PLANNING PROPOSAL

CITY OF COFFS HARBOUR

Reduce Minimum Lot Size
Lot 411 DP 1276302, 198 Ayrshire Park Drive, Boambee

July 2024
VERSION 2 Exhibition

PLANNING PROPOSAL STATUS

Stage	**Version / Date** *(blank until achieved)*
Reported to Council – Initiate s3.33 **Version 1 - Pre_Exhibition**	***Version 1 – Pre-Exhibition*** ***09/05/2024***
Referred to DPHI s3.34(1) **Version 1 - Pre_Exhibition**	***16/05/2024***
Gateway Determination s3.34(2) **Version 1 - Pre_Exhibition**	***14/06/2024***
Amendments Required:	***No***
Public Exhibition – Schedule 1 Clause 4 **Version 2 - Exhibition**	***05/07/2024 – 15/08/2024***
Reported to Council – Initiate Revised PP s3.33 **Version x - Re_Exhibition**	
Revised PP Sent to the Minister - s3.35(1) **Version x - Re_Exhibition**	
Altered Gateway Determination s3.34(2) **Version x - Re_Exhibition**	
Public Exhibition – Schedule 1 Clause 4 **Version x - Re_Exhibition**	
Reported to Council – Endorsement (or Making of LEP if delegated) s3.36 **Version x - Post Exhibition**	
Endorsed by Council for Submission to Minister for Notification (or Making where not delegated) s3.36(2) **Version x – Post Exhibition**	

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APPENDICES

EXECUTIVE SUMMARY & EXHIBITION INFORMATION

What is a Planning Proposal?

A planning proposal is a document that explains the intended effect of a proposed local environmental plan (LEP) and sets out the justification for making that plan. Essentially, the preparation of a planning proposal is the first step in making an amendment to Coffs Harbour LEP 2013.

A planning proposal assists those who are responsible for deciding whether an LEP amendment should proceed and is required to be prepared by a relevant planning authority. Council, as a relevant planning authority, is responsible for ensuring that the information contained within a planning proposal is accurate and accords with the *Environmental Planning and Assessment Act 1979* and the NSW Department of Planning, Housing and Infrastructure's *Local Environmental Plan Making Guideline 2023.*

What is the Intent of this Planning Proposal?

The intent of this Planning Proposal is to amend the Lot Size Map Sheet LSZ_006B of Coffs Harbour LEP 2013, as it relates to Lot 411 DP 1276302, 198 Ayrshire Park Drive, Boambee, from 1 hectare to 4,500 m^2.

Public Exhibition

This planning proposal is on public exhibition in accordance with any Gateway Determination issued by NSW Department of Planning, Housing and Infrastructure. Copies of the planning proposal and supportive information can be viewed on the City of Coffs Harbour's Have Your Say Page https://haveyoursay.coffsharbour.nsw.gov.au/ for the duration of the exhibition period.

All interested persons are invited to view and make a submission on the planning proposal during the exhibition period. Issues raised by submissions will be reported to Council for a final decision. Submissions can be made online, or in writing by email or post to:

The General Manager
City of Coffs Harbour
Locked Bag 155
COFFS HARBOUR NSW 2450
Email: coffs.council@chcc.nsw.gov.au

Any questions, contact:
Joseph Kirwood on 6648 4628
or email joseph.kirwood@chcc.nsw.gov.au

Note: The City is committed to openness and transparency in its decision making processes. The Government Information (Public Access) Act 2009 requires the City to provide public access to information held unless there are overriding public interest considerations against disclosure. Any submissions received will be made publicly available unless the writer can demonstrate that the release of part or all of the information would not be in the public interest. However, the City would be obliged to release information as required by court order or other specific law.

Written submissions must be accompanied, where relevant, by a "Disclosure Statement of Political Donations and Gifts" in accordance with the provisions of the Local Government and Planning Legislation Amendment (Political Donations) Act 2008 No. 44 Disclosure forms are available from the City's Customer Service Section or on the City's website www.coffsharbour.nsw.gov.au/disclosurestatement.

BACKGROUND

Proposal	Reduce Minimum Lot Size
Property Details	Lot 411 DP 1276302, 198 Ayrshire Park Drive, Boambee
Current Land Use Zone(s)	R5 Large Lot Residential
Proponent	Keiley Hunter Town Planning
Landowner	G Russell & K Russell
Location	Figure 1: Location Map is included below

This planning proposal has been prepared in accordance with the Environmental Planning and Assessment Act 1979 and *Local Environmental Plan Making Guideline 2023* (NSW Department of Planning, Housing and Infrastructure).

This planning proposal explains the intended effects of a proposed amendment to Coffs Harbour LEP 2013 to enable amendment of the Lot Size Map from 1 hectare to 4,500 m^2 for Lot 411 DP 1276302, 198 Ayrshire Park Drive, Boambee. The amendment will provide the ability for development application to be made for subdivision of the site to create a single additional lot as shown in Figure 2.

The Site

The site is located along Ayrshire Park Drive, Boambee and within a wider area largely developed for large lot residential purposes as shown in Figure 1 below.

The site contains a dwelling house, is largely cleared, and contains domestic landscaping. It has a gentle fall from northern portion of the site to the southeast boundary fronting Ayrshire Park Drive.

The site has an area of 1.001 hectares and is zoned R5 Large Lot Residential under LEP 2013. The current minimum lot size for this area is 1 hectare as shown in Part 4: Mapping - Figure 3.

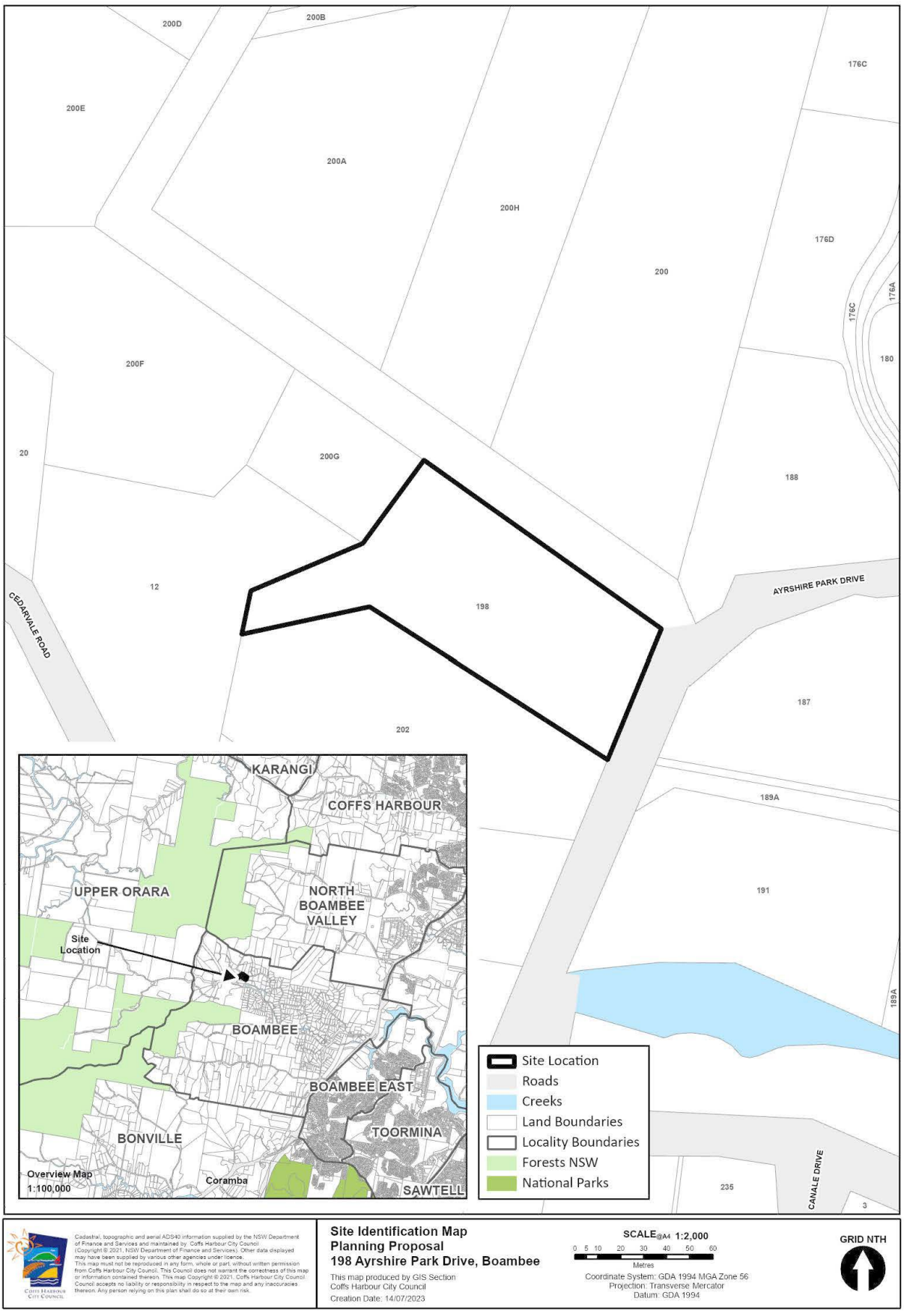


Figure 1: Location Map

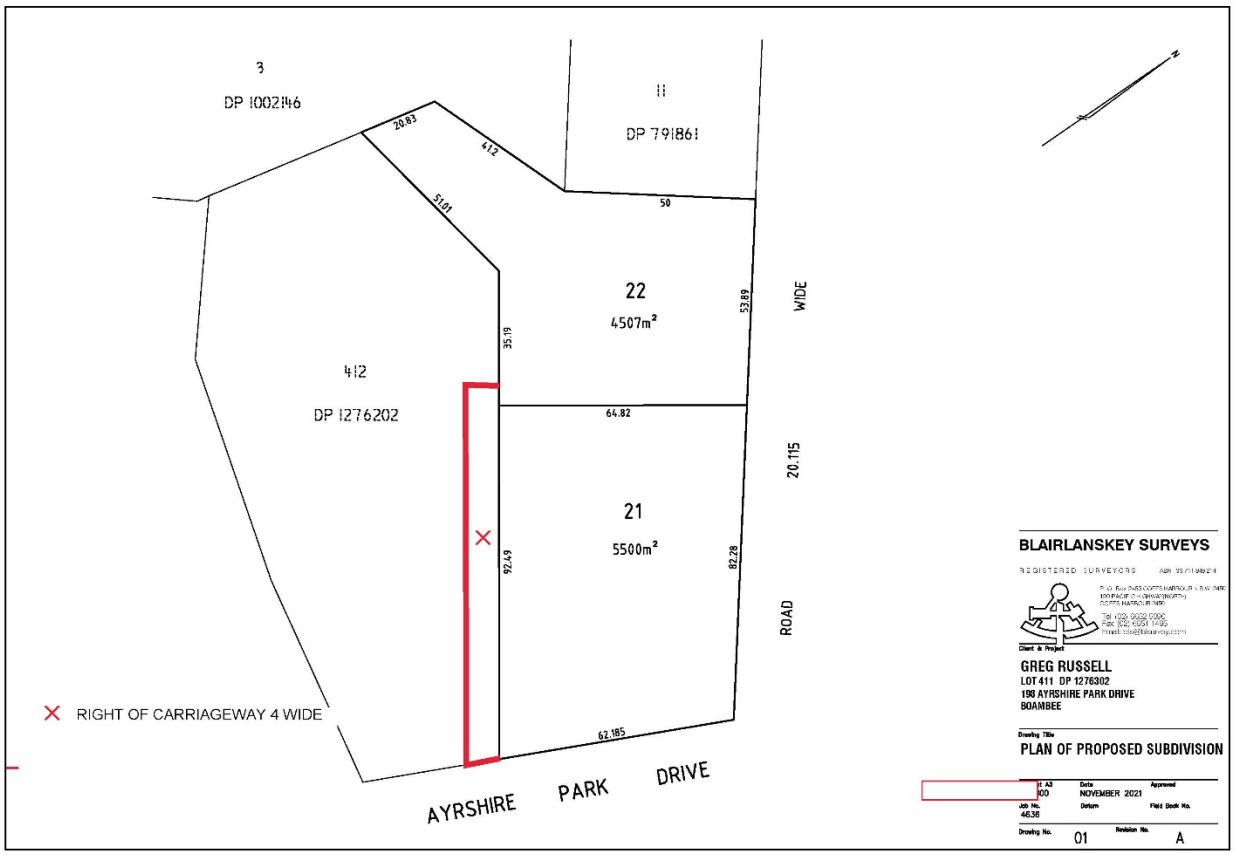


Figure 2: Concept Subdivision Layout

Note: In preparing this planning proposal, Council has not endorsed the proposed plan of subdivision, as this is subject to the development application process.

PART 1 – OBJECTIVES OR INTENDED OUTCOMES

The objective of this planning proposal is to amend the Lot Size Map (Sheet LSZ_006B) of Coffs Harbour LEP 2013 to reduce the minimum lot size on the site from 1 hectare to 4,500 m^2 to enable application to be made for subdivision of the site.

PART 2 – EXPLANATION OF PROVISIONS

The intended outcome of the proposed LEP amendment is to reduce the minimum lot size of 1 hectare to 4,500 m^2 for Lot 411 DP 1276302, 198 Ayrshire Park Drive, Boambee. This is to be achieved through the amendment of Sheet LSZ_006B (Lot Size Map) of LEP 2013.

PART 3 – JUSTIFICATION & SITE-SPECIFIC MERIT

This part provides a response to the following matters in accordance with the *Local Environmental Plan Making Guideline 2023* (NSW Department of Planning, Housing and Infrastructure):

- Section A: Need for the planning proposal
- Section B: Relationship to strategic planning framework
- Section C: Environmental, social and economic impact

Section A – Need for the planning proposal

1. Is the planning proposal a result of an endorsed local strategic planning statement, strategic study or report?

Yes. The site is included in an existing R5 Large Lot Residential zone and the City's Local Growth Management Strategy (LGMS) 2020, Chapter 6 – Large Lot Residential allows for the potential reduction of minimum lot size in the R5 zone, where sufficiently justified.

Coffs Harbour has a range of lot sizes in its large lot (rural residential) areas, which reflect varying minimum lot size standards that have changed over time. These varied lot sizes are apparent within the Boambee large lot area, and in close proximity to the site. A reduction in minimum lot size for the site would be consistent with the surrounding neighbourhood and its character, as smaller sizes lots are already present.

The proposed minimum lot size of 4,500 m2 will be sufficient to ensure that future lots might achieve a practical and efficient layout to meet their intended (rural residential) use. In this regard, the indicative layout in Figure 2 is demonstrative of this, achieving a practical and efficient layout in a rural residential context.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes. The planning proposal is considered the best way to achieve the intended outcome and is consistent with the approach set out in the LGMS, which is set out above. It is also consistent with the manner in which Council has dealt with similar planning proposals.

3. Is there a net community benefit?

The Net Community Benefit Criteria is identified in the NSW Government's publication *The Right Place for Business and Services*. This policy document has a focus on ensuring growth within existing centres and minimising dispersed trip generating development. It applies most appropriately to planning proposals that promote significant increased residential areas or densities, or significant increased employment areas or the like. This planning proposal does not relate to ensuring growth within existing centres and minimising dispersed trip generating development; nor does it relate to promoting significant increased residential areas or densities, or significant increased employment areas or the like. The criteria in the Net Community Benefit test cannot be properly applied to this planning proposal.

Section B – Relationship to strategic planning framework

4. Will the planning proposal give effect to the objectives and actions contained within the North Coast Regional Plan 2041?

The proposed LEP amendment is considered to be consistent with the relevant goals, objectives, activities and actions within the North Coast Regional Plan 2041 as follows:

GOAL 1 – LIVEABLE, SUSTAINABLE AND RESILIENT

- ***Objective 1 – Provide well located homes to meet demand***

Strategy 1.1 A 10 year supply of zoned and developable residential land is to be provided and maintained in Local Council Plans endorsed by the Department of Planning, Housing and Infrastructure.

The proposed LEP amendment is not inconsistent with this strategy. As per Coffs Harbour Local Growth Management Strategy 2020, reduction of minimum lot size of land in Zone R5 Large Lot Residential is permitted where a land capability assessment supports a smaller lot size. The proposed amendment is contained within Zone R5 and is therefore consistent.

Action 1 Establish the North Coast urban housing monitoring program.

The proposed LEP amendment is not inconsistent with this action.

Strategy 1.2 Local Council plans are to encourage and facilitate a range of housing options in well located areas.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 1.3 Undertake infrastructure service planning to establish land can be feasibly serviced prior to rezoning.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment is supported by a Land Capability Assessment in Appendix 3, which indicates the on-site sewage management can be maintained at a reduced minimum lot size.

Strategy 1.4 Councils in developing their future housing strategies must prioritise new infill development to assist in meeting the region's overall 40% multi-dwelling / small lot housing target and are encouraged to work collaboratively at a subregional level to achieve the target.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 1.5 New rural residential housing is to be located on land which has been approved in a strategy endorsed by the Department of Planning, Housing and Infrastructure and is to be directed away from the coastal strip.

As per Coffs Harbour Local Growth Management Strategy 2020, reduction of minimum lot size of land in Zone R5 Large Lot Residential is permitted where a land capability assessment supports a smaller lot size. The proposed amendment is contained within an existing R5 Large Lot Residential Zone and shall only result in the potential for a single additional allotment. As such, the proposed amendment is consistent with this strategy.

Strategy 1.6 Councils and LALCs can partner to identify areas which may be appropriate for culturally responsive housing on Country.

The proposed LEP amendment is not inconsistent with this strategy.

Action 2 Provide guidance to help councils plan for and manage accommodation options for seasonal and itinerant workers.

The proposed LEP amendment is not inconsistent with this action.

- ***Objective 2 – Provide for more affordable and low cost housing***

Action 3 Establish Housing Affordability Roundtables for the Mid North Coast and Northern Rivers subregions with councils, community housing providers, State agencies and the housing development industry to collaborate, build knowledge and identify measures to improve affordability and increase housing diversity.

The proposed LEP amendment is not inconsistent with this action.

- ***Objective 3 – Protect regional biodiversity and areas of high environmental value***

Strategy 3.1 Strategic planning and local plans must consider opportunities to protect biodiversity values by:

- focusing land-use intensification away from HEV assets and implementing the 'avoid, minimise and offset' hierarchy in strategic plans, LEPs and planning proposals;
- ensuring any impacts from proposed land use intensification on adjoining reserved lands or land that is subject to a conservation agreement are assessed and avoided;
- encouraging and facilitating biodiversity certification by Councils at the precinct scale for high growth areas and by individual land holders at the site scale, where appropriate;
- updating existing biodiversity mapping with new mapping in LEPs where appropriate;
- identifying HEV assets within the planning area at planning proposal stage through site investigations;
- applying appropriate mechanisms such as conservation zones and Biodiversity Stewardship Agreements to protect HEV land within a planning area and considering climate change risks to HEV assets;
- developing or updating koala habitat maps to strategically conserve koala habitat to help protect, maintain and enhance koala habitat; and
- considering marine environments, water catchment areas and groundwater sources to avoid potential development impacts.

The proposed LEP amendment is not inconsistent with this strategy. The site does not contain any mapped biodiversity values indicated by this strategy.

Strategy 3.2 In preparing local and strategic plans Councils should:

- embed climate change knowledge and adaptation actions; and
- consider the needs of climate refugia for threatened species and other key species.

The proposed LEP amendment is not inconsistent with this strategy.

Collaboration Activity 1:

Work with and assist councils to:

- review biodiversity mapping and related local environmental plan and development control plan provisions;
- improve access to data to enable identification of protected areas including NPWS Estate, Crown Reserves and in-perpetuity private land conservation agreements to inform local planning;
- ensure koala habitat values are included in land-use planning decisions through regional plans, local strategic planning statements and local environmental plans.

Lead Agency: NSW Biodiversity and Conservation Division

The proposed LEP amendment is not inconsistent with this activity.

- ***Objective 4 – Understand, celebrate and integrate Aboriginal culture***

Strategy 4.1 Councils prepare cultural heritage mapping with an accompanying Aboriginal cultural management plan in collaboration with Aboriginal communities to protect culturally important sites.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 4.2 Prioritise applying dual names in local Aboriginal language to important places, features or infrastructure in collaboration with the local Aboriginal community.

