessible from the bulk of residential areas which are located in the area bound by Clarke Street, the NWRLRTF, Tallawong Road and Guntawong Road.
CONCLUSION AND RECOMMENDATIONS

The site analysis has revealed that there are a number of alternative sites that would physically be able to accommodate sports fields, as well as perform equally or better against open space planning principles, compared to the location of sports fields proposed by the ILP.

They would further be able to address a gap in the distribution in sports fields which would result in residents in the adjoining Riverstone Precinct having to travel significantly further than the recommended 1km to access a local sports field.

Together with the sports fields planned for Stage 3 of the Riverstone East Precinct, all identified alternative sites would ensure that an appropriate quantum of sports fields would be provided to meet the active recreation needs of residents in the Precinct, as well as of residents in the adjoining Area 20 (Cudgegong Road) Precinct. All residents would have access to sports fields within the recommended maximum travel distance.

All identified sites offer opportunities for integration with natural systems such as protection of ecologically valuable remnant vegetation. They would maintain the integrity of the proposed riparian and drainage network, delivering an interconnected network of open space and green links. It would deliver the same degree of connectedness along First Ponds Creek, as well as between First Ponds Creek and Cudgegong Road.

Finally, the proposed alternative sites are more centrally located relative to where the majority of residents will live. This is important as it ensures safe and easy access, in particular for children. It would also achieve a higher degree of integration of open space with surrounding urban areas, as is important for maximum use and safety through passive surveillance.

This is the case in particular for Sites 1 and 2 that are more centrally located relative to residential areas. With its proximity to the NWRLRTF, Site 3 is located towards the edges of residential areas, limiting the number of residents within its 1km catchment.

Based on the range of potential benefits associated with the identified alternative sites, Site 1 is considered to be the strongest performing alternative option - refer Figures 24 and 28. It offers a range of benefits in terms of its physical characteristics, is consistent with open space planning principles and has the additional benefit of already being held in government ownership. This may reduce land acquisition costs and ensure that open space is available to new residents as the Precinct is developed.
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