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 5 – Manage and improve resilience to shocks and stresses, natural hazards and climate change***

Strategy 5.1 When preparing local strategic plans, councils should be consistent with and adopt the principles outlined in the Strategic Guide to Planning for Natural Hazards.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 5.2 Where significant risk from natural hazard is known or presumed, updated hazard strategies are to inform new land use strategies and be prepared in consultation with emergency service providers and Local Emergency Management Committees (LEMCs). Hazard strategies should investigate options to minimise risk such as voluntary housing buy back schemes.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 5.3 Use local strategic planning and local plans to adapt to climate change and reduce exposure to natural hazards by:

- identifying and assessing the impacts of place-based shocks and stresses;
- taking a risk-based-approach that uses the best available science in consultation with the NSW Government, emergency service providers, local emergency management committees and bush fire risk management committees;
- locating development (including urban release areas and critical infrastructure) away from areas of known high bushfire risk, flood and coastal hazard areas to reduce the community's exposure to natural hazards;
- identifying vulnerable infrastructure assets and considering how they can be protected or adapted;
- building resilience of transport networks in regard to evacuation routes, access for emergencies and, maintaining freight connections;
- identifying industries and locations that would be negatively impacted by climate change and natural hazards and preparing strategies to mitigate negative impacts and identify new paths for growth;
- preparing, reviewing and implementing updated natural hazard management plans and Coastal Management Programs to improve community and environmental

resilience which can be incorporated into planning processes early for future development;

- identifying any coastal vulnerability areas;
- updating flood studies and flood risk management plans after a major flood event incorporating new data and lessons learnt; and
- communicating natural hazard risk through updated flood studies and strategic plans.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment shall be referred to NSW Rural Fire Service for further consideration, as the site is located within Bushfire Prone Land (Vegetation Category 3).

Strategy 5.4 Resilience and adaptation plans should consider opportunities to:

- encourage sustainable and resilient building design and materials (such as forest products) including the use of renewable energy to displace carbon intensive or fossil fuel intensive options
- promote sustainable land management including Ecologically Sustainable Forest Management (ESFM)
- address urban heat through building and street design at precinct scale that considers climate change and future climatic conditions to ensure that buildings and public spaces are designed to protect occupants in the event of heatwaves and extreme heat events
- integrate emergency management and recovery needs into new and existing urban areas including evacuation planning, safe access and egress for emergency services personnel, buffer areas, building back better, whole-of-life cycle maintenance and operation costs for critical infrastructure for emergency management
- adopt coastal vulnerability area mapping for areas subject to coastal hazards to inform the community of current and emerging risks
- promote economic diversity, improved environmental, health and well-being outcomes and opportunities for cultural and social connections to build more resilient places and communities.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 5.5 Partner with local Aboriginal communities to develop land management agreements and policies to support cultural management practices.

The proposed LEP amendment is not inconsistent with this strategy.

Collaboration Activity 2:

Work with councils and agencies and the Transition North Coast Working Group to deliver the North Coast Enabling Regional Adaptation report to provide opportunities for climate change adaptation pathways with the aim of transitioning key regional systems to a more resilient future.

Lead Agency: NSW Office of Energy and Climate Change

The proposed LEP amendment is not inconsistent with this activity.

- ***Objective 6 – Create a circular economy***

Strategy 6.1 Support the development of circular economy, hubs, infrastructure and activities and consider employment opportunities that may arise from circular economies and industries that harness or develop renewable energy technologies and will aspire towards an employment profile that displays a level of economic self-reliance, and resilience to external forces.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 6.2 Use strategic planning and waste management strategies to support a circular economy,

including dealing with waste from natural disasters and opportunities for new industry specialisations.

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 7 – Promote renewable energy opportunities***

Strategy 7.1 When reviewing LEPs and local strategic planning statements:

- ensure current land use zones encourage and promote new renewable energy infrastructure;
- identify and mitigate impacts on views, local character and heritage where appropriate; and
- undertake detailed hazard studies.

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 8 – Support the productivity of agricultural land***

Strategy 8.1 Local planning should protect and maintain agricultural productive capacity in the region by directing urban, rural residential and other incompatible development away from important farmland.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment is not located within proximity to any important farmland identified in the North Coast Regional Plan 2041.

- ***Objective 9 – Sustainably manage and conserve water resources***

Strategy 9.1 Strategic planning and local plans should consider:

- opportunities to encourage riparian and coastal floodplain restoration works;
- impacts to water quality, freshwater flows and ecological function from land use change;
- water supply availability and issues, constraints and opportunities early in the planning process;
- partnering with local Aboriginal communities to care for Country and waterways;
- locating, designing, constructing and managing new developments to minimise impacts on water catchments, including downstream waterways and groundwater resources;
- possible future diversification of town water sources, including groundwater, stormwater harvesting and recycling;
- promoting an integrated water cycle management approach to development;
- encouraging the reuse of water in new developments for urban greening and for irrigation purposes;
- improving stormwater management and water sensitive urban design;
- ensuring sustainable development of higher-water use industries by considering water availability and constraints, supporting more efficient water use and reuse, and locating development where water can be accessed without significantly impacting on other water users or the environment;
- identifying and protecting drinking water catchments and storages in strategic planning and local plans; and
- opportunities to align local plans with any certified Coastal Management Programs.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 9.2 Protect marine parks, coastal lakes and estuaries by implementing the NSW

Government's Risk-Based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions, with sensitive marine parks, coastal lakes and estuaries prioritised.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 9.3 Encourage a whole of catchment approach to land use and water management across the region that considers climate change, water security, sustainable demand and growth, the natural environment and investigate options for water management through innovation.

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 10 – Sustainably manage the productivity of our natural resources***

Strategy 10.1 Enable the development of the region's natural, mineral and forestry resources by avoiding interfaces with land uses that are sensitive to impacts from noise, dust and light interference.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 10.2 Plan for the ongoing productive use of lands with regionally significant construction material resources in locations with established infrastructure and resource accessibility.

The proposed LEP amendment is not inconsistent with this strategy.

GOAL 2 – PRODUCTIVE AND CONNECTED

- ***Objective 11 – Support cities and centres and coordinate the supply of well-located employment land***

Strategy 11.1 Local council plans will support and reinforce cities and centres as a focal point for economic growth and activity.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 11.2 Utilise strategic planning and land use plans to maintain and enhance the function of established commercial centres by:

- simplifying planning controls
- developing active city streets that retain local character
- facilitating a broad range of uses within centres in response to the changing retail environment
- maximising the transport and community facilities commensurate with the scale of development proposals.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 11.3 Support existing and new economic activities by ensuring council strategic planning and local plans:

- retain, manage and safeguard significant employment lands
- respond to characteristics of the resident workforce and those working in the LGA and neighbouring LGAs
- identify local and subregional specialisations
- address freight, service and delivery considerations
- identify future employment lands and align infrastructure to support these lands
- provide flexibility in local planning controls
- are responsive to future changes in industry to allow a transition to new opportunities
- provide flexibility and facilitate a broad range of commercial, business and retail uses within centres

- focus future commercial and retail activity in existing commercial centres, unless there is no other suitable site within existing centres, there is a demonstrated need, or there is positive social and economic benefit to locate activity elsewhere
- are supported by infrastructure servicing plans for new employment lands to demonstrate feasibility prior to rezoning.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment does not intend to remove, add or otherwise impact employment land.

Strategy 11.4 New employment areas are in accordance with an employment land strategy endorsed by the Department of Planning, Housing and Infrastructure.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment only intends to enable the creation of a single additional large lot residential lot.

- ***Objective 12 – Create a diverse visitor economy***

Strategy 12.1 Council strategic planning and local plans should consider opportunities to:

- enhance the amenity, vibrancy and safety of centres and township precincts;
- create green and open spaces that are accessible and well connected and enhance existing green infrastructure in tourist and recreation facilities;
- support the development of places for artistic and cultural activities;
- identify appropriate areas for tourist accommodation and tourism development;
- protect heritage, biodiversity and agriculture to enhance cultural tourism, agri-tourism and eco-tourism;
- partner with local Aboriginal communities to support cultural tourism and connect ventures across the region;
- support appropriate growth of the nighttime economy;
- provide flexibility in planning controls to allow sustainable agritourism and ecotourism;
- improve public access and connection to heritage through innovative interpretation; and
- incorporate transport planning with a focus on active transport modes to connect visitors to key destinations.

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 13 – Champion Aboriginal self-determination***

Strategy 13.1 Provide opportunities for the region's LALCs, Native Title holders and community recognised Aboriginal organisations to utilise the NSW planning system to achieve development aspirations, maximising the flow of benefits generated by land rights to Aboriginal communities through strategic led planning.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.2 Prioritise the resolution of unresolved Aboriginal land claims on Crown land.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.3 Partner with community recognised Aboriginal organisations to align strategic planning and community aspirations including enhanced Aboriginal economic participation, enterprise and land, sea and water management.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.4 Councils consider engaging Aboriginal identified staff within their planning teams to facilitate strong relationship building between councils, Aboriginal communities and key stakeholders such as Local Aboriginal Land Councils and local Native Title holders.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 13.5 Councils should establish a formal and transparent relationship with local recognised Aboriginal organisations and community, such as an advisory committee.

The proposed LEP amendment is not inconsistent with this strategy.

Action 5 The Department of Planning, Housing and Infrastructure will work with LALCs, Native Title holders and councils by:

- meaningfully engaging with LALCs and Native Title holders in the development and review of strategic plans to ensure aspirations are reflected in plans;
- building capacity for Aboriginal communities, LALCs and Native Title holders to utilise the planning system; and
- incorporating Aboriginal knowledge of the region into plan.

The proposed LEP amendment is not inconsistent with this action.

- ***Objective 14 – Deliver new industries of the future***

Strategy 14.1 Facilitate agribusiness employment and income-generating opportunities through the regular review of council planning and development controls, including suitable locations for intensive agriculture and agribusiness.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment relates to rural residential land, and therefore will not result in any change to agribusiness opportunities.

Strategy 14.2 Protect established agriculture clusters and identify expansion opportunities in local plans that avoid land use conflicts, particularly with residential and rural residential land uses.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment is located approximately 100 metres from neighbouring RU2 Rural Landscape zoned land. As the proposed amendment results in a minor increase (single additional lot) to rural residential land within an existing rural residential zone, land use conflict is deemed to be unlikely.

- ***Objective 15 – Improve state and regional connectivity***

Strategy 15.1 Protect proposed and existing transport infrastructure and corridors to ensure network opportunities are not sterilised by incompatible land uses or land fragmentation.

The proposed LEP amendment is not inconsistent with this strategy.

Collaboration Activity 4:

To ensure that centres experiencing high growth have well planned and sustainable transport options, placed-based Transport Plans will be developed for key cities and centres across the North Coast region.

Lead Agency: Transport for NSW

The proposed LEP amendment is not inconsistent with this activity.

- ***Objective 16 – Increase active and public transport usage***

Strategy 16.1 Encourage active and public transport use by:

- prioritising pedestrian amenity within centres for short everyday trips
- providing a legible, connected and accessible network of pedestrian and cycling facilities
- delivering accessible transit stops and increasing convenience at interchanges to serve an ageing customer
- incorporating emerging anchors and commuting catchments in bus contract renewals
- ensuring new buildings and development include end of trip facilities

- integrating the active transport network with public transport facilities
- prioritising increased infill housing in appropriate locations to support local walkability and the feasibility of public transport stops

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 16.2 Local plans should encourage the integration of land use and transport and provide for environments that are highly accessible and conducive to walking, cycling and the use of public transport and encourage active travel infrastructure around key trip generators.

The proposed LEP amendment is not inconsistent with this strategy.

- ***Objective 17 – Utilise new transport technology***

Strategy 17.1 Councils should consider how new transport technology can be supported in local strategic plans, where appropriate.

The proposed LEP amendment is not inconsistent with this strategy.

Collaboration Activity 6:

Investigate public transport improvements including on-demand services.

Lead Agency: Transport for NSW

The proposed LEP amendment is not inconsistent with this activity.

GOAL 3 – GROWTH CHANGE AND OPPORTUNITY

- ***Objective 18 – Plan for sustainable communities***

Action 6 Undertake housing and employment land reviews for the Northern Rivers and Mid North Coast subregions to assess future supply needs and locations.

The proposed LEP amendment is not inconsistent with this action.

- ***Objective 19 – Public spaces and green infrastructure support connected and healthy communities***

Strategy 19.1 Councils should aim to undertake public space needs analysis and develop public space infrastructure strategies for improving access and quality of all public space to meet community need for public spaces. This could include:

- drawing on community feedback to identify the quantity, quality and the type of public space required
- prioritising the delivery of new and improved quality public space to areas of most need
- considering the needs of future and changing populations
- identifying walkable and cycleable connectivity improvements and quality and access requirements that would improve use and enjoyment of existing infrastructure
- consolidating, linking and enhancing high quality open spaces and recreational areas
- working in partnership with local Aboriginal communities to develop bespoke cultural infrastructure which responds to the needs of Aboriginal communities and

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 19.2 Public space improvements and new development should consider the local conditions, including embracing opportunities for greening and applying water sensitive urban design principles.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 19.3 Encourage the use of council owned land for temporary community events and creative practices where appropriate by reviewing development controls.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 19.4 Local environmental plan amendments that propose to reclassify public open space must consider the following:

- the role or potential role of the land within the open space network;
- how the reclassification is strategically supported by local strategies such as open space or asset rationalisation strategies;
- where land sales are proposed, details of how sale of land proceeds will be managed; and
- the net benefit or net gain to open space.

The proposed LEP amendment is not inconsistent with this strategy. The proposed amendment shall not reclassify public open space.

- ***Objective 20 – Celebrate local character***

Strategy 20.1 Ensure strategic planning and local plans recognise and enhance local character through use of local character statements in local plans and in accordance with the NSW Government's Local Character and Place Guideline.

The proposed LEP amendment is not inconsistent with this strategy.

Strategy 20.2 Celebrate buildings of local heritage significance by:

- retaining the existing use where possible
- establishing a common understanding of appropriate reuses
- exploring history and significance
- considering temporary uses
- designing for future change of use options.

The proposed LEP amendment is not inconsistent with this strategy. There are no buildings of local heritage significance on the site.

Coffs Harbour Narrative

Regional Priorities

- Manage and support growth in Coffs Harbour, anchored by the expanding health, education and creative industries sectors, and Coffs Harbour Airport Enterprise Park.
- Deliver suitable housing and job opportunities across the LGA including in Coffs Harbour, Woolgoolga, Moonee Beach, Toormina and Sapphire Beach.
- Protect environmental assets that sustain the agricultural and tourism industries.

Livable and Resilient

- Provide mitigation measures in response to climate change.
- Support environmentally sustainable development that is responsive to natural hazards.
- Retain and protect local biodiversity through effective management of environmental assets and ecological communities.

Productive and Connected

- Develop health, education and aviation precincts at the South Coffs Harbour Enterprise Area and Coffs Harbour Airport Enterprise Park, and new employment land at Woolgoolga and Bonville.

- Promote the sustainable use of important farmland areas through encouraging initiatives to support the development of the agricultural sector and agribusiness.
- Identify opportunities to expand nature based, adventure and cultural tourism assets including Solitary Islands Marine Park and other coastal, hinterland, and heritage assets, which will support the local ecotourism industry.

Housing and Place

- Enable 'better places' through placemaking initiatives, active transport, urban design specific to the North Coast, and facilitation of the '20 minute neighbourhood'.
- Deliver housing at Woolgoolga, North Boambee Valley and Bonville, and address the temporary worker housing needs associated with the Coffs Harbour Bypass.
- Enhance the variety of housing options available by promoting a compact urban form in and around the Coffs Harbour city centre and Park Beach.

Smart, Connected and Accessible (Infrastructure)

- Increase and strengthen social, economic and strategic links with the Mid North Coast subregion including Bellingen, Clarence Valley and Nambucca LGAs, particularly regarding the delivery of additional employment lands.
- Maximise opportunities associated with the increased connectivity provided by the new Coffs Harbour Bypass.

The proposed LEP amendment is not inconsistent with this narrative given that it shall only result in a minor increase for large lot residential land. The reduction in minimum lot size will enable more efficient use of rural residential land, and shall not negatively impact any biodiversity values. The proposed amendment is in keeping with the neighbourhood character, where other similarly sized lots can be found.

5. Is the planning proposal consistent with Council's endorsed local strategic planning statement, or another endorsed local strategy or strategic plan?

Council adopted its Local Strategic Planning Statement (LSPS) on 25 June 2020 for the whole of the Coffs Harbour LGA. The proposed LEP amendment accords with the vision and planning priorities within the Coffs Harbour LSPS, in particular:

Planning Priority	Action
5. Deliver greater housing supply, choice and diversity	A5.1 - Review and amend Council's local planning controls relating to housing supply, choice and diversity as outlined in the Local Growth Management Strategy
	A5.5 - Implement remaining actions from the Local Growth Management Strategy as funding allows

MyCoffs Community Strategic Plan 2032

The City's Community Strategic Plan is based on four overarching themes: Community Wellbeing; Community Prosperity; A Place for Community; and Sustainable Community Leadership. Within each theme there are a number of sustainable development objectives and outcomes.

The planning proposal supports the vision of the MyCoffs Community Strategic Plan 'connected, sustainable, thriving' and will assist in achieving the objectives of the Plan by: attracting people to work, live and visit; and by undertaking development that is environmentally, socially and economically responsible.

Theme	Objective	Outcome
A Place for Community: *Liveable neighbourhoods with a defined identity*	We are creating liveable places that are beautiful and appealing.	• The Coffs Harbour area is a place we are proud to call home. Our neighbourhoods have a strong sense of identity and are actively shaped by the local community. • Our neighbourhoods are people-friendly and liveable environments.
	We undertake development that is environmentally, socially and economically responsible.	• Population growth is focussed within the existing developed footprint. • Sustainable design and best practice development provide quality housing options.

Coffs Harbour Local Growth Management Strategy

The Planning Proposal is consistent with the Coffs Harbour Local Growth Management Strategy.

The site is included in an existing R5 Large Lot Residential zone, and the LGMS (Chapter 6 – Large Lot Residential Lands) addresses the potential reduction of minimum lot size in the R5 zone, where sufficiently justified. Section 6.7 within Chapter 6 of the LGMS states the following:

"It is also reasonable that if undeveloped land within zone R5 can justify a reduced lot size, then it should be considered through an applicant-initiated planning proposal. This would allow a merit case for a revised minimum lot size LEP amendment request to be submitted to Council, bearing in mind the underlying reasons for the standard in the first place and the objectives of zone R5."

The planning proposal is supported by Appendix 3 – Minimum Lot Size and Land Capability Assessment and Appendix 4 – Bushfire Assessment Report, which indicate that the reduction of the minimum lot size is appropriate.

6. Is the planning proposal consistent with any other applicable State and Regional Study or Strategies?

Coffs Harbour Regional City Action Plan 2036

The NSW Government developed the Coffs Harbour Regional City Action Plan (the Plan) to provide a framework to manage and shape the city's future growth. The Plan was finalised in March 2021 and it identifies 5 overarching goals which incorporate objectives and related actions. This planning proposal is consistent with the following relevant goals, objectives and associated actions within the Plan:

Goal	Objective	Actions

Live	17. Deliver a city that responds to Coffs Harbour's unique green cradle setting and offer housing choice.	17.1	Promote a sustainable growth footprint and enhance place-specific character and design outcomes.
		17.4	Support a greater variety and supply of affordable housing.

7. Is the planning proposal consistent with applicable state environmental planning policies (SEPP)?

The table provided in Appendix 1 provides an assessment of consistency against each State Environmental Planning Policy relevant to the Planning Proposal.

8. Is the planning proposal consistent with applicable Ministerial Directions (s9.1 directions)?

The table provided in Appendix 2 provides an assessment of consistency against Ministerial Planning Directions relevant to the Planning Proposal.

Section C – Environmental, social and economic impact

9. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

No; there is little likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the planning proposal. The site is largely cleared and has been developed for rural residential purposes, and does not contain any threatened species habitat, nor is it located near any such habitat.

Given the degraded and modified nature of the site, the lack of native vegetation and high conservation value habitat for flora and fauna, biodiversity values at the site are relatively low. Consequently, the planning proposal will have minimal impacts on biodiversity.

10. Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

Yes; the following matters have been identified as considerations for the planning proposal and any resulting development application.

Bushfire Risk

Bushfire risk has been addressed in a Bushfire Assessment Report (Appendix 4).

The report demonstrates that the planning proposal (and eventual two-lot large lot residential subdivision of the site) complies with relevant objectives (for the development type) and performance criteria within *Planning for Bushfire Protection 2019*.

Wastewater Capability Assessment

The Minimum Lot Size and Land Capability Assessment (Appendix 3) demonstrates that a minimum lot size of 4,500 m^2 is suitable to accommodate the sustainable application of wastewater (on-site) from both future and existing residential development, considering the intended future subdivision of the site for large lot purposes.

11. Has the planning proposal adequately addressed any social and economic effects?

Yes; the planning proposal is not likely to result in any adverse social or economic effects. Social benefits include a likely minor increase in housing stock in the Boambee locality, which may have flow on benefits to local community activities. Economic benefits are limited to the likely construction of a further dwelling on the site, and minor flow on benefits to local businesses.

Section D – State and Commonwealth interests

12. Is there adequate public infrastructure for the planning proposal?

Yes; the planning proposal is unlikely to create significant additional demand on existing public infrastructure. The proposed LEP amendment will enable the creation of one additional lot, which shall be serviced by on-site water collection and a waste-water treatment system, as there are no available City water and sewer mains. Vehicular access to the additional lot can be achieved from Ayrshire Park Drive through a right of carriageway arrangement.

13. What are the views of State and federal public authorities and government agencies consulted in order to inform the Gateway determination?

The NSW Department of Planning, Housing and Infrastructure issued a Gateway Determination for the planning proposal on 14 June 2024 (Appendix 7). The Gateway Determination requires consultation on the planning proposal with NSW Rural Fire Service.

The NSW Rural Fire Service shall be consulted during the public exhibition period.

Note: Following exhibition this section of the planning proposal will be updated to include details of the community consultation.

PART 4 – MAPS

Proposed amendments to Coffs Harbour LEP 2013 maps, as described in Part 2 of this planning proposal, are shown below.

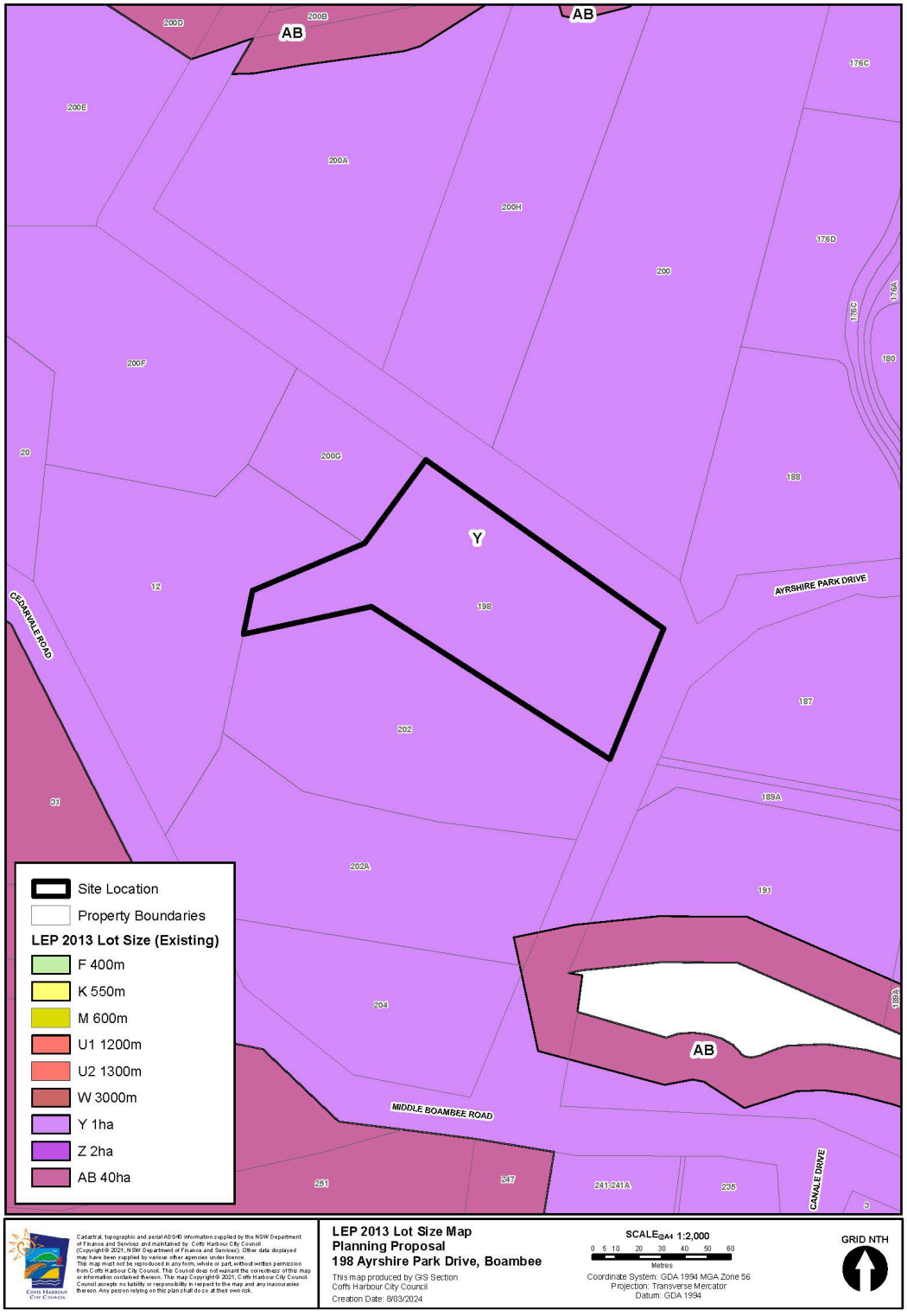


Figure 3: Existing Lot Size Map (Sheet LSZ_006B)

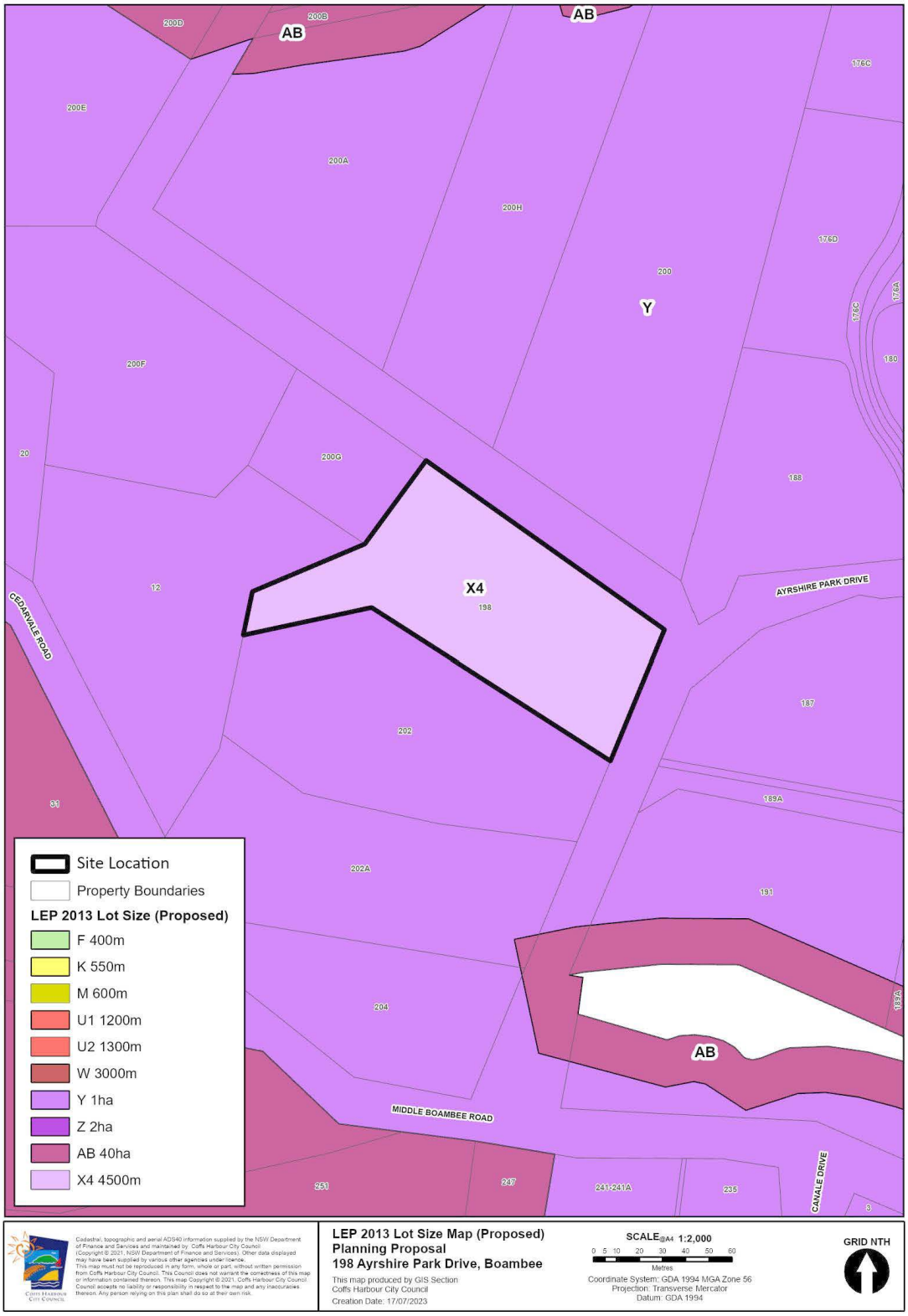


Figure 4: Proposed amendment to the Lot Size Map (Sheet LSZ_006B)

Technical Notes:

- *An amended version of this map sheet will be created and supplied to NSW Department of Planning, Housing and Infrastructure if Council resolves to initiate the planning proposal.*

PART 5 – COMMUNITY CONSULTATION

The Gateway determination issued by the NSW Department of Planning, Housing and Infrastructure specifies the community consultation requirements that must be undertaken for the planning proposal. The planning proposal shall be exhibited for a minimum of 20 working days and the NSW Rural Fire Service shall have the opportunity to comment on the planning proposal within 30 working days.

Public Exhibition of the planning proposal will include the following:

Advertisement

Placement of an online advertisement in the Coffs Newsroom.

Consultation with affected owners and adjoining landowners

Written notification of the public exhibition to the proponent, the landowner and adjoining/adjacent landowners.

Website

The planning proposal will be made publicly available on the City's Have Your Say Website at: https://haveyoursay.coffsharbour.nsw.gov.au/

Note: Following public exhibition, this section of the planning proposal will be updated to include details of the community consultation.

PART 6 –PROJECT TIMELINE

A project timeline is yet to be determined however the anticipated timeframes are provided below in Table 1, noting that the Gateway Determination issued by the NSW Department of Planning, Housing and Infrastructure will specify the date that the planning proposal is to be completed.

Table 1: Anticipated Timeline

Milestone	Anticipated Timeframe
Consideration by Council	May 2024
Commencement (date of Gateway determination)	June 2024
Pre-exhibition & agency consultation	July - August 2024
Consideration of submissions	August 2024
Post-Exhibition review and additional studies	August 2024
Reporting to Council for consideration	November 2024
Submission to Minister to make the plan (if not delegated) Submission to Minister for notification of the plan (if delegated)	December 2024
Gazettal of LEP Amendment	December 2024

APPENDIX 1 – CONSIDERATION OF STATE ENVIRONMENTAL PLANNING POLICIES

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Chapter 2 - Vegetation in Non-Rural Areas	No	N/A	The aims of this chapter of the Policy are: a) to protect the biodiversity values of trees and other vegetation in non-rural areas of the State, and b) to preserve the amenity of non-rural areas of the State through the preservation of trees and other vegetation. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 - Koala Habitat Protection 2020	No	N/A	The aims of this chapter of the Policy are to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline: a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and b) by encouraging the identification of areas of core koala habitat, and c) by encouraging the inclusion of areas of core koala habitat in environment protection zones. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 - Koala Habitat Protection 2021	No	N/A	The aims of this chapter of the Policy are to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 6 – Water Catchments	N/A	N/A	The City of Coffs Harbour is not listed in the "land to which this chapter applies" and thus this chapter of the policy does

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				not apply to the Coffs Harbour LGA at this point in time.
	Chapter 13 – Strategic Conservation Planning	N/A	N/A	The City of Coffs Harbour is not listed in the "land application map" and thus this chapter of the policy does not apply to the Coffs Harbour LGA at this point in time.
SEPP (Exempt and Complying Development Codes) 2008	N/A – this is a standalone State Environmental Planning Policy	No	N/A	This Policy aims to provide streamlined assessment processes for development that complies with specified development standards by: a) providing exempt and complying development codes that have State-wide application, and b) identifying, in the exempt development codes, types of development that are of minimal environmental impact that may be carried out without the need for development consent, and c) identifying, in the complying development codes, types of complying development that may be carried out in accordance with a complying development certificate as defined in the Act, and d) enabling the progressive extension of the types of development in this Policy, and e) providing transitional arrangements for the introduction of the State-wide codes, including the amendment of other environmental planning instruments. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this SEPP.
State Environmental Planning Policy (Housing) 2021	N/A – this is a standalone State Environmental Planning Policy	No	N/A	The principles of this Policy are: a) enabling the development of diverse housing types, including purpose-built rental housing, b) encouraging the development of housing that will meet the needs of more vulnerable members of the community, including very low to moderate income households, seniors and people with a disability, c) ensuring new housing development provides residents with a reasonable level of amenity, promoting the planning and delivery of housing in locations where it will make good use

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				of existing and planned infrastructure and services, d) minimising adverse climate and environmental impacts of new housing development, e) reinforcing the importance of designing housing in a way that reflects and enhances its locality, f) supporting short-term rental accommodation as a home-sharing activity and contributor to local economies, while managing the social and environmental impacts from this use, g) mitigating the loss of existing affordable rental housing. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this SEPP.
State Environmental Planning Policy (Industry and Employment) 2021	Chapter 3 - Advertising and Signage	No	N/A	This aims of this chapter of the Policy are: a) to ensure that signage (including advertising): (i) is compatible with the desired amenity and visual character of an area, and (ii) provides effective communication in suitable locations, and (iii) is of high quality design and finish, and b) to regulate signage (but not content) under Part 4 of the Act, and c) to provide time-limited consents for the display of certain advertisements, and d) to regulate the display of advertisements in transport corridors, and e) to ensure that public benefits may be derived from advertising in and adjacent to transport corridors. This Policy does not regulate the content of signage and does not require consent for a change in the content of signage. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Planning Systems) 2021.	Chapter 2 -State and Regional Development	No	N/A	The aims of this chapter of the Policy are: a) to identify development that is State significant development, b) to identify development that is State significant infrastructure and critical State significant infrastructure,

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				c) to identify development that is regionally significant development. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 - Aboriginal Land	N/A	N/A	The aims of this Chapter of the Policy are: a) to provide for development delivery plans for areas of land owned by Aboriginal Land Councils to be considered when development applications are considered, and b) to declare specified development carried out on land owned by Aboriginal Land Councils to be regionally significant development. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 - Concurrences and Consents	No	N/A	The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Precincts—Central River City) 2021	Chapter 2 -State Significant Precincts	No	N/A	The aims of this chapter of the Policy are to: a) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State, b) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Precincts—	Chapter 2 -State Significant Precincts	No	N/A	The aims of this chapter of the Policy are to:

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
Eastern Harbour City) 2021				c) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State, d) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Precincts—Regional) 2021	Chapter 2 -State Significant Precincts	N/A	N/A	The aims of this chapter of the Policy are to: a) to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State, b) to facilitate service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Primary Production) 2021	Chapter 2 - Primary Production and Rural Development	No	N/A	The aims of this chapter of the Policy are to: a) to facilitate the orderly economic use and development of lands for primary production, b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources,

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations, d) to simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts, e) to encourage sustainable agriculture, including sustainable aquaculture, f) to require consideration of the effects of all proposed development in the State on oyster aquaculture, g) to identify aquaculture that is to be treated as designated development using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Resilience and Hazards) 2021	Chapter 2 - Coastal Management	No	N/A	The aim of this chapter of the Policy is to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area, by: a) managing development in the coastal zone and protecting the environmental assets of the coast, and b) establishing a framework for land use planning to guide decision-making in the coastal zone, and c) mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the Coastal Management Act 2016. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 – Hazardous and	No	N/A	The aims of this chapter of the Policy are:

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
	Offensive Development			a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy, and c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division, and d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and f) to require the advertising of applications to carry out any such development. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 – Remediation of Land	No	N/A	The aims of this chapter of the Policy are to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment— a) by specifying when consent is required, and when it is not required, for a remediation work, and b) by specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular, and

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				c) by requiring that a remediation work meet certain standards and notification requirements. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Resources and Energy) 2021	Chapter 2 - Mining, Petroleum Production and Extractive Industries	No	N/A	The aims of this chapter of the Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries: a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and b1) to promote the development of significant mineral resources, and c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and d) to establish a gateway assessment process for certain mining and petroleum (oil and gas) development: (i) to recognise the importance of agricultural resources, and (ii) to ensure protection of strategic agricultural land and water resources, and (iii) to ensure a balanced use of land by potentially competing industries, and (iv) to provide for the sustainable growth of mining, petroleum and agricultural industries. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
State Environmental Planning Policy (Sustainable Buildings) 2022	Chapter 2 - Standards for residential development - BASIX	No	N/A	The aims of this SEPP are to encourage the design and delivery of sustainable buildings that minimise energy and water use.

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				The proposed LEP amendment does not contain provisions that contradict or hinder the application of Chapter 2 of the SEPP.
	Chapter 3 - Standards for non-residential development	No	N/A	The aims of this SEPP are to encourage the design and delivery of sustainable buildings that minimise energy and water use. The proposed LEP amendment does not contain provisions that contradict or hinder the application of Chapter 3 of the SEPP.
State Environmental Planning Policy (Transport and Infrastructure) 2021	Chapter 2 - Infrastructure	No	N/A	The aim of this chapter of the Policy is to facilitate the effective delivery of infrastructure across the State by: a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and b) providing greater flexibility in the location of infrastructure and service facilities, and c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing, and g) providing opportunities for infrastructure to demonstrate good design outcomes. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 3 - Educational Establishments	No	N/A	The aim of this chapter of the Policy is to facilitate the effective delivery of

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
	and Child Care Facilities			educational establishments and early education and care facilities across the State by: a) improving regulatory certainty and efficiency through a consistent planning regime for educational establishments and early education and care facilities, and b) simplifying and standardising planning approval pathways for educational establishments and early education and care facilities (including identifying certain development of minimal environmental impact as exempt development), and c) establishing consistent State-wide assessment requirements and design considerations for educational establishments and early education and care facilities to improve the quality of infrastructure delivered and to minimise impacts on surrounding areas, and d) allowing for the efficient development, redevelopment or use of surplus government-owned land (including providing for consultation with communities regarding educational establishments in their local area), and e) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing, and f) aligning the NSW planning framework with the National Quality Framework that regulates early education and care services, and g) ensuring that proponents of new developments or modified premises meet the applicable requirements of the National Quality Framework for early education and care services, and of the corresponding regime for State regulated education and care services, as part of the planning approval and development process, and h) encouraging proponents of new developments or modified premises and consent authorities to facilitate the joint and shared use of the facilities of educational establishments with the community through appropriate design.

State Environmental Planning Policy	Relevant Chapter	Applicable	Consistent	Comment
				The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.
	Chapter 4 – Major Infrastructure Corridors	No	N/A	The aims of this chapter of the Policy are: a) to identify land that is intended to be used in the future as an infrastructure corridor, b) to establish appropriate planning controls for the land for the following purposes— (i) to allow the ongoing use and development of the land until it is needed for the future infrastructure corridor, (ii) to protect the land from development that would adversely impact on or prevent the land from being used as an infrastructure corridor in the future. The proposed LEP amendment does not contain provisions that contradict or hinder the application of this chapter of the SEPP.

APPENDIX 2 – CONSIDERATION OF MINISTERIAL PLANNING DIRECTIONS

S9.1 Direction	Applicable	Consistent	Comment
Focus area 1: Planning Systems			
1.1 Implementation of Regional Plans	This direction applies to a relevant planning authority when preparing a planning proposal for land to which a Regional Plan has been released by the Minister for Planning and Public Spaces. Planning proposals must be consistent with a Regional Plan released by the Minister for Planning and Public Spaces. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary), that: (a) the extent of inconsistency with the Regional Plan is of minor significance, and (b) the planning proposal achieves the overall intent of the Regional Plan and does not undermine the achievement of the Regional Plan's vision, land use strategy, goals, directions or actions.	Yes	The North Coast Regional Plan 2041 (NCRP) applies to the Coffs Harbour LGA. The NCRP includes strategies and actions on environmental, economic and social (community) opportunities, as well as maintaining character and housing. Specific responses to relevant strategies and the associated actions and activities contained within the NCRP are provided in Part 3, Section B (4) above. It is considered that the planning proposal complies with the NCRP.
1.2 Development of Aboriginal Land Council land	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
1.3 Approval and Referral Requirements	This direction applies to all relevant planning authorities when preparing a planning proposal. A planning proposal to which this direction applies must: (a) minimise the inclusion of provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority, and (b) not contain provisions requiring concurrence, consultation or referral of a Minister or public authority unless the relevant planning authority has obtained the approval of: i. the appropriate Minister or public authority, and ii. the Planning Secretary (or an officer of the Department nominated by the Secretary), prior to undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act, and	Yes	The planning proposal does not include provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority. It also does not identify development as designated development.

S9.1 Direction	Applicable	Consistent	Comment
	(c) not identify development as designated development unless the relevant planning authority: i. can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the class of development is likely to have a significant impact on the environment, and ii. has obtained the approval of the Planning Secretary (or an officer of the Department nominated by the Secretary) prior to undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act. A planning proposal must be substantially consistent with the terms of this direction.		
1.4 Site Specific Provisions	This direction applies to all relevant planning authorities when preparing a planning proposal that will allow a particular development to be carried out. (1) A planning proposal that will amend another environmental planning instrument in order to allow particular development to be carried out must either: (a) allow that land use to be carried out in the zone the land is situated on, or (b) rezone the site to an existing zone already in the environmental planning instrument that allows that land use without imposing any development standards or requirements in addition to those already contained in that zone, or (c) allow that land use on the relevant land without imposing any development standards or requirements in addition to those already contained in the principal environmental planning instrument being amended. (2) A planning proposal must not contain or refer to drawings that show details of the proposed development. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance.	Yes	The planning proposal does not allow a particular development to be carried out, it shall only reduce the minimum lot size to enable subdivision.
1.4A Exclusion of Development Standards from Variation	This direction applies when a planning proposal authority prepares a planning proposal that proposes to introduce or alter an existing exclusion to clause 4.6 of a Standard	N/A	The planning proposal will not introduce or alter an existing exclusion to clause 4.6 of Coffs Harbour LEP 2013.

S9.1 Direction	Applicable	Consistent	Comment
	Instrument LEP or an equivalent provision of any other environmental planning instrument.		
Focus area 1: Planning Systems – Place Based			
Directions 1.5 – 1.22 do not apply to the Coffs Harbour LGA.			
Focus area 2: Design and Place			
Directions yet to be included.			
Focus area 3: Biodiversity and Conservation			
3.1 Conservation Zones	This direction applies to all relevant planning authorities when preparing a planning proposal. (1) A planning proposal must include provisions that facilitate the protection and conservation of environmentally sensitive areas. (2) A planning proposal that applies to land within a conservation zone or land otherwise identified for environment conservation/protection purposes in a LEP must not reduce the conservation standards that apply to the land (including by modifying development standards that apply to the land). This requirement does not apply to a change to a development standard for minimum lot size for a dwelling in accordance with Direction 9.3 (2) of "*Rural Lands*". A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or	Yes	The site does not include any environmentally sensitive areas. The site does not contain land within a conservation zone or land otherwise identified for environment conservation/protection purposes.

S9.1 Direction	Applicable	Consistent	Comment
	(c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) is of minor significance.		
3.2 Heritage Conservation	This direction applies to all relevant planning authorities when preparing a planning proposal. A planning proposal must contain provisions that facilitate the conservation of: (a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area, (b) Aboriginal objects or Aboriginal places that are protected under the *National Parks and Wildlife Act 1974*, and (c) Aboriginal areas, Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey prepared by or on behalf of an Aboriginal Land Council, Aboriginal body or public authority and provided to the relevant planning authority, which identifies the area, object, place or landscape as being of heritage significance to Aboriginal culture and people. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that: (a) the environmental or indigenous heritage significance of the item, area, object or place is conserved by existing or draft environmental planning instruments, legislation, or regulations that apply to the land, or (b) the provisions of the planning proposal that are inconsistent are of minor significance.	Yes	*European Heritage* The site does not contain any items listed as Heritage Items in Schedule 5 of Coffs Harbour LEP 2013 or the State Heritage Register. There are no European Heritage issues that would prevent a reduction in minimum lot size applying to the land. *Aboriginal Cultural Heritage* The site does not contain any mapped known or predictive Aboriginal Cultural Heritage (ACH), and an AHIMS search has not revealed any ACH sites on or near the site.
3.3 Sydney Drinking Water Catchments	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.4 Application of C2 and C3	This direction does not currently apply to the Coffs Harbour LGA.	N/A	

S9.1 Direction	Applicable	Consistent	Comment
Zones and Environmental Overlays in Far North Coast LEPs			
3.5 Recreation Vehicle Areas	A planning proposal must not enable land to be developed for the purpose of a recreation vehicle area (within the meaning of the *Recreation Vehicles Act 1983*): (a) where the land is within a conservation zone, (b) where the land comprises a beach or a dune adjacent to or adjoining a beach, (c) where the land is not within an area or zone referred to in paragraphs (a) or (b) unless the relevant planning authority has taken into consideration: i. the provisions of the guidelines entitled Guidelines for the Selection, Establishment and Maintenance of Recreation Vehicle Areas, Soil Conservation Service of NSW, September 1985, and ii. the provisions of the guidelines entitled Recreation Vehicles Act 1983, Guidelines for Selection, Design and Operation of Recreation Vehicle Areas, State Pollution Control Commission, September 1985. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan	Yes	The planning proposal does not enable land to be developed for the purpose of a recreation vehicle area (within the meaning of the *Recreation Vehicles Act 1983*).

S9.1 Direction	Applicable	Consistent	Comment
	prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) of minor significance.		
3.6 Strategic Conservation Planning	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.7 Public Bushland	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.8 Willandra Lakes Region	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.9 Sydney Harbour Foreshores and Waterways Area	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
3.10 Water Catchment Protection	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
Focus Area 4: Resilience and Hazards			
4.1 Flooding	This direction applies to all relevant planning authorities that are responsible for flood prone land when preparing a planning proposal that creates, removes or alters a zone or a provision that affects flood prone land. (1) A planning proposal must include provisions that give effect to and are consistent with: (a) the NSW Flood Prone Land Policy, (b) the principles of the Floodplain Development Manual 2005, (c) the Considering flooding in land use planning guideline 2021, and (d) any adopted flood study and/or floodplain risk management plan prepared in accordance with the principles of the Floodplain Development Manual 2005 and adopted by the relevant council. (2) A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Business, Industrial or Special Purpose Zones.	N/A	The site is not identified as flood prone land.

S9.1 Direction	Applicable	Consistent	Comment
	(3) A planning proposal must not contain provisions that apply to the flood planning area which: (a) permit development in floodway areas, (b) permit development that will result in significant flood impacts to other properties, (c) permit development for the purposes of residential accommodation in high hazard areas, (d) permit a significant increase in the development and/or dwelling density of that land, (e) permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate, (f) permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require development consent, (g) are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or (h) permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event. (4) A planning proposal must not contain provisions that apply to areas between the flood planning area and probable maximum flood to which Special Flood Considerations apply which: (a) permit development in floodway areas, (b) permit development that will result in significant flood impacts to other properties, (c) permit a significant increase in the dwelling density of that land, (d) permit the development of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals,		

S9.1 Direction	Applicable	Consistent	Comment
	residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate, (e) are likely to affect the safe occupation of and efficient evacuation of the lot, or (f) are likely to result in a significantly increased requirement for government spending on emergency management services, and flood mitigation and emergency response measures, which can include but not limited to road infrastructure, flood mitigation infrastructure and utilities. (5) For the purposes of preparing a planning proposal, the flood planning area must be consistent with the principles of the Floodplain Development Manual 2005 or as otherwise determined by a Floodplain Risk Management Study or Plan adopted by the relevant council. A planning proposal may be inconsistent with this direction only if the planning proposal authority can satisfy the Planning Secretary (or their nominee) that: (a) the planning proposal is in accordance with a floodplain risk management study or plan adopted by the relevant council in accordance with the principles and guidelines of the *Floodplain Development Manual 2005*, or (b) where there is no council adopted floodplain risk management study or plan, the planning proposal is consistent with the flood study adopted by the council prepared in accordance with the principles of the *Floodplain Development Manual 2005* or (c) the planning proposal is supported by a flood and risk impact assessment accepted by the relevant planning authority and is prepared in accordance with the principles of *the Floodplain Development Manual 2005* and consistent with the relevant planning authorities' requirements, or (d) the provisions of the planning proposal that are inconsistent are of minor significance as determined by the relevant planning authority.		
4.2 Coastal Management	This direction applies when a planning proposal authority prepares a planning proposal that applies to land that is within the coastal zone, as defined under the *Coastal Management Act*	N/A	The site is not within the coastal zone, as defined under the *Coastal Management Act 2016* – comprising the coastal

S9.1 Direction	Applicable	Consistent	Comment
	2016 -comprising the coastal wetlands and littoral rainforests area, coastal vulnerability area, coastal environment area and coastal use area -and as identified by chapter 3 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021.* (1) A planning proposal must include provisions that give effect to and are consistent with: (a) the objects of the *Coastal Management Act 2016* and the objectives of the relevant coastal management areas; (b) the NSW Coastal Management Manual and associated Toolkit; (c) NSW Coastal Design Guidelines 2003; and (d) any relevant Coastal Management Program that has been certified by the Minister, or any Coastal Zone Management Plan under the *Coastal Protection Act 1979* that continues to have effect under clause 4 of Schedule 3 to the *Coastal Management Act 2016*, that applies to the land. (2) A planning proposal must not rezone land which would enable increased development or more intensive land-use on land: (a) within a coastal vulnerability area identified by the *State Environmental Planning Policy (Resilience and Hazards) 2021*; or (b) that has been identified as land affected by a current or future coastal hazard in a local environmental plan or development control plan, or a study or assessment undertaken: i. by or on behalf of the relevant planning authority and the planning proposal authority, or ii. by or on behalf of a public authority and provided to the relevant planning authority and the planning proposal authority. (3) A planning proposal must not rezone land which would enable increased development or more intensive land-use on land within a coastal wetlands and littoral rainforests area identified by chapter 3 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021.* (4) A planning proposal for a local environmental plan may propose to amend the following maps, including increasing or decreasing the land within these maps, under the *State Environmental Planning Policy (Resilience and Hazards) 2021*:		wetlands and littoral rainforests area, coastal vulnerability area, coastal environment area or coastal use area – and as identified *by State Environmental Planning Policy (Biodiversity and Conservation) 2021.*

S9.1 Direction	Applicable	Consistent	Comment
	(a) Coastal wetlands and littoral rainforests area map; (b) Coastal vulnerability area map; (c) Coastal environment area map; and (d) Coastal use area map. Such a planning proposal must be supported by evidence in a relevant Coastal Management Program that has been certified by the Minister, or by a *Coastal Zone Management Plan* under the *Coastal Protection Act 1979* that continues to have effect under clause 4 of Schedule 3 to the *Coastal Management Act 2016*. A planning proposal may be inconsistent with the terms of this direction only if the planning proposal authority can satisfy the Planning Secretary (or their nominee) that the provisions of the planning proposal that are inconsistent are: (a) justified by a study or strategy prepared in support of the planning proposal which gives consideration to the objective of this direction, or (b) in accordance with any relevant Regional Strategic Plan or District Strategic Plan, prepared under Division 3.1 of the EP&A Act by the relevant strategic planning authority, which gives consideration to the objective of this direction, or (c) of minor significance.		
4.3 Planning for Bushfire Protection	This direction applies to all local government areas when a relevant planning authority prepares a planning proposal that will affect, or is in proximity to land mapped as bushfire prone land. In the preparation of a planning proposal, the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a Gateway determination under section 56 of the Act, and prior to undertaking community consultation in satisfaction of section 57 of the Act, and take into account any comments so made. A planning proposal must: (a) have regard to *Planning for Bushfire Protection 2019*, (b) introduce controls that avoid placing inappropriate developments in hazardous areas, and (c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).	No	The site is mapped as bushfire prone land. The Bushfire Assessment Report (Appendix 4) demonstrates that future development of the site by way of subdivision can comply with Planning for Bushfire Protection 2019. Upon receipt of a Gateway Determination, the NSW Rural Fire Service shall be consulted to determine if the LEP amendment is justifiably inconsistent to this direction.

S9.1 Direction	Applicable	Consistent	Comment
	A planning proposal must, where development is proposed, comply with the following provisions, as appropriate: (a) provide an Asset Protection Zone (APZ) incorporating at a minimum: (i) an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and (ii) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road, (b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the *Rural Fires Act 1997*), the APZ provisions must be complied with, (c) contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks, (d) contain provisions for adequate water supply for firefighting purposes, (e) minimise the perimeter of the area of land interfacing the hazard which may be developed, (f) introduce controls on the placement of combustible materials in the Inner Protection Area. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the council has obtained written advice from the Commissioner of the NSW Rural Fire Service to the effect that, notwithstanding the non-compliance, the NSW Rural Fire Service does not object to the progression of the planning proposal.		
4.4 Remediation of Contaminated Land	This direction applies when a planning proposal authority prepares a planning proposal that applies to: (a) land that is within an investigation area within the meaning of the *Contaminated Land Management Act 1997*,	N/A	A review of the City's records does not identify any past activities on the site that would suggest potential land contamination.

S9.1 Direction	Applicable	Consistent	Comment
	(b) land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out, (c) the extent to which it is proposed to carry out development on it for residential, educational, recreational or childcare purposes, or for the purposes of a hospital – land: i. in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and ii. on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge). (1) A planning proposal authority must not include in a particular zone (within the meaning of the local environmental plan) any land to which this direction applies if the inclusion of the land in that zone would permit a change of use of the land, unless: (a) the planning proposal authority has considered whether the land is contaminated, and (b) if the land is contaminated, the planning proposal authority is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and (c) if the land requires remediation to be made suitable for any purpose for which land in that zone is permitted to be used, the planning proposal authority is satisfied that the land will be so remediated before the land is used for that purpose. In order to satisfy itself as to paragraph 1(c), the planning proposal authority may need to include certain provisions in the local environmental plan. (2) Before including any land to which this direction applies in a particular zone, the planning proposal authority is to obtain and have regard to a report specifying the findings of a preliminary investigation of the land carried out in accordance with the contaminated land planning guidelines.		The site is not: • land that is within an investigation area within the meaning of the *Contaminated Land Management Act 1997*, or • land on which development for a purpose referred to in Table 1 of the contaminated land planning guidelines is being, or is known to have been, carried out.

S9.1 Direction	Applicable	Consistent	Comment
4.5 Acid Sulfate Soils	This direction applies to all relevant planning authorities that are responsible for land having a probability of containing acid sulfate soils when preparing a planning proposal that will apply to land having a probability of containing acid sulfate soils as shown on the Acid Sulfate Soils Planning Maps held by the Department of Planning, Housing and Infrastructure. (1) The relevant planning authority must consider the Acid Sulfate Soils Planning Guidelines adopted by the Planning Secretary when preparing a planning proposal that applies to any land identified on the Acid Sulfate Soils Planning Maps as having a probability of acid sulfate soils being present. (2) When a relevant planning authority is preparing a planning proposal to introduce provisions to regulate works in acid sulfate soils, those provisions must be consistent with: (a) the Acid Sulfate Soils Model LEP in the Acid Sulfate Soils Planning Guidelines adopted by the Planning Secretary, or (b) other such provisions provided by the Planning Secretary that are consistent with the Acid Sulfate Soils Planning Guidelines. (3) A relevant planning authority must not prepare a planning proposal that proposes an intensification of land uses on land identified as having a probability of containing acid sulfate soils on the Acid Sulfate Soils Planning Maps unless the relevant planning authority has considered an acid sulfate soils study assessing the appropriateness of the change of land use given the presence of acid sulfate soils. The relevant planning authority must provide a copy of any such study to the Planning Secretary prior to undertaking community consultation in satisfaction of clause 4 of Schedule 1 to the Act. (4) Where provisions referred to under 2(a) and 2(b) above of this direction have not been introduced and the relevant planning authority is preparing a planning proposal that proposes an intensification of land uses on land identified as having a probability of acid sulfate soils on the Acid Sulfate Soils Planning Maps, the planning proposal must contain provisions consistent with 2(a) and 2(b). A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning	N/A	The site does not contain the probability of containing acid sulphate soils.

S9.1 Direction	Applicable	Consistent	Comment
	Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (b) of minor significance.		
4.6 Mine Subsidence and Unstable Land	This direction applies when a relevant planning authority prepares a planning proposal that permits development on land that is within a declared mine subsidence district in the Coal Mine Subsidence Compensation Regulation 2017 pursuant to section 20 of the Coal Mine Subsidence Compensation Act 2017, or has been identified as unstable in a study, strategy or other assessment undertaken by or on behalf of the relevant planning authority or by or on behalf of a public authority and provided to the relevant planning authority. (1) When preparing a planning proposal that would permit development on land that is within a declared mine subsidence district, a relevant planning authority must: (a) consult Subsidence Advisory NSW to ascertain: i. if Subsidence Advisory NSW has any objection to the draft local environmental plan, and the reason for such an objection, and ii. the scale, density and type of development that is appropriate for the potential level of subsidence, and (b) incorporate provisions into the draft Local Environmental Plan that are consistent with the recommended scale, density and type of development recommended under 1(a)(ii), and (c) include a copy of any information received from Subsidence Advisory NSW with the statement to the Planning Secretary (or an officer of the Department nominated by the Secretary prior to undertaking community consultation in satisfaction of Schedule 1 to the Act. (2) A planning proposal must not permit development on land that has been identified as unstable as referred to in the application section of this direction. A planning proposal may be inconsistent with the terms of this direction only if the relevant	N/A	The planning proposal does not apply to land that: • is within a declared mine subsidence district, or • has been identified as unstable in a study, strategy or other assessment undertaken by or on behalf of a public authority or by or on behalf of a public authority and provided to the relevant planning authority.

S9.1 Direction	Applicable	Consistent	Comment
	planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) of minor significance.		
Focus Area 5: Transport and Infrastructure			
5.1 Integrating Land Use and Transport	This direction applies to all relevant planning authorities when preparing a planning proposal that will create, alter or remove a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes. (1) A planning proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of: (a) Improving Transport Choice – Guidelines for planning and development (DUAP 2001), and (b) The Right Place for Business and Services – Planning Policy (DUAP 2001). A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and	Yes	The proposal shall alter a provision relating to land zoned for residential, by reducing the applicable minimum lot size. The proposal is consistent with the Improving Transport Choice – Guidelines for planning and development (DUAP 2001), and The Right Place for Business and Services – Planning Policy (DUAP 2001). The proposal is deemed to be of minor significance as it accords with the City's Local Growth Management Strategy and will not result in a substantial increase of movement due to the potential of a single additional lot.

S9.1 Direction	Applicable	Consistent	Comment
	ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) of minor significance.		
5.2 Reserving Land for Public Purposes	This direction applies to all relevant planning authorities when preparing a planning proposal. (1) A planning proposal must not create, alter or reduce existing zonings or reservations of land for public purposes without the approval of the relevant public authority and the Planning Secretary (or an officer of the Department nominated by the Secretary). (2) When a Minister or public authority requests a relevant planning authority to reserve land for a public purpose in a planning proposal and the land would be required to be acquired under Division 3 of Part 2 of the Land Acquisition (Just Terms Compensation) Act 1991, the relevant planning authority must: (a) reserve the land in accordance with the request, and (b) include the land in a zone appropriate to its intended future use or a zone advised by the Planning Secretary (or an officer of the Department nominated by the Secretary), and (c) identify the relevant acquiring authority for the land. (3) When a Minister or public authority requests a relevant planning authority to include provisions in a planning proposal relating to the use of any land reserved for a public purpose before that land is acquired, the relevant planning authority must: (a) include the requested provisions, or (b) take such other action as advised by the Planning Secretary (or an officer of the Department nominated by the Secretary) with respect to the use of the land before it is acquired.	N/A	The planning proposal does not create, alter or reduce land reserved for a public purpose.

S9.1 Direction	Applicable	Consistent	Comment
	(4) When a Minister or public authority requests a relevant planning authority to include provisions in a planning proposal to rezone and/or remove a reservation of any land that is reserved for public purposes because the land is no longer designated by that public authority for acquisition, the relevant planning authority must rezone and/or remove the relevant reservation in accordance with the request. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that: (a) with respect to a request referred to in paragraph (4), further information is required before appropriate planning controls for the land can be determined, or (b) the provisions of the planning proposal that are inconsistent with the terms of this direction are of minor significance.		
5.3 Development Near Regulated Airports and Defence Airfields	This direction applies to all relevant planning authorities when preparing a planning proposal that will create, alter or remove a zone or a provision relating to land near a regulated airport which includes a defence airfield. (1) In the preparation of a planning proposal that sets controls for development of land near a regulated airport, the relevant planning authority must: (a) consult with the lessee/operator of that airport; (b) take into consideration the operational airspace and any advice from the lessee/operator of that airport; (c) for land affected by the operational airspace, prepare appropriate development standards, such as height controls. (d) not allow development types that are incompatible with the current and future operation of that airport. (2) In the preparation of a planning proposal that sets controls for development of land near a core regulated airport, the relevant planning authority must: (a) consult with the Department of the Commonwealth responsible for airports and the lessee/operator of that airport; (b) for land affected by the prescribed airspace (as defined in clause 6(1) of the	N/A	The planning proposal does not create, alter or remove a zone or a provision relating to land near a regulated airport including a defence airfield.

S9.1 Direction	Applicable	Consistent	Comment
	Airports (Protection of Airspace) Regulation 1996, prepare appropriate development standards, such as height controls. (c) not allow development types that are incompatible with the current and future operation of that airport. (d) obtain permission from that Department of the Commonwealth, or their delegate, where a planning proposal seeks to allow, as permissible with consent, development that would constitute a controlled activity as defined in section 182 of the *Airports Act 1996*. This permission must be obtained prior to undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act. (3) In the preparation of a planning proposal that sets controls for the development of land near a defence airfield, the relevant planning authority must: (a) consult with the Department of Defence if: i. the planning proposal seeks to exceed the height provisions contained in the *Defence Regulations 2016 – Defence Aviation Areas* for that airfield; or ii. no height provisions exist in the *Defence Regulations 2016 – Defence Aviation Areas* for the airfield and the proposal is within 15km of the airfield. (b) for land affected by the operational airspace, prepare appropriate development standards, such as height controls. (c) not allow development types that are incompatible with the current and future operation of that airfield. (4) A planning proposal must include a provision to ensure that development meets *Australian Standard 2021 – 2015, Acoustic-Aircraft Noise Intrusion – Building siting and construction* with respect to interior noise levels, if the proposal seeks to rezone land: (a) for residential purposes or to increase residential densities in areas where the Australian Noise Exposure Forecast (ANEF) is between 20 and 25; or (b) for hotels, motels, offices or public buildings where the ANEF is between 25 and 30; or		

S9.1 Direction	Applicable	Consistent	Comment
	(c) for commercial or industrial purposes where the ANEF is above 30. (5) A planning proposal must not contain provisions for residential development or to increase residential densities within the 20 Australian Noise Exposure Concept (ANEC)/ANEF contour for Western Sydney Airport. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary, which: i. gives consideration to the objectives of this direction; and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction; or (c) in accordance with the relevant Regional Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objectives of this direction.		
5.4 Shooting Ranges	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect, create, alter or remove a zone or a provision relating to land adjacent to and/ or adjoining an existing shooting range. (1) A planning proposal must not seek to rezone land adjacent to and/ or adjoining an existing shooting range that has the effect of: (a) permitting more intensive land uses than those which are permitted under the existing zone; or (b) permitting land uses that are incompatible with the noise emitted by the existing shooting range. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the	N/A	The planning proposal does not create, alter or remove a zone or provision relating to land adjacent to and/or adjoining an existing shooting range.

S9.1 Direction	Applicable	Consistent	Comment
	provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary, which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) is of minor significance.		
Focus area 6: Housing			
6.1 Residential Zones	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect land within an existing or proposed residential zone (including the alteration of any existing residential zone boundary), or any other zone in which significant residential development is permitted or proposed to be permitted. (1) A planning proposal must include provisions that encourage the provision of housing that will: (a) broaden the choice of building types and locations available in the housing market, and (b) make more efficient use of existing infrastructure and services, and (c) reduce the consumption of land for housing and associated urban development on the urban fringe, and (d) be of good design. (2) A planning proposal must, in relation to land to which this direction applies: (a) contain a requirement that residential development is not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service it), and (b) not contain provisions which will reduce the permissible residential density of land. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department	Yes	The planning proposal will enable the creation of one additional lot on the site. The potential for an additional lot will broaden the locality for further housing development. The planning proposal relates to land that has infrastructure and services available to it that are suitable for rural residential purposes. Appropriate planning controls are also contained within Coffs Harbour DCP 2015 to ensure that future development is of good design.

S9.1 Direction	Applicable	Consistent	Comment
	nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) of minor significance.		
6.2 Caravan Parks and Manufactured Home Estates	This direction applies to all relevant planning authorities when preparing a planning proposal. This direction does not apply to Crown land reserved or dedicated for any purposes under the *Crown Land Management Act 2016,* except Crown land reserved for accommodation purposes, or land dedicated or reserved under the *National Parks and Wildlife Act 1974.* (1) In identifying suitable zones, locations and provisions for caravan parks in a planning proposal, the relevant planning authority must: (a) retain provisions that permit development for the purposes of a caravan park to be carried out on land, and (b) retain the zonings of existing caravan parks, or in the case of a new principal LEP zone the land in accordance with an appropriate zone under the *Standard Instrument (Local Environmental Plans) Order 2006* that would facilitate the retention of the existing caravan park. (2) In identifying suitable zones, locations and provisions for manufactured home estates (MHEs) in a planning proposal, the relevant planning authority must:	Yes	The planning proposal does not identify suitable zones, locations or provisions for caravan parks or manufactured home estates.

S9.1 Direction	Applicable	Consistent	Comment
	(a) take into account the categories of land set out in Schedule 6 of *State Environmental Planning Policy (Housing)* as to where MHEs should not be located, (b) take into account the principles listed in clause 9 Schedule 5 of *State Environmental Planning Policy (Housing)* (which relevant planning authorities are required to consider when assessing and determining the development and subdivision proposals), and (c) include provisions that the subdivision of MHEs by long term lease of up to 20 years or under the *Community Land Development Act 1989* be permissible with consent. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) of minor significance.		
Focus area 7: Industry and Employment			
7.1 Employment Zones	This direction applies to all relevant planning authorities when preparing a planning proposal that will affect land within an existing or proposed business or industrial zone (including the alteration of any existing business or industrial zone boundary). A planning proposal must: (a) give effect to the objectives of this direction,	N/A	The planning proposal will not affect land within an existing or proposed employment zone (including the alteration of any employment zone boundary).

S9.1 Direction	Applicable	Consistent	Comment
	(b) retain the areas and locations of existing business and industrial zones, (c) not reduce the total potential floor space area for employment uses and related public services in business zones, (d) not reduce the total potential floor space area for industrial uses in industrial zones, and (e) ensure that proposed new employment areas are in accordance with a strategy that is approved by the Planning Secretary. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary, which: i. gives consideration to the objective of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study (prepared in support of the planning proposal) which gives consideration to the objective of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) of minor significance.		
7.2 Reduction in non-hosted short-term rental accommodation period	This direction does not currently apply to the Coffs Harbour LGA.	N/A	
7.3 Commercial and Retail Development along the Pacific Highway, North Coast	Applies when a relevant planning authority prepares a planning proposal for land in the vicinity of the existing and/or proposed alignment of the Pacific Highway. (1) A planning proposal that applies to land located on "within town" segments of the Pacific Highway must provide that: (a) new commercial or retail development must be concentrated within district	N/A	The site is not located in the vicinity of the existing and/or proposed alignment of the Pacific Highway.

S9.1 Direction	Applicable	Consistent	Comment
	centres rather than spread along the Highway; (b) development with frontage to the Pacific Highway must consider impacts that the development has on the safety and efficiency of the highway; and (c) for the purposes of this paragraph, "within town" means areas which prior to the draft LEP have an urban zone (e.g. Village, residential, tourist, commercial and industrial etc.) and where the Pacific Highway is less than 80km/hour. (2) A planning proposal that applies to land located on "out-of-town" segments of the Pacific Highway must provide that: (a) new commercial or retail development must not be established near the Pacific Highway if this proximity would be inconsistent with the objectives of this Direction. (b) development with frontage to the Pacific Highway must consider the impact the development has on the safety and efficiency of the highway. (c) For the purposes of this paragraph, "out-of-town" means areas which, prior to the draft local environmental plan, do not have an urban zone (e.g.: "village", "residential", "tourist", "commercial", "industrial", etc.) or are in areas where the Pacific Highway speed limit is 80 km/hour or greater. (3) Notwithstanding the requirements of paragraphs (4) and (5), the establishment of highway service centres may be permitted at the localities listed in Table 1, provided that the Roads and Traffic Authority is satisfied that the highway service centre(s) can be safely and efficiently integrated into the highway interchange(s) at those localities. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance.		
Focus area 8: Resources and Energy			

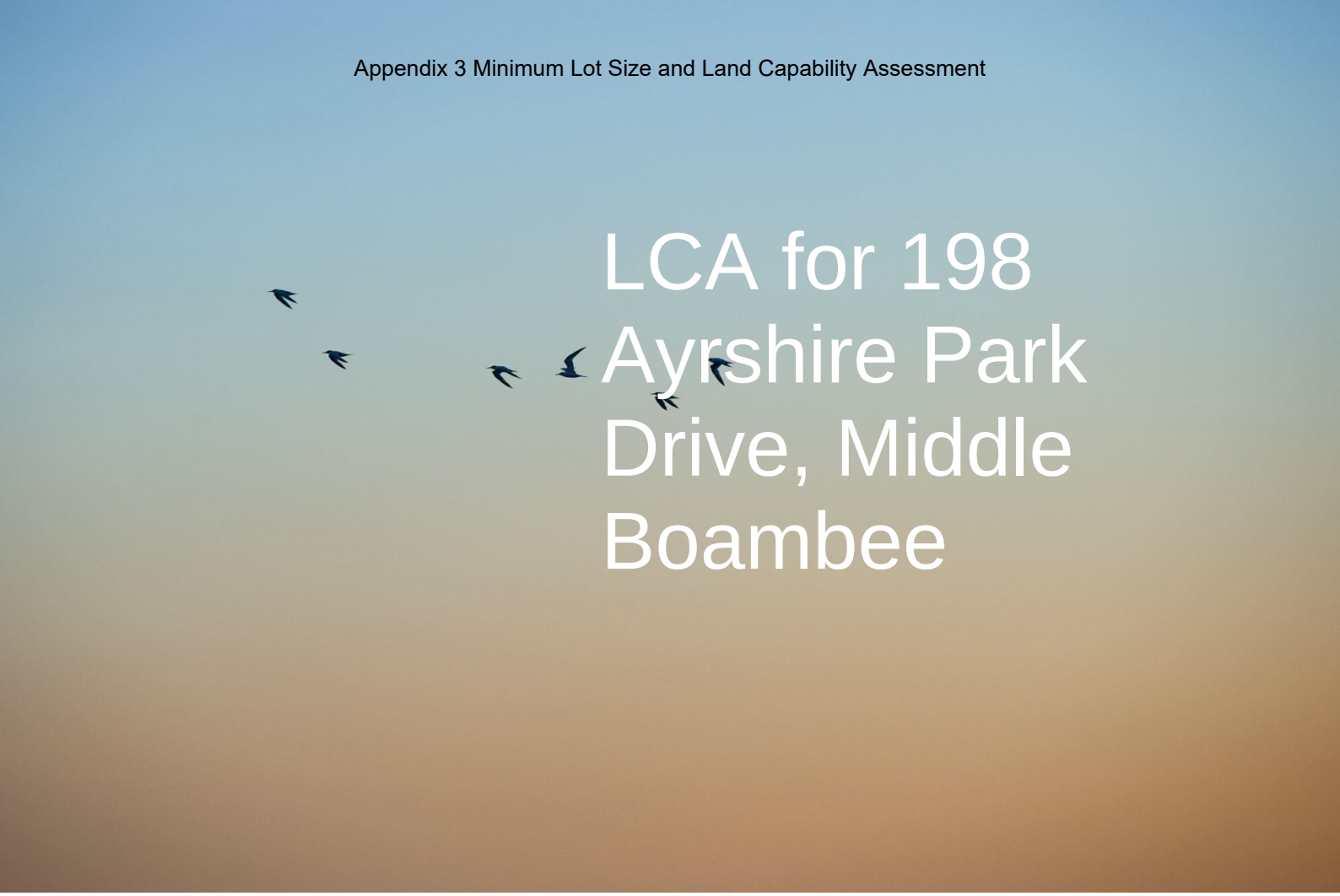
S9.1 Direction	Applicable	Consistent	Comment
8.1 Mining, Petroleum Production and Extractive Industries	This direction applies to all relevant planning authorities when preparing a planning proposal that would have the effect of: (a) prohibiting the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials, or (b) restricting the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance by permitting a land use that is likely to be incompatible with such development. (1) In the preparation of a planning proposal affected by this direction, the relevant planning authority must: (a) consult the Secretary of the Department of Primary Industries (DPI) to identify any: i. resources of coal, other minerals, petroleum or extractive material that are of either State or regional significance, and ii. existing mines, petroleum production operations or extractive industries occurring in the area subject to the planning proposal, and (b) seek advice from the Secretary of DPI on the development potential of resources identified under (1)(a)(i), and (c) identify and take into consideration issues likely to lead to land use conflict between other land uses and: i. development of resources identified under (1)(a)(i), or ii. existing development identified under (1)(a)(ii). (2) Where a planning proposal prohibits or restricts development of resources identified under (1)(a)(i), or proposes land uses that may create land use conflicts identified under (1)(c), the relevant planning authority must: (a) provide the Secretary of DPI with a copy of the planning proposal and notification of the relevant provisions, (b) allow the Secretary of DPI a period of 40 days from the date of notification to provide in writing any objections to the terms of the planning proposal, and (c) include a copy of any objection and supporting information received from the Secretary of DPI with the statement to the Planning Secretary (or an officer of the	N/A	The planning proposal will not prohibit the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials; or restrict the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance (by permitting a land use that is likely to be incompatible with such development).

S9.1 Direction	Applicable	Consistent	Comment
	Department nominated by the Secretary before undertaking community consultation in satisfaction of Schedule 1 to the Act. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary), that the provisions of the planning proposal that are inconsistent are of minor significance.		
Focus area 9: Primary Production			
9.1 Rural Zones	This direction applies when a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed rural zone (including the alteration of any existing rural zone boundary). A planning proposal must not rezone land from a rural zone to a residential, business, industrial, village or tourist zone. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or (c) in accordance with the relevant Regional Strategy, Regional Plan or District Plan prepared by the Department of Planning, Housing and Infrastructure which gives consideration to the objective of this direction, or (d) is of minor significance.	N/A	The planning proposal will not rezone land from a rural zone to a residential, employment, mixed use, SP4 Enterprise, SP5 Metropolitan Centre, W4 Working Waterfront, village or tourist zone. The planning proposal does not include provisions that will increase the permissible density of land within a rural zone.
9.2 Rural Lands	This direction applies when a relevant planning authority prepares a planning proposal for land outside the local government areas of lake Macquarie, Newcastle, Wollongong and LGAs	N/A	The planning proposal will not affect land within an existing or proposed rural or conservation zone (including the alteration of

S9.1 Direction	Applicable	Consistent	Comment
	in the Greater Sydney Region (as defined in the *Greater Sydney Commission Act 2015*) other than Wollondilly and Hawkesbury, that: (a) will affect land within an existing or proposed rural or conservation zone (including the alteration of any existing rural or conservation zone boundary) or (b) changes the existing minimum lot size on land within a rural or conservation zone. (1) A planning proposal must: (a) be consistent with any applicable strategic plan, including regional and district plans endorsed by the Planning Secretary, and any applicable local strategic planning statement (b) consider the significance of agriculture and primary production to the State and rural communities (c) identify and protect environmental values, including but not limited to, maintaining biodiversity, the protection of native vegetation, cultural heritage, and the importance of water resources (d) consider the natural and physical constraints of the land, including but not limited to, topography, size, location, water availability and ground and soil conditions (e) promote opportunities for investment in productive, diversified, innovative and sustainable rural economic activities (f) support farmers in exercising their right to farm (g) prioritise efforts and consider measures to minimise the fragmentation of rural land and reduce the risk of land use conflict, particularly between residential land uses and other rural land use (h) consider State significant agricultural land identified *in* chapter 2 of the *State Environmental Planning Policy (Primary Production) 2021* for the purpose of ensuring the ongoing viability of this land (i) consider the social, economic and environmental interests of the community. (2) A planning proposal that changes the existing minimum lot size on land within a rural or conservation zone must demonstrate that it: (a) is consistent with the priority of minimising rural land fragmentation and land use conflict, particularly between residential and other rural land uses		existing rural or conservation zone boundaries) or change the existing minimum lot size within a rural or conservation zone.

S9.1 Direction	Applicable	Consistent	Comment
	(b) will not adversely affect the operation and viability of existing and future rural land uses and related enterprises, including supporting infrastructure and facilities that are essential to rural industries or supply chains (c) where it is for rural residential purposes: i. is appropriately located taking account of the availability of human services, utility infrastructure, transport and proximity to existing centres. ii. is necessary taking account of existing and future demand and supply of rural residential land. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy approved by the Planning Secretary and is in force which: i. gives consideration to the objectives of this direction, and ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), or (b) is of minor significance.		
9.3 Oyster Aquaculture	This direction applies to any relevant planning authority when preparing a planning proposal in 'Priority Oyster Aquaculture Areas' and oyster aquaculture outside such an area as identified in the *NSW Oyster Industry Sustainable Aquaculture Strategy* (2006) ("the Strategy"), when proposing a change in land use which could result in: (a) adverse impacts on a 'Priority Oyster Aquaculture Area' or a "current oyster aquaculture lease in the national parks estate", or (b) incompatible use of land between oyster aquaculture in a 'Priority Oyster Aquaculture Area' or a "current oyster aquaculture lease in the national parks estate" and other land uses. (1) In the preparation of a planning proposal the relevant planning authority must: (a) identify any 'Priority Oyster Aquaculture Areas' and oyster aquaculture leases outside such an area, as shown the maps	N/A	This direction only applies to Priority Oyster Aquaculture Areas and oyster aquaculture outside such an area as identified in the NSW Oyster Industry Sustainable Aquaculture Strategy (2006).

S9.1 Direction	Applicable	Consistent	Comment
	to the Strategy, to which the planning proposal would apply, (b) identify any proposed land uses which could result in any adverse impact on a 'Priority Oyster Aquaculture Area' or oyster aquaculture leases outside such an area, (c) identify and take into consideration any issues likely to lead to an incompatible use of land between oyster aquaculture and other land uses and identify and evaluate measures to avoid or minimise such land use in compatibility, (d) consult with the Secretary of the Department of Primary Industries (DPI) of the proposed changes in the preparation of the planning proposal, and (e) ensure the planning proposal is consistent with the Strategy. (2) Where a planning proposal proposes land uses that may result in adverse impacts identified under (1)(b) and (1)(c), relevant planning authority must: (a) provide the Secretary of DPI with a copy of the planning proposal and notification of the relevant provisions, (b) allow the Secretary of DPI a period of 40 days from the date of notification to provide in writing any objections to the terms of the planning proposal, and (c) include a copy of any objection and supporting information received from the Secretary of DPI with the statement to the Planning Secretary before undertaking community consultation in satisfaction of Schedule 1 to the EP&A Act. A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance.		
9.4 Farmland of State and Regional Significance on the NSW Far North Coast	This direction does not currently apply to the Coffs Harbour LGA.	N/A	



LCA for 198 Ayrshire Park Drive, Middle Boambee

28 November 2022

For: Mr G & Mrs K Russell

Authored by: Strider Duerinckx

Ref	Ver	Date	Distribution
2122-027-02	A	3/5/22	Client, Planner
	B	2/12/22	

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Appendices

1 Introduction

Earth Water Consulting Pty Limited (EWC) were engaged by Mr G & Mrs K Russell to undertake a Land Capability Assessment (LCA) and Minimum Lot Size analysis (MLS) for the proposed subdivision of 198 Ayrshire Park Drive, Middle Boambee (Lot 411 Deposited Plan No: 1276302) (the 'Site'), as shown on Figure 1.

The purpose of the LCA is to show that wastewater from an On-site Sewage Management System (OSMS) can be sustainably applied on the proposed Lots, and the purpose of the MLS is to confirm that a reduction in the minimum lot size for the zoning would be suitable.

2 Proposed Development

Based on plans of the proposed subdivision layout (Ref: Blairlanskey Surveys - Plan of Proposed Subdivision. Dated: November 2021), it is understood that the Site is proposed to be subdivided from one Lot of 10,007m^2, into two (2) lots, of 5,500m^2 (Proposed Lot 21) and 4,507m^2 (Proposed Lot 2) (Figure 2).

3 Scope of Work

The LCA was undertaken by Arthur Schultz and Strider Duerinckx of EWC. The study methodology included:

- A desktop review of Site conditions including geology, hydrogeology, soils, and landscape features;
- A site inspection to map site and soil constraints plus an audit of the existing dwelling OSMS in relation to the proposed subdivision boundary;
- Drilling of two boreholes and an additional cutting assessment, to assess soil conditions across the Site;
- Assessment of a range of site constraints including landform, slope, aspect, drainage, flooding and proximity to sensitive environments;
- Analysis of selected soil sample for a range of chemical properties including pH, EC, dispersibility, PSorp, CEC and ESP;
- Estimation of likely wastewater loads (quantity and quality) from the existing childcare centre and future dwellings on the proposed lost, and undertaking water and nutrient balance modelling to size suitable land application areas;
- Determining an appropriate level of wastewater treatment and the preferred method of land application of effluent to overcome the constraints on the proposed lots;
- Outlining any land improvement works or mitigation measures required to address particular constraints in the land application areas;
- Provision of a written report, including site plans, describing the results and recommendations from our investigations.

The MLS involved a comparison of nearby properties of a similar target area to confirm the available land for onsite effluent application.

4 Site Details

The Site is located on the western side of Ayrshire Park Drive, towards its western end and approximately 150m north of its junction with Middle Boambee Road. An unnamed access road for adjacent properties flanks the northern boundary.

The Site is zoned R5 Large Lot Residential, is approximately 10,007m^2, and is currently only maintained grass with a few ornamental trees. There are no buildings or infrastructure on the Site.

The Site is located on a generally east facing undulating slope, which falls gradually towards Ayrshire Park Drive at its eastern end. A mapped intermittent drainage crosses the western edge of the property, which flows south after exiting the property to Boambee Creek about 160m away.

Photograph 1 – Looking east across the proposed Lot 2.

Photograph 2 – Looking west over the proposed Lot 2.

Photograph 3 – Looking east from Proposed Lot 2 across Proposed Lot 1.

4.1 Existing OSMS

The Site is currently undeveloped and there is no existing OSMS infrastructure on the property.

4.2 Site Constraints

Table 1 summarises the Site constraints for the primary and reserve Effluent Management Area (EMAs) for each of the proposed lots. These are discussed in terms of the degree of limitation they present (i.e. minor, moderate or major limitation) for on-site effluent application. Reference is made to the rating scale described in Table 4 of DLG (1998). Site features are presented in Figure 3.

Table 1: Site Constraints

Constraint	Degree of Limitation
Landform: Waning planar midslope location.	Minor
Exposure: Good exposure. Minimal trees near the proposed EMAs.	Minor
Slope: Moderate slope of 1-4% to the east.	Moderate
Rocks and Rock Outcrops: No rock outcrops were observed on the Site.	Minor
Erosion Potential: Erosion potential is expected to be low due to the slope and soils.	Minor
Climate: The Site experiences a sub-tropical-temperate climate, typical of north-eastern NSW.	Minor
Vegetation: Open grassland with minimal trees and shrubs.	Minor
Fill: None noted	Minor
Surface Waters: Both EMAs are over 40m from the mapped intermittent drainage to the west and south of the property boundary.	Minor
Groundwater: (NSW Office of Water: Groundwater Bore Search) A total of 13 registered groundwater bores were recognized within 500m of the proposed EMAs for both Lots. The closest registered domestic bore is located approximately 100 metres to the southeast on 191 Ayrshire Park Drive. This bore (GW066465) was drilled to a final depth of 36 metres, and encountered a water bearing aquifer at between 28 and 36 metres in fractured bedrock. A second bore is located at 200 Ayrshire Park Drive, approximately 100m to the north. This bore (GW302998) is 48m deep, with a water bearing zone detected at between 42 and 47m depth in cracked basalt. A further	Major

Constraint	Degree of Limitation
examination of other bores within 500m of the Site demonstrates that groundwater is generally not detected shallower than 20m in the area. Groundwater vulnerability? Clay subsoil, distance and deep groundwater depth indicate that the risk to groundwater would be minimal.	
Stormwater run-on and upslope seepage: The midslope position of the proposed EMAs would have moderate run-on from upslope areas.	Moderate
Flood Potential: The Site is not impacted by 1:100 year flood extents on the CHCC flood mapping and both proposed EMA's are >4m above flood mapping contours.	Minor
Available Effluent Application Area Both lots have sufficient area available for the application of effluent, and reserve EMAs.	Minor

4.3 Soil Survey and Description

4.3.1 Regional Soils

We reviewed the Soil Landscapes of the Coffs Harbour 1:100,000 Sheet (Milford, 1999) which indicates that the Site is part of the Megan Soil Landscape, which is an erosional landscape located on rolling low hills to hills on late Carboniferous metasediments of the Coffs Harbour association in the Coast Range and the Gleniffer-Bonville Hills. Soils are moderately deep to deep, well-drained structured Red and Brown Earths and Red and Brown Podzolic Soils, moderately deep to deep, well-drained structured Yellow Earths and Yellow Podzolic Soils in drier situations, and moderately deep to deep (>120cm) well-drained Krasnozems in the moistest sites.

Limitations include strongly acid, stony soils with high erodibility, aluminium toxicity potential and low subsoil permeability. The soil is characterised by dark clay loam topsoil (up to 400mm) and dull reddish brown clay loam deep topsoil (up to 150mm) underlain by reddish brown moderately to strongly pedal light clay (up to 700mm) underlain by reddish brown to orange, massive to moderately pedal silty clay loam to silty clay. Bedrock is typically greater than 1.2m depth.

4.3.2 Site Soils

Site soils were assessed by drilling two (2) boreholes using a power auger (Figure 3) to a target 1.2m depth. Additionally, soil landscape was examined to greater than 1.5m depth using a large emergent cutting on the property. In general, these soils comprised:

- Approximately 100mm of clay loam topsoil, dark brown, with strong structure and 20-30% coarse fragments; overlying
- At least 500mm of light clay, brown, with strong structure and less than 5% coarse fragments.

Refusal on bedrock gravels was encountered at 600mm (BH1) and 800mm (BH2) in the boreholes. The borehole logs are provided in Appendix A.

Photograph 3 – **BH1 soil profile.**

Table 2 summarises the key soil physical and chemical assessments. Reference is made to the rating scale described in Table 6 of DLG (1998). Borehole logs are presented in Appendix A and soil chemistry in Appendix B.

Table 2: Soil Assessment

Parameter	Constraint
Depth to bedrock or hardpan (m): The borehole was terminated at 0.6m and 0.8m depth respectively, in light clay, with suspected bedrock encountered at the base of each borehole.	Major
Depth to high soil watertable: The depth of the vadose zone (i.e. non-saturated soil material above watertable) was greater than 0.8m at the time of the investigation. The depth to the permanent groundwater aquifer is expected to be more than 20m depth based on local groundwater bores.	Minor
Coarse Fragments (%): The borehole contained between 5 and 30% coarse fragments.	Moderate
Hydraulic loading rate: Soil structure: Strong Soil texture: Light clay 0.1/0.7-0.6m **Permeability category:** Category 5a Hydraulic loading recommended: 3mm/day for subsurface irrigation. Reasons for the hydraulic loading recommendation: Strongly structured light clay subsoils.	Moderate
pH: 5.02 pH Units from BH1 0.2-0.6m. Strongly acidic soils.	Major
Electrical Conductivity (dS/m): 0.313dS/m from BH1 0.2-0.6m. Not saline.	Minor
Dispersiveness: The Emerson Aggregate Test is a measure of soil dispersibility and susceptibility to erosion and structural degradation. It assesses the physical changes that	Moderate

Parameter	Constraint
occur in a single ped of soil when immersed in water, specifically whether the soil slakes and falls apart or disperses and clouds the water. An EAT was recorded as Class 3/6 (Slake 2) for BH1 0.2-0.6m. The instability of these aggregates is expected to increase slightly with the application of effluent.	
Sodicity (ESP): The ESP is a measure of how readily the soils allow sodium from wastewater to be substituted in the soil lattice for other cations. Once accepted, the weak sodium bonds allow increased structural degradation of the soil, increasing the erosion risk. The ESP of BH1 0.2-0.6m was 2.9%. The ESP infers a minimal potential for structural degradation due to sodium salts already present.	Minor
Cation Exchange Capacity: Like ESP, the CEC is a measure of how easily the soils hold and exchange excess cations from the effluent. These cations, such as potassium, magnesium and calcium are used by plants as a nutrient source. The higher the CEC the more likely plant growth will be aided by the application of effluent. CEC was measured in BH1 0.2-0.6m at 4.5 cmol/kg, which indicates that this soil type has low ability to accept and release excess nutrients from effluent.	Moderate
Phosphorus Adsorption: Phosphorus is a cation present in effluent. It is required only to a limited extent by plants as a trace nutrient, but if there is an excess of phosphorus in environments where other limiting factors are not present (such as waterways), excess phosphorus can result in very high plant growth. Typically, on land, excess phosphorus is taken up by soil adsorption, or is flushed out of the soil into groundwater or surface water bodies. The Site soils in BH1 0.2-0.6m has a Psorp of 792mg/kg (12,796kg/ha) in the subsoil.	Minor

5 Minimum Lot Size (MLS) Analysis

A minimum lot size analysis and modelling were completed to assess if the proposed lot size would be sustainable for onsite effluent application.

5.1 Methodology

When considering the suitability for a lot to sustainably manage wastewater on-site, we typically refer to 'available effluent management area'. This broadly refers to available areas (i.e. not built out or used for a conflicting purpose) where OSMS will not be unduly constrained by site and soil characteristics. Available area on a developed a lot is determined by the following factors:

- total building area (including dwellings, sheds, pools etc.) which includes a defined building envelope but may extend beyond with additional improvements to a property, such as driveways and paths (impervious areas), and gardens/vegetated areas unsuitable for effluent reuse;
- dams, intermittent and permanent watercourses running through lots;

- maintenance of appropriate buffer distances from property boundaries, buildings, driveways and paths, dams and watercourses;
- flood prone land;
- excessive slope;
- excessively shallow soils;
- heavy (clay) soils with low permeability;
- excessively poor drainage, shallow groundwater and/or stormwater run-on; and
- excessive shading by vegetation.

The residual areas (areas not otherwise occupied by improvements, buffers, restrictions or conservation vegetation) were then calculated for the selected lots (Figure 4), and the available area compared to the wastewater envelope required.

5.2 MLS Buffer Distances

Buffer distances from EMAs are typically enforced to minimise risk to public health, maintain public amenity and protect sensitive environments. Generally, adopted environmental buffers for secondary treated effluent land applied into absorption trenches/ beds based on DLG (1998) are:

- 250m from domestic groundwater bores;
- 100m from permanent watercourses;
- 40m from intermittent watercourses and dams;
- 6m from downslope property boundaries and 3m from upslope property boundaries; and
- 6m from downslope buildings and 3m from upslope buildings.

In addition, ASNZS1547:2012 provides suggested risk assessable buffer distances that include buffers to inground water tanks and swimming pools and cuttings. In the comparative lot assessment by EWC these land uses were also buffered.

5.3 MLS Comparative Lots Assessed

Four, nearby R5 zoned, representative lots were selected that have already been subdivided (Table 3) (Figure 4).

Table 3: Comparative Lots Assessed

MLS No.	Lot	DP	Address	Lot Area (m^2)
MLS 1	18	834765	176D Ayrshire Park Drive Boambee	5,246
MLS 2	15	834765	176A Ayrshire Park Drive Boambee	4,706
MLS 3	11	837609	21 Borsato Drive Boambee	4,084
MLS 4	10	837609	2 Raintree Place Boambee	4,258

The properties typically included a dwelling, garage/shed, landscaped trees, shrubs and gardens, driveways, water tanks, and recreational space. This development style will be similar to that

proposed for the Site and therefore minimum lot size and development potential should be consistent.

MLS Assessed Available EMA**Table 4** shows the assessment of available effluent management areas for each of the four lots. As is evident, the variability of lot sizes and on-lot improvements and restrictions of developed lots makes selection of a "typical" lot difficult, however comparison of the four lots with site and soil constraints at the Site indicates that lot size is a greater issue on the comparative lots assessed than at the proposed Lots at the Site.

From the sample selection of lots investigated (**Table 4**), two of the lots are smaller than the nominated minimum 4,507m^2 lot size, being 4,084-4,258m^2 (MLS 3 and 4) while MLS 1 and 2 are marginally larger than the minimum nominated Lot size, being 4,706-5,246m^2.

In order to assess the required Effluent Management Area (EMA) footprint, the modelling for secondary treated effluent and subsurface irrigation was undertaken and assumed to be utilised on the MLS lots. The modelling suggests that 932m^2 is the required available effluent application areas to accommodate the main irrigation area and a reserve (backup) area.

Table 4: Minimum Lot Size Assessment Results

MLS No.	Lot Area (m^2)	Total Restricted Area (m^2)	Available Eff. Application Area (m^2)	Percent of Lot Available for Eff. Disposal (%)	>932m^2 Area Available for Secondary Treatment?
1	5,246	3,661	1,585	30	Yes
2	4,706	3,131	1,575	33	Yes
3	4,084	3,068	1,016	24	Yes
4	4,258	2,369	1,889	57	Yes

5.4 Discussion

A comparison of nearby properties suggests that:

- Percent of lot area available for effluent disposal is variable depending on site and soil constraints, ranging between 24-57%, equating to about 1,016-1,889m^2 available area for effluent land application;
- The larger lot size proposed on the Site compared to the adjacent lots will significantly increases the percentage of the lot available for effluent disposal;
- The minimum required 932m^2 footprint for application of secondary treated effluent is available on the assessed lots down to about 4,000m^2.
- A minimum lot size of 4,507m^2 is considered suitable for the proposed subdivision of the Site.

6 Recommended OSMS Combination

Due to the cost of reticulated sewerage provision by Council, it is expected that the Site will not be sewered in the foreseeable future.

Based on the site and soil constraints, particularly the shallow and subdivision boundaries, the minimum treatment and land application combination selected for proposed lots is treatment to a secondary standard with SubSurface Irrigation (SSI) at 150mm depth.

7 Effluent Management Areas

7.1 Design Hydraulic Load

For hydraulic purposes a proposed dwelling of four bedrooms on tank water supply was assumed for both proposed Lots. AS/NZS1547:2012 recommends that a wastewater generation load of 120L/p/day for households supplied by tank water without bore backup be used as a basis for wastewater system design. The design hydraulic loading for a four bedroom dwelling under full occupancy is presented in Table 5.

Table 5: Proposed Design Hydraulic Load for both Lots

No. of Bedrooms	Design Wastewater Load (L/day)
4	720

7.2 Sizing of Effluent Management Areas

Water balance modelling was undertaken to determine sustainable effluent application rates, and from this estimate the necessary size of the EMA required for effluent to be applied from a secondary treatment system trench or beds. The procedures used in the water balance generally follow the *AS/NZS 1547:2012* standard and DLG (1998) Guideline. The water balance used is a monthly nominated area model. These calculations determined minimum EMAs for given effluent loads for each month of the year. The water balance can be expressed by the following equation:

Precipitation + Effluent Applied = Evapotranspiration + Percolation + Storage

Mean monthly rainfall data was conservatively utilised in the modelling. Mean data has a higher rainfall than median data typically adopted for domestic wastewater investigations. The water balance conservatively assumes a retained rainfall coefficient of 0.9; that is, generally 90% of rainfall will percolate into the soil and 10% will run off. Given the slopes and groundcover at the Site this is considered a conservative value. The rainfall hydraulic load is incorporated into the water balance to ensure that runoff from the EMA will not occur under typical (design) climate conditions.

The modelling input data for secondary treated wastewater and land application into an SSI field are presented in Table 6, and calculation sheets included in Appendix C.

A conservative nutrient balance was also undertaken, which calculates the minimum buffer around a trench or bed to enable nutrients to be assimilated by the soils and vegetation. The nutrient balance used here is based on the simplistic DLG (1998) methodology, but improves this by more accurately accounting for natural nutrient cycles and processes. It acknowledges that a proportion of nitrogen will be retained in the soil through processes such as ammonification (the conversion of organic nitrogen to ammonia) and a certain amount will be lost by denitrification, microbial digestion and volatilisation (Patterson, 2003). Patterson (2002) estimates that these processes may account for up to 40% of total nitrogen loss from soil. In this case, a more conservative estimate of 20% is adopted for the nitrogen losses due to soil processes. A summary of the nutrient balance is provided in Table 7.

Table 6: Inputs for Secondary Treatment Modelling

Data Parameter	Units	Value	Comments
Hydraulic load	L/day	720	6 persons occupancy at residence.
Precipitation	mm/month	Coffs Harbour	BoM, mean monthly.
Pan Evaporation	mm/month	Coffs Harbour MO	BoM, mean monthly.
Retained rainfall	unitless	0.9	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 10% runoff.
Crop Factor	unitless	0.6-0.8	Expected annual range for vegetation based on monthly values.
Design Irrigation Rate (DIR) - Secondary	mm/day	3	Maximum rate for design purposes, based on strongly structured light clay subsoils.
Effluent total nitrogen concentration	mg/L	30	Target effluent quality for secondary treatment systems.
Nitrogen lost to soil processes (denitrification and volatilisation)	annual percentage	20	Patterson (2002).
Effluent total phosphorus concentration	mg/L	10	Target effluent quality for secondary treatment systems.
Soil phosphorus sorption capacity	mg/kg	12,796	Value based on soil testing.
Nitrogen uptake rate by plants	kg/Ha/yr	250	Conservative estimated value.
Phosphorus uptake rate by plants	kg/Ha/yr	25	Conservative estimated value.
Design life of system (for nutrient management)	years	50	Reasonable minimum service life for system.

Table 7: Hydraulic Sizing for Secondary Treatment Modelling

Hydraulic Loading (m^2)	Area (m^2)
Minimum secondary treatment SSI field basal area for hydraulic load (m^2)	466m^2 SSI field footprint
Minimum secondary treatment SSI field area for total phosphorus load, without off-site export	174m^2
Minimum secondary treatment SSI field area for total nitrogen load, without off-site export	272m^2

Based on monthly water balance calculations, a default/main EMA and reserve EMA of 466m^2 each have been nominated for both proposed Lots, totaling 932m^2.

8 Buffers

Buffer distances or setbacks from EMAs are required to minimise risk to public health, maintain public amenity and protect sensitive environments. The buffers from DLG (1998) are presented in Table 9 below.

Table 8: Available Buffers

Site Feature	DLG (1998) Buffer	Achievable?
Intermittent watercourses, drainage channels and dams	40m	**Yes**
Permanent waterways	100m	**Yes**
Domestic groundwater bore	250m	**No, 100m.**
Property boundary	Secondary - 3m downslope and sideslope, 6m upslope	**Yes**
Driveway and building	6m downslope of / 3m upslope	**Yes**

Although the EMAs fall within the 250m buffer to a domestic groundwater bore required by DLG (1998), comparison to the maximum risk assessed buffer in Appendix R of AS/NZS1547:2012 of 50m indicates that the available buffer of over 100m to the nearest bore is suitable.

9 Conclusions & Recommendations

Having undertaken a land capability assessment for the proposed subdivision of 198 Ayrshire Park Drive Middle Boambee, EWC consider that there is the opportunity for the sustainable application of wastewater following subdivision of the existing lot into Proposed Lots 1-2.

We recommend that:

- A minimum lot size of 4,500m^2 is suitable for the subdivision to allow for all reasonable development configurations (dwelling, shed, swimming pool, recreation areas, driveways etc) and sustainable wastewater application;

  - Wastewater be treated to a secondary level with SSI land application. A main and reserve EMA of 466m^2 minimum each has been nominated for a four bedroom dwelling;
- Final details to be confirmed during application for individual dwelling construction. For any future system we recommend that a dwelling specific OSMS should be designed by an experienced professional, taking into account the assumptions and recommendations contained in this report; and
- We also recommend that any OSMS be installed by a suitably qualified plumber, ensuring that effluent is distributed evenly across the entire area serviced.

10 References

Coffs Harbour City Council (2015) *On-site Sewage Management Strategy 2015*, Coffs Harbour.

Department of Local Government et al. (1998). *Environment & Health Protection Guidelines: On-site Sewage Management for Single Households*.

Milford, H. B., (1999) *Soil Landscapes of the Coffs Harbour 1:100 000 Sheet*, Department of Land and Water Conservation Soil Landscape Series.

Patterson, R.A. (2002). *'Workshop 2 – Calculations for Nutrient Balances.' In Evaluating Site and Soil Assessment Reports for On-site Wastewater Systems*. A one-day training course held in Fairfield, Sydney. Centre for Environment Training, Cardiff Heights NSW. March 2002.

Patterson, R.A. (2003). *Nitrogen in Wastewater and its Role in Constraining On-Site Planning*. In Patterson & Jones (Eds.) Proceedings of On-site '03 Conference: *Future Directions for On-site Systems: Best Management Practice*. Lanfax Laboratories, Armidale.

Standards Australia / Standards New Zealand (2012*). AS/NZS 1547:2012 On-site Domestic-wastewater Management*.

FIGURES

0 50 100

Horizontal Scale (metres) 1:2000

EARTH WATER CONSULTING

LEGEND

- Property Boundary
- Contour (10m)
- Drainage Alignment

TITLE: Site Location			PROJECT: LCA for 198 Ayrshire Park Drive Middle Boambee		CLIENT: Mr G & Mrs K Russell
FIGURE: Figure 1					
SHEET: 1 OF 1	ISSUE: A	AUTHOR: SD	DATE: 28/04/22	SCALE: 1:2000	PROJECT: 2122-072

DP 791[illegible]

50

53.89

20.115

22

4507m²

BE
400m²

41.2

20.83

51.01

35.19

64.82

82.28

ROAD

21

5500m²

BE
400m²

ROW

92.49

ROW

DP 1002146

412

DP 1276202

62.185

PARK DRIVE

0 10 20 30

Horizontal Scale (metres) 1:600

EARTH WATER CONSULTING

LEGEND

- Property Boundary
- Subdivison Boundary
- Contour (1m)
- Proposed Building Envelope

TITLE: Proposed Development Layout			FIGURE: Figure 2
			SHEET: 1 OF1 ISSUE: A
PROJECT: LCA for 198 Ayrshire Park Drive Middle Boambee			CLIENT: Mr G & Mrs K Russell
AUTHOR: SD	DATE: 27/04/22	SCALE: 1:600	PROJECT: 2122-072

0 10 20 30

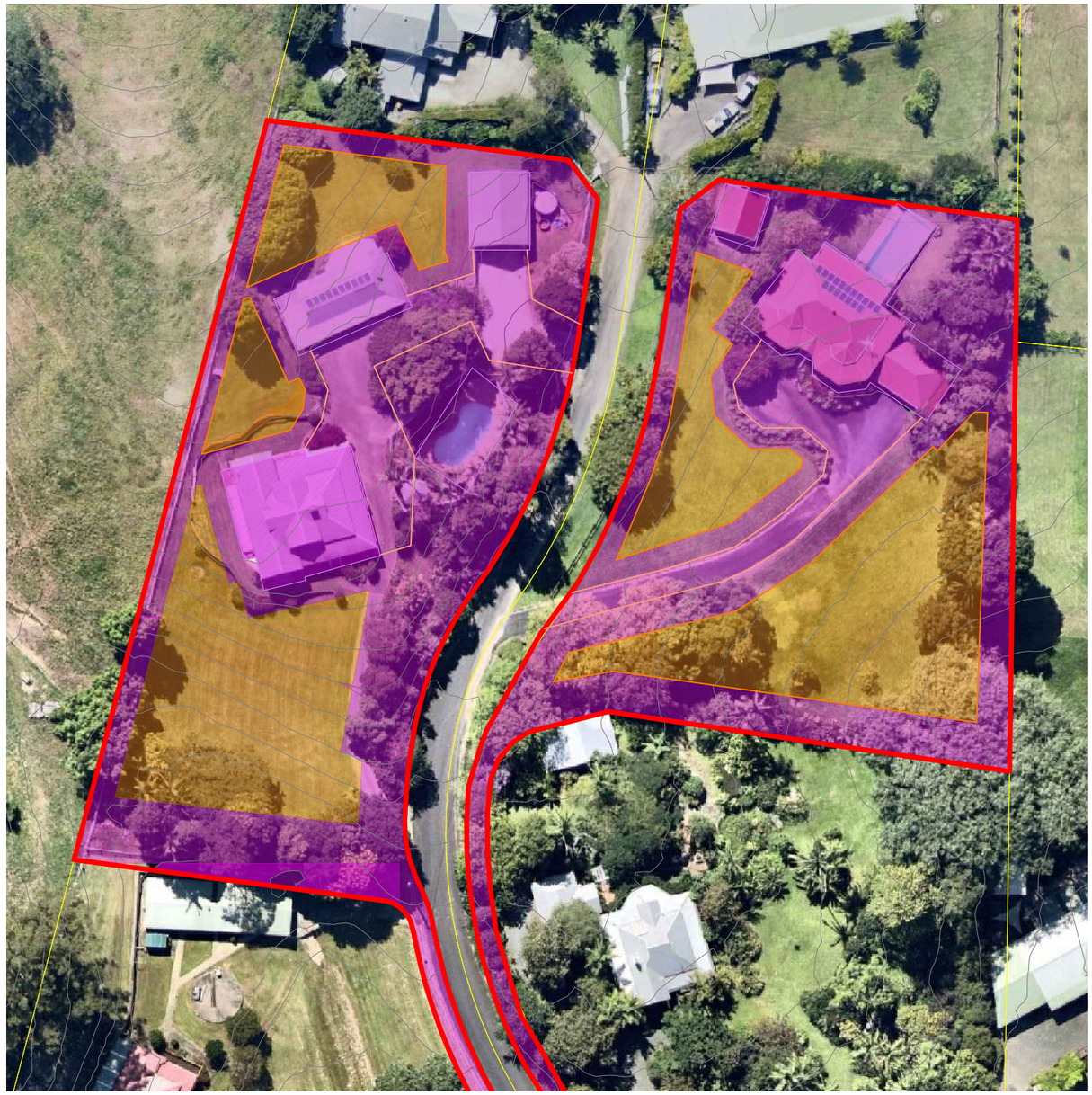
Horizontal Scale (metres) 1:600

EARTH WATER CONSULTING

LEGEND

- Property Boundary
- Proposed Subdivision Boundary
- Proposed Building Envelope
- Drainage Alignment
- Contour Line (1m)
- Slope % Slope Direction and Extent
- Approximate Borehole Location

TITLE: Existing Site Layout			FIGURE: Figure 3
			SHEET: 1 OF1 ISSUE: A
PROJECT: LCA for 198 Ayrshire Park Drive Middle Boambee			CLIENT: Mr G & Mrs K Russell
AUTHOR: SD	DATE: 28/04/22	SCALE: 1:600	PROJECT: 2122-072



Inset A - 176D/176A
Ayrshire Park Drive
Middle Boambee

Inset B - 21 Borsato
Drive/2 Raintree Place
Middle Boambee

0 20 40

Horizontal Scale (metres) 1:800

LEGEND

- Property Boundary
- Proposed Subdivision Boundary
- EMA Restricted Area
- EMA Available Area

TITLE: Comparative MLS Constraints			FIGURE: Figure 4
			SHEET: 1 OF 1 ISSUE: A
PROJECT: LCA for 198 Ayrshire Park Drive Middle Boambee			CLIENT: Mr G & Mrs K Russell
AUTHOR: SD	DATE: 28/04/22	SCALE: 1:800	PROJECT: 2122-072

APPENDIX A

Soil Borelog

Borehole No:	**BH1**
Logged by:	RL
Drilling date:	23/03/2022
Drilling method:	Powered Auger
Borehole location:	Figure 2
Borehole coords:	504907, 6645357

Project ref:	2122-072
Client:	Graeme Fry
Address:	198 Ayrshire Pk Dr, Boambee

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Brown	Nil	20 - 50%	SM	Topsoil
0.2			B1	Light Clay	Strong	Brown	Nil	< 5%	SM	Residual
0.3										
0.4	S									
0.5										
0.6										
0.7					Borehole refusal at 600mm					
0.8										
0.9										
1.0										
1.1										
1.2										
1.3										
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

Soil Borelog

Borehole No:	**BH2**
Logged by:	RL
Drilling date:	23/03/2022
Drilling method:	Powered Auger
Borehole location:	Figure 2
Borehole coords:	504931, 6645352

Project ref:	2122-072
Client:	Graeme Fry
Address:	198 Ayrshire Pk Dr, Boambee

PROFILE DESCRIPTION

Depth (m)	Sampling depth/name	Graphic Log	Horizon	Texture	Structure	Colour	Mottles	Coarse Fragments	Moisture Condition	Comments
0.1			A1	Clay Loam	Strong	Dark Brown	Nil	20 - 50%	SM	Topsoil
0.2			B1	Light Clay	Strong	Brown	Nil	< 5%	SM	Residual
0.3										
0.4	S									
0.5										
0.6										
0.7										
0.8										
0.9					Borehole refusal at 800mm					
1.0										
1.1										
1.2										
1.3										
1.4										
1.5										

Moisture condition

D	Dry	M	Moist	W	Wet / saturated
SM	Slightly moist	VM	Very moist		

APPENDIX B

WASTEWATER DISPOSAL SOIL ASSESSMENT

1 sample supplied by Earth Water Consulting Pty Limited on 1/04/2022 - Lab Job No. M7325
Analysis requested by Strider Duerinckx. - **Customer Reference: 2022-072**
PO Box 50 BELLINGEN NSW 2454

	SAMPLE 1 BH1 200-600
Job No.	*M7325/1*
Description	Clay Loam
Moisture Content (% moisture)	20
Emerson Aggregate Stability Test (SAR 5 Solution) note 12	EAST Class 3/6, Slake 2[see note 12]
Soil pH (1:5 $CaCl_2$)	5.02
Soil Conductivity (1:5 water dS/m)	0.036
Soil Conductivity (as EC_e dS/m)[note 10]	0.313
Native NaOH Phosphorus (mg/kg P)	19.08
Residual phosphorus remaining in solution from the initial phosphate phosphorus	
Initial Phosphorus concentration (ppm P)	**25.3**
72 hour - 3 Day (ppm P)	15.11
120 hour - 5 Day (ppm P)	11.46
168 hour - 7 Day (ppm P)	10.19
Equilibrium Phosphorus (ppm P)	5.51
EXCHANGEABLE CATIONS	
Calcium ($cmol_+$/kg)	2.24
Magnesium ($cmol_+$/kg)	1.12
Potassium ($cmol_+$/kg)	0.63
Sodium ($cmol_+$/kg)	0.13
Aluminium ($cmol_+$/kg)	0.21
Hydrogen ($cmol_+$/kg)	0.13
ECEC (effective cation exchange capacity)($cmol_+$/kg)	4.5
Exchangeable Calcium %	50.2
Exchangeable Magnesium %	25.2
Exchangeable Potassium %	14.2
Exchangeable Sodium % (ESP)	2.9
Exchangeable Aluminium %	4.7
Exchangeable Hydrogen %	2.9
Calcium/ Magnesium Ratio	1.99

Notes:

1: ECEC = Effective Cation Exchange Capacity = sum of the exchangeable Mg, Ca, Na, K, H and Al

2: Exchangeable bases determined using standard Ammonium Acetate extract (Method 15D3) with no pretreatment for soluble salts. When Conductivity ≥0.25 dS/m soluble salts are removed (Method 15E2).

3. ppm = mg/kg dried soil

4. Insitu P determined using 0.1 M NaOH and shaking for 24 h before determining phosphate

5. Soils were crushed using a ceramic grinding head and mill; five 1 g subsamples of each soil were used to which 40 mL of 0.1 M NaCl with 30 ppm phosphorus was added to each. The samples were shaken on an orbital shaker

6. Exchangeable sodium percentage (ESP) is calculated as sodium ($cmol_+$/kg) divided by ECEC

7. All results as dry weight DW - soils were dried at 60°C for 48 h prior to crushing and analysis.

8. Phosphorus Capacity method from Ryden and Pratt, 1980.

9. Aluminium detection limit is 0.05 $cmol_+$/kg; Hydrogen detection limit is 0.1 $cmol_+$/kg. However for calculation purposes a value of 0 is used.

10. For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm; EC_e conversions: sand loam 14, loam 9.5; clay loam 8.6; heavy clay 5.8

11. 1 $cmol_+$/kg = 1 meq/100g

12. Emerson Aggregate Stability Test (EAST) for Wastewater applications (see Sheet 3 - Patterson, 2015). EAST Class 1: Slaking, complete dispersion; Class 2: Slaking, some dispersion; Class 3-6*: Slaking 1 slight to 3 complete, No dispersion; Class 7: No slaking, yes swelling; Class 8: No slaking, no swelling.

13. Analysis conducted between sample arrival date and reporting date.

14. .. Denotes not requested.

15. This report is not to be reproduced except in full.

16. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal or on request).

17. This report was issued on 14/04/2022

NATA
WORLD RECOGNISED ACCREDITATION
Accreditation No. 14960
Accredited for compliance with ISO/IEC 17025 - Testing

Checked:.....

PHOSPHORUS SORPTION TRIAL

1 sample supplied by Earth Water Consulting Pty Limited on 1/04/2022 - Lab Job No. M7325

Analysis requested by Strider Duerinckx. - Customer Reference: 2022-072

PO Box 50 BELLINGEN NSW 2454

Calculations for Equilibrium Absorption Maximum for Soil provided

I.D.	JOB NO.	Equilibrium P mg P/L (in solution)	Added P mg P/L	P Sorb at Equil. mg P/kg	Native P mg P/kg	Equilibrium P Sorption Level µg P/g soil	Divide Θ (from Table)	Equilibrium Absorption Maximum (B) µg P/g soil
BH1 200-600	**M7325/1**	5.5	25.312	792	19	811	0.68	**1,195**

Calculations for phosphorus sorption capacity

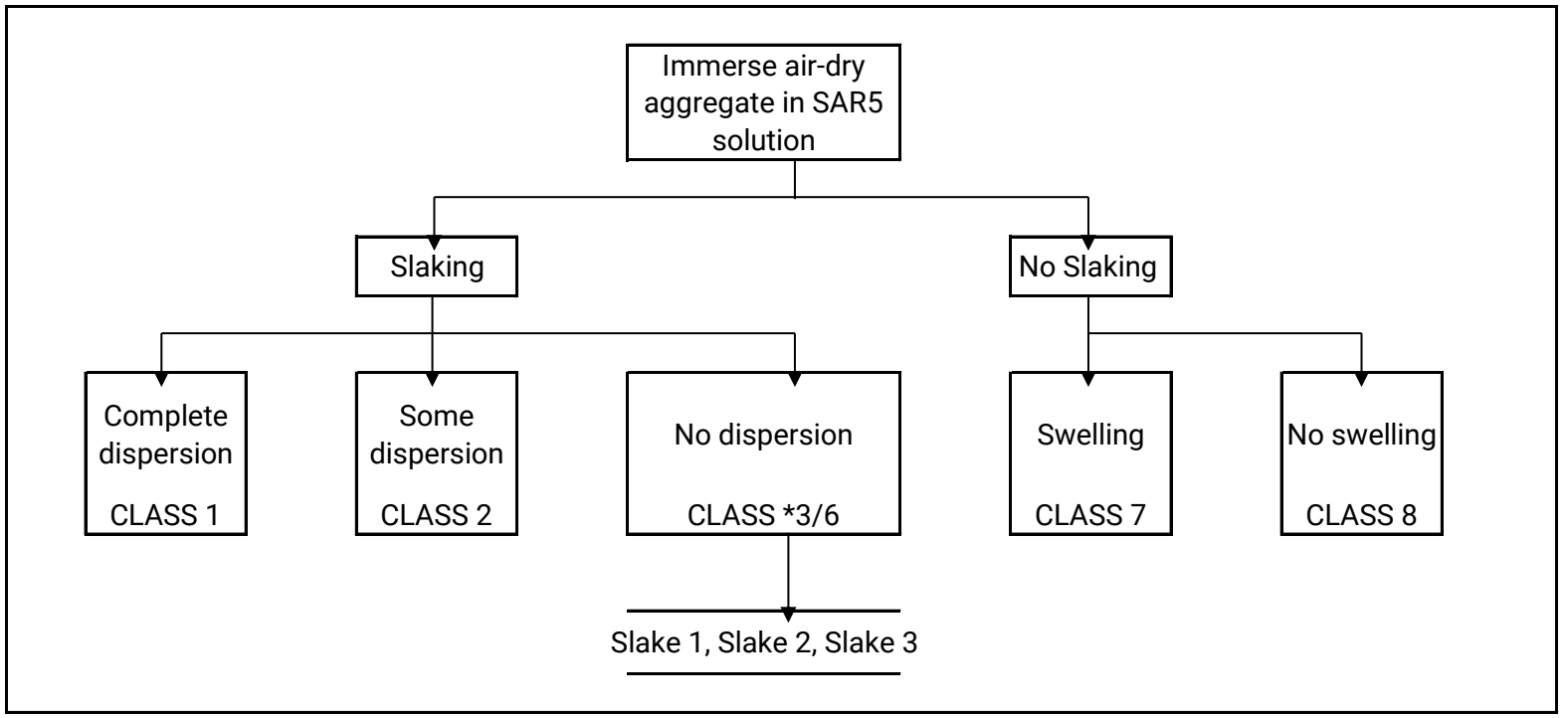
	JOB NO.	Equilibrium Absorption Maximum (B) µg P/g soil	multiply by theta of wastewater to be applie (=X)	minus the native P (=Y)	**kg P sorption / hectare (to a depth of 15 cm)** (1.95 is a correction factor for density, etc)	**kg P sorption / hectare (to a depth of 100 cm)** (1.95 is a correction factor for density, etc)
BH1 200-600	*M7325/1*	1195	(=B x theta)	(=X -native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)

EXAMPLE 1 - Calculations for phosphorus sorption capacity using a wastewater phosphorus of 15 mg/L P

	JOB NO.	Equilibrium Absorption Maximum (B) µg P/g soil	multiply by theta of wastewater to be applie (ie. 0.84)	minus the native P (=Y)	**kg P sorption / hectare (to a depth of 15 cm)** (1.95 is a correction factor for density, etc)	**kg P sorption / hectare (to a depth of 100 cm)** (1.95 is a correction factor for density, etc)
BH1 200-600	*M7325/1*	1195	1003	984	**1,919**	**12,796**

Checked:.....

Emerson Aggregate Stability Test for Wastewater



CLASS 1 : severe dispersion, maybe related to high sodicity which forces the clay particles apart in water. Amerlioration with lime or gypsum may improve structural stability by increasing EC. Class 1 soils have a major limitation to wastewater application because of reduced permeability and potential to compact as the pores block.

CLASS 2 : moderate dispersion, maybe related to high sodicity. Amelioration may be effective by increasing EC. Without amelioration, this class has a major limitation to wastewater application as for Class 1.

CLASS *3/6 : remoulding, and 1:5 soil:water suspension tests are irrelevant to wastewater assessment, but can be reported as Slake 1 (slight), Slake 2 (moderate) or slake 3 (completely slumped). Slake 1,2 or 3 - no limitation to wastewater application, but may benefit from additional organic matter fr surface irrigated soils.

CLASS 7 : these soils are water stable, but may swell. There is no limitation to wastewater application.

CLASS 8 : these soils retain their original size and shape. There is no limitation to wastewater application.

Method reference: Patterson, R. 2015. *Emerson aggregate stability test for wastewater.* Lanfax Laboratories: Armidale.

APPENDIX C

Nominated Area Irrigation Water Balance

Site Address: **198 Ayrshire Park Drive Middle Boamee**

Proj Ref: 2122-072

Notes:

Flow Allowance		120	l/p/d
No. of bedrooms		4	bdr
Occupancy		1.5	p/room
Design Wastewater Flow	Q	720	L/day
Daily DIR		3.0	mm/day
Crop Factor	C	0.6-0.8	unitless
Retained Rainfall Coefficient	RRc	0.8	untiless
Nominated Land Application Area	N	466	sqm
Rainfall Data	Coffs Harbour Rainfall Data (monthly median)		
Evaporation Data	Coffs Harbour Evap Data (monthly average)		

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	**365**
Median Rainfall	R	\	mm/month	151.2	179	205.1	135.9	117.4	90	54.3	40.7	35.4	74.7	130.4	114.1	1612.2
Average Evaporation	E	\	mm/month	192.2	156.8	148.8	117	86.8	69	77.5	105.4	135	161.2	171	192.2	**0**
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.60	0.60	0.60	0.70	0.70	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	154	125	119	82	61	41	47	63	95	113	137	154	**1189.94**
Percolation	B	DLRxD	mm/month	93.0	84	93.0	90.0	93.0	90.0	93.0	93.0	90.0	93.0	90.0	93.0	**1095.0**
Outputs		ET+B	mm/month	246.8	209.44	212.0	171.9	153.8	131.4	139.5	156.2	184.5	205.8	226.8	246.8	**2284.9**
INPUTS																
Retained Rainfall	RR	R*RRc	mm/month	120.96	143.2	164.08	108.72	93.92	72	43.44	32.56	28.32	59.76	104.32	91.28	**1062.56**
Effluent Irrigation	W	(QxD)/L	mm/month	47.9	43.3	47.9	46.4	47.9	46.4	47.9	47.9	46.4	47.9	46.4	47.9	**563.9**
Inputs		RR+W	mm/month	168.9	186.5	212.0	155.1	141.8	118.4	91.3	80.5	74.7	107.7	150.7	139.2	**1626.5**
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-77.9	-23.0	-0.1	-16.8	-11.9	-13.0	-48.2	-75.8	-109.8	-98.2	-76.1	-107.6	**-188.8**
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Maximum Storage for Nominated Area	N		mm	**0.00**												
	V	NxL	L	**0**												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	177	304	465	342	373	364	232	180	138	153	176	144	

MINIMUM AREA REQUIRED FOR ZERO STORAGE: **465.4** m^2

Nutrient Balance

Proj Ref: 2122-072

Site Address: 198 Ayrshire Park Drive Middle Boamee

Notes:

INPUT DATA

Hydraulic Load		720	L/Day	
Effluent N Concentration		30	mg/L	
% Lost to Soil Processes		0.2	Decimal	
Total N Loss to Soil		4320	mg/day	
Effluent P Concentration		12	mg/L	
Design Life of System		50	yrs	
Crop N Uptake	250	kg/ha/yr =	68	$mg/m^2/day$
Crop P Uptake	25	kg/ha/yr =	7	$mg/m^2/day$
P-sorption analytical result in soil		15640	kg/ha	
% of Predicted P-sorp		0.5	Decimal	

Nitrogen Balance

Nitrogen uptake ability in vegetation	68	$mg/m^2/day$
Nitrgen loading in wastewater	12796	mg/day
Area required for nitrogen	**187**	m^2

Phosphorus Balance

P adsorbed	0.782	kg/m^2
P uptake	0.125	kg/m^2
P generated	157.68	kg
Area required for Phosphorus	**174**	m^2

Midcoast
Building and
Environmental

BUSH FIRE ASSESSMENT REPORT

Planning Proposal/ Two (2) x Lot Subdivision

Lot 411 DP 1276302
No 198 Ayrshire Park Drive
Boambee

March 2022

41 Belgrave Street, Kempsey NSW 2440 – PO Box 353 Kempsey NSW 2440 – phone 0265631292 – mecham@bigpond.com – ABN 32098436812

1.0 INTRODUCTION

A Bush Fire Assessment Report has been carried out for a proposed planning proposal and two (2) x lot subdivision, for the owners of Lot 411 DP 1276302 No 198 Ayrshire Park Drive, Boambee and Town Planner, Keiley Hunter.

The development application for the subdivision would be an integrated development and has a requirement for a Bushfire Safety Authority under Section 100B of the *Rural Fires Act 1997*.

NOTE

The report has been prepared with all reasonable skill, care and diligence.

The information contained in this report has been gathered from field survey, experience and has been completed in consideration of the following legislation.

1. Rural Fires Act 1997.
2. Environmental Planning and Assessment Act 1979 No 203.
3. Building Code of Australia (2019).
4. Council Local Environment Plans and Development Control Plans where applicable.
5. NSW Rural Fire Services, Planning for Bushfire Protection, 2019. (PBP, 2019).
6. AS 3959-2018 Construction of Buildings in Bushfire Prone Areas.

The report recognizes the fact that no property and lives can be guaranteed to survive a bushfire attack.

The report examines ways the risk of bushfire attack can be reduced where the Planning Proposal/Subdivision falls within the scope of the legislation.

The report is confidential and the writer accepts no responsibility of whatsoever nature, to third parties who use this report or part thereof is made known. Any such party relies on this report at their own risk.

1.1 Objectives

The objectives of this report are to:

- Ensure that the proposed Planning Proposal/Subdivision meets the aims and objectives of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019 and has measures sufficient to minimize the impact of bushfires; and
- Reduce the risk to property and the community from bushfire; and
- Comply where applicable with AS3959 – 2018.

1.2 Legislative Framework

In NSW, the bushfire protection provisions of the BCA are applied to Class 1, 2, 3, Class 4 parts of buildings, some Class 10 and Class 9 buildings that are Special Fire Protection Purposes (SFPPs).

The BCA references AS3959 – 2018 as the deemed-to-satisfy (DTS) solution for construction requirements in bushfire prone areas for NSW.

All development on bushfire prone land in NSW should comply with the bushfire protection measures identified within PBP, 2019.

1.3 Location

The site is Lot 411 DP 1276302 No 198 Ayrshire Park Drive, Boambee.

Locality – Boambee
Local Government Area – Coffs Harbour City Council
Closest Rural Fire Service – Boambee
Closest Fire Control Centre – Coffs Harbour

Figure 1 – Topographic Map

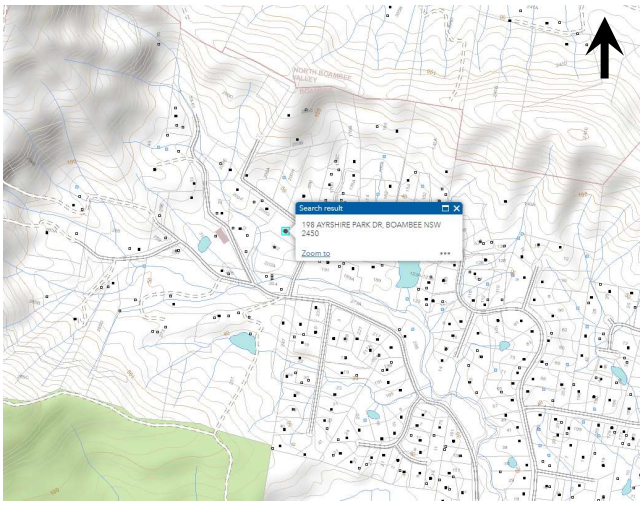


Figure 2 – Aerial View

1.4 Development Proposal and History

It is an existing lot that the owners wish to subdivide into two (2) and will include a planning proposal.

See **Appendix 1**.

2.0 BUSH FIRE ASSESSMENT

2.1 Assessment Methodology

Several factors need to be considered in determining the bushfire hazard.

These factors are slope, vegetation type, and distance from hazard, access/egress and fire weather. Each of these factors has been reviewed in determining the bushfire protection measures.

The assessment of slope and vegetation being carried out in accordance with NSW Rural Fire Service, *Planning for Bushfire Protection*, 2019.

2.2 Slope Assessment

Slope is a major factor to consider when assessing the bushfire risk.

The slopes were measured using a Suunto PM-5/360 PC Clinometer.

The dominant hazard vegetation was identified and the slopes within the vegetation measured.

Table 1 – Hazard Vegetation Slopes

Hazard Aspect	Slope
North	0° Flat
East	0-5° Downslope
West	0° Flat

2.3 Vegetation Assessment

The vegetation on and surrounding the subject site was assessed over a distance of 140m.

The vegetation formations were classified using the system adopted as per Keith (2004) and considering the fuel loads as documented in Planning for Bush Fire Protection, 2019.

2.3.1 Vegetation on the Subject Lot

The existing vegetation on the subject lot is mostly managed. There is an area of remnant vegetation approximately 10m wide on the northern boundary that can be seen in **Photo 6.**

2.3.2 Vegetation on the Adjoining Lots

The adjacent lots are of similar vegetation types, mostly managed with small areas of remnant vegetation or planted vegetation such as hedges. A conservative approach has been adopted with respect to the hazards as some of the adjoining premises will not meet the requirements for

landscaping as set out in PBP, 2019. Because of the width of the vegetation, it is also not likely to constitute a hazard similar to rainforest.

Figure 3

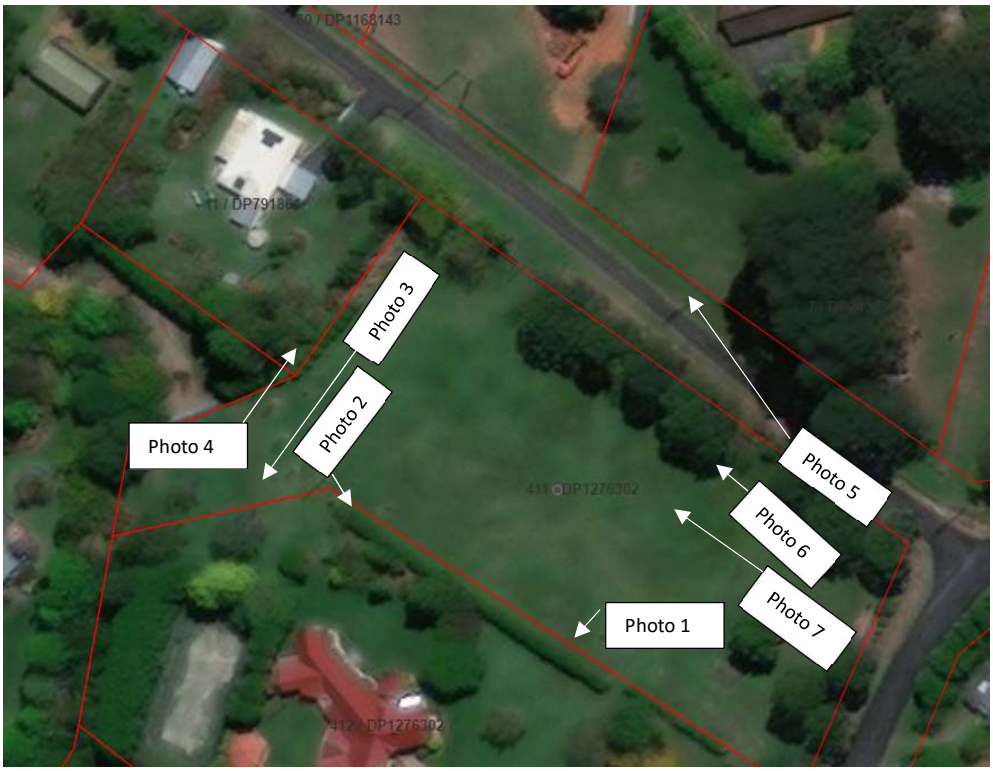


Photo 1 - Hedge to south of property

Photo 2 – Managed grassland behind the hedge

Photo 3 – Managed grassalnd to the west of hedge on the southern boundary

Photo 4 – The hedge at the western end

Photo 5 – Grassland vegetation to the north behind the thin strip of vegetation on northern boundary

Photo 6 – Thin strip of vegetation along northern boundary

Photo 7 – Photo of the subject lot looking from the east

2.4 Hazard

A conservative approach has been adopted with respect to the hazards as some of the adjoining premises will not meet the requirements for landscaping as set out in PBP, 2019. Because of the width of the vegetation, it is not likely to constitute a hazard similar to rainforest, however a hazard similar to rainforest has been adopted. With future reporting an APZ maybe identified and a Bush Fire Attack Level (BAL) may also be identified that is not consistent with the APZ.

Due to width of the hedge and the lack of connection to other hazards and the managed state of the adjoining premises, a hazard has not been identified to the west.

It is noted that the majority of the surrounding area as Category 3.

Figure 4: Hazards

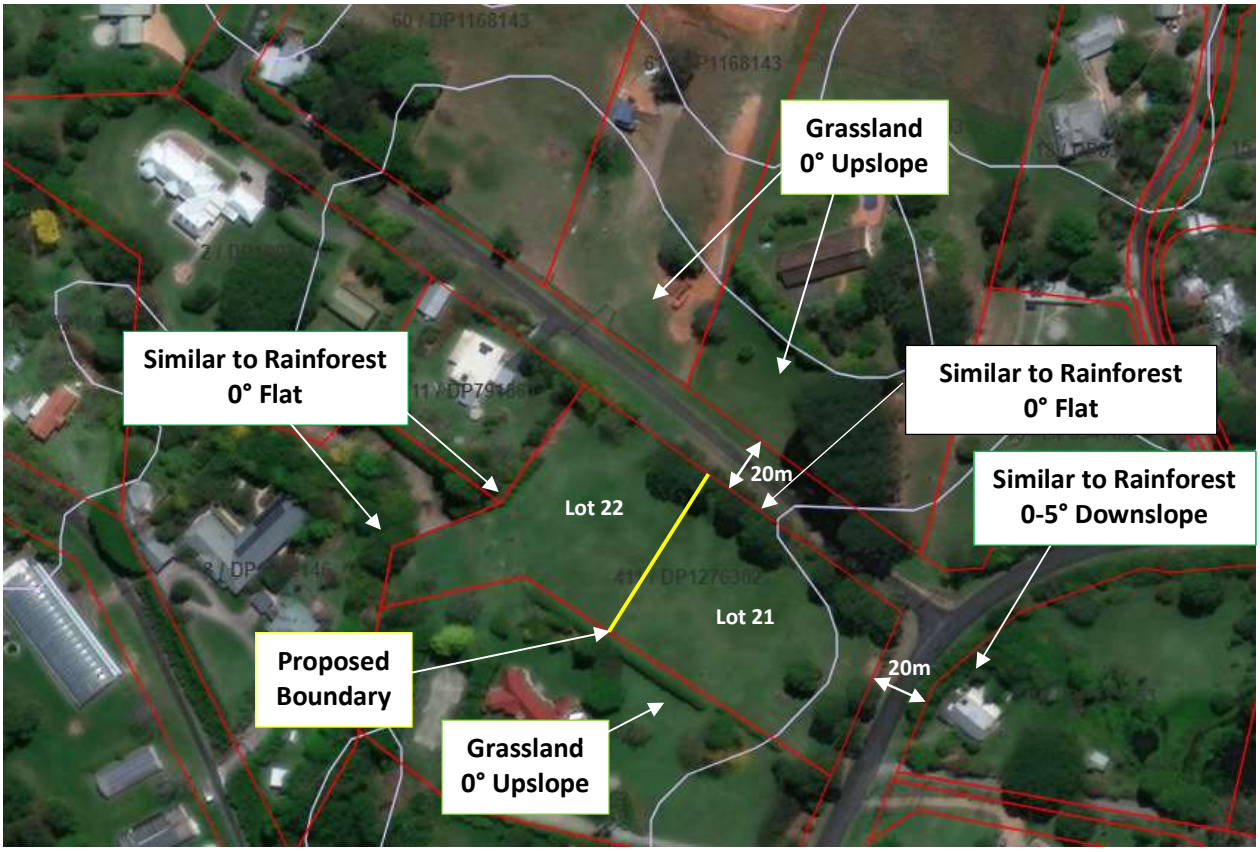


Figure 5 - Bushfire Hazard Mapping

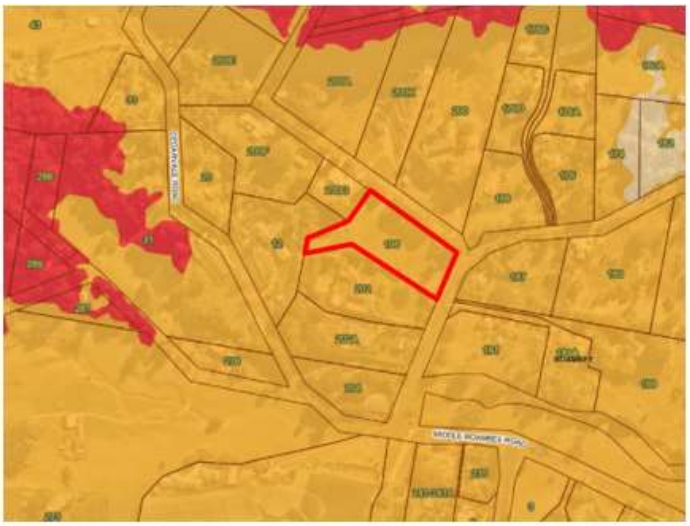


Table 2 – Summary of Hazard Characteristics

Hazard Aspect	Hazard	Slope
North	Similar to rainforest	0° Flat
East	Similar to rainforest	0-5° Downslope
West	Similar to rainforest	0° Flat

2.5 Fire Danger Index

The fire weather for the site is assumed on the worst-case scenario. In accordance with NSW Rural Fire Services, the fire weather for the site is based upon the 1:50 year fire weather scenario and has a Fire Danger Index (FDI) of 80.

3.0 BUSHFIRE THREAT REDUCTION MEASURES

3.1 NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019

The following provisions of PBP 2019 have been identified:

3.1.1 Defendable Space/Asset Protection Zone (APZ)

To ensure that the aims and objectives of NSW Rural Fire Services, PBP, 2019, a defendable space between the asset and the hazard should be provided. The defendable space provides for, minimal separation for safe firefighting, reduced radiant heat, reduced influence of convection driven winds, reduced ember viability and dispersal of smoke.

The proposed development is not considered to be subject to the Special Fire Protection Purpose requirements which are applicable to schools etc, (the proposed development is not a SFPP).

It is recommended that the defendable space for the proposed development be based upon the minimum requirements for Asset Protection Zones as set out in NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019.

Table 3 - APZ Requirements (PBP 2019)

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
North	Similar to rainforest	0° Flat	9m	-	9m
East	Similar to rainforest	0-5° Downslope	11m	-	11m
West	Similar to rainforest	0° Flat	9m	-	9m

The report assumes that both lots with exception of the vegetation identified will continue to be managed as the existing lot as Inner Protection Area. See **Appendix 2** for the indicative Asset Protection Contour lines (i.e. BAL contour lines).

3.1.2 Operational Access and Egress

There is one access to be provided from Ayrshire Park Drive and it is proposed to utilise the existing Crown Road for the other access as can be seen in **Appendix 1.**

It is noted that in the case of existing Crown roads that the specification would comply with the requirements of non-perimeter roads and in this case the Crown Road is approximately 4m wide.

It is recommended that a suitable turning area in accordance with Appendix 3 of PBP, 2019 is provided for each lot. A comparison with a property access road is completed in **Table 4**.

Figure 6

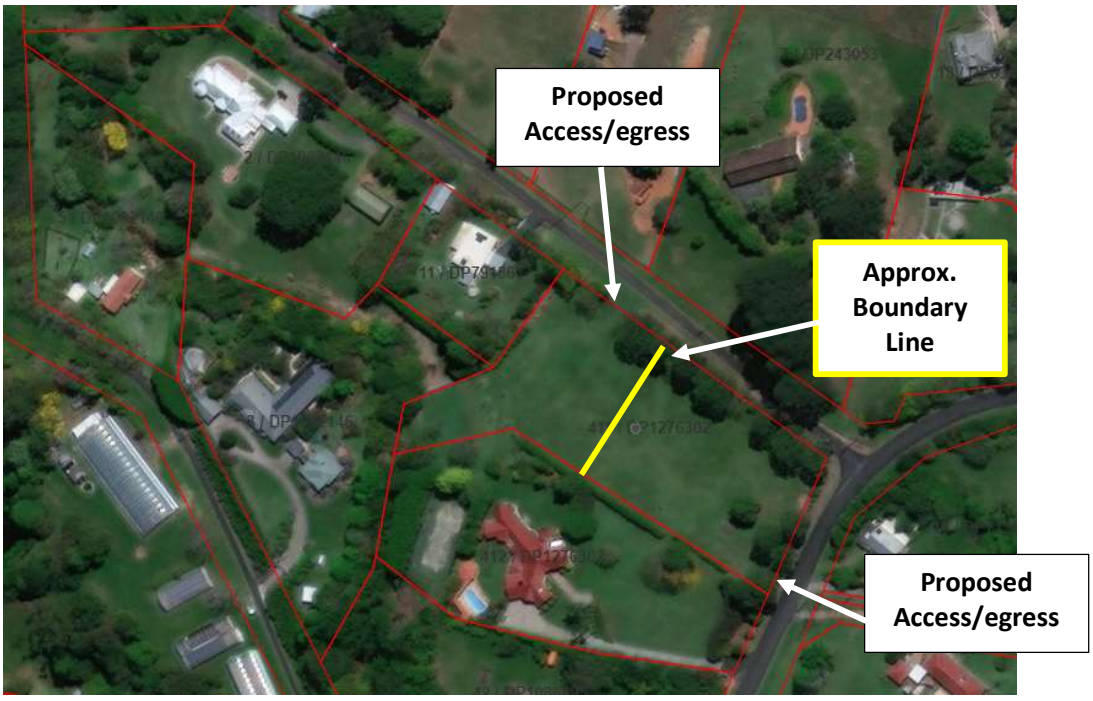


Table 4

Table 5.3b			
Performance criteria		**Acceptable Solution**	**Comment**
PROPERTY ACCESS	**The intent may be achieved where:**		
	Firefighting vehicles can access the dwelling and exit the property safely.	• There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur the following requirements apply: • Minimum 4m carriageway width; • In forest, woodland and heath situations, rural property access roads have passing bays at every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; • A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; • Provide a suitable turning area in accordance with Appendix 3; • Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; • The minimum distance between inner and outer curves is 6m; • The crossfall is not more than 10 degrees; • Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and • A development comprising more than three dwellings has access by dedication of a road and not by right of way.	N/A Existing Crown will comply Driveway less than 200m from Ayrshire Park Drive Will comply To comply see **Appendix 3.** Can comply Can comply Will comply Will comply – Driveways less than 10°. See Report

See **Appendix 3** for Turning Head Options.

3.1.3 Services - Water, Gas and Electricity

As set out in NSW Rural Fire Services**,** *Planning for Bushfire Protection*, 2019, developments in bushfire prone areas must maintain a water supply for firefighting purposes.

Electricity supply is available and will be connected to the subject site. It is assumed the power lines will be underground.

Reticulated water supply is not available. It is recommended that a minimum 10,000 litre water supply for firefighting be provided in accordance with PBP, 2019 to the proposed dwellings as seen in **Table 6**.

Bottled gas supplies are to be installed and maintained in accordance AS 1596. Metal piping is to be used. All fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10m and shielded on the hazard side of the installation. If gas cylinders need to be located close to the building, the release valves are to be directed away from the building and at least 2 metres away from any combustible material so they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal.

Table 5

Table 5.3c			
	Performance Criteria	**Acceptable Solutions**	**Comment**
ELECTRICITY	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings Regular inspection of lines is undertaken to ensure they are not fouled by branches	• Where practical, electrical transmission lines are underground. • Where overhead electrical transmission lines are proposed: 1. Lines are installed with short pole spacing (30 metres) unless crossing gullies, gorges or riparian areas; and 2. No part of a tree is closer to a power line than the distance set out in ISSC3 "Guideline for Managing Vegetation near Power Lines.	To comply
GAS SERVICES	Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	• Reticulated or bottle gas is installed and maintained in accordance with AS 1596:2014 – The storage and handling of LP Gas, the requirements of relevant authorities and metal piping is to be used. • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.	To comply

		• Connections to and from gas cylinders are metal. • Polymer-sheathed flexible gas supply lines are not used. • Above ground gas service pipes are metal, including and up to any outlets.	

Table 6

STATIC WATER SUPPLY	A static water supply is provided for firefighting purposes in areas where reticulated water is not available.	• Where no reticulated water supply is available, water for firefighting purposes is provided in accordance with Table 5.3d; • A connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; 65mm Storz outlet with a ball valve is fitted to the outlet; • Ball valve and pipes are adequate for water flow and are metal; • Supply pipes from tank to ball valve have the same bore size to ensure flow volume; • Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; • A hardened ground surface for truck access is supplied within 4m; • Above ground tanks are manufactured from concrete or metal; • Raised tanks have their stands constructed from non-combustible material or bush fire resisting timber (See Appendix F of AS3959); • Unobstructed access can be provided at all times; • Underground tanks are clearly marked; • Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; • All exposed water pipes external to the building are metal, including any fittings; • Where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bushfire attack; any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and • Fire hose reels are constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.	To comply To comply To comply To comply To comply To comply To comply To comply To comply To comply if provided To comply To comply N/A N/A

3.1.4 Landscaping

Landscaping is a major cause of fire spreading to buildings, and therefore any landscaping proposed in conjunction with the proposed development will need consideration when planning, to produce gardens that do not contribute to the spread of a bushfire.

When planning any future landscaping surrounding any proposed building or rezoning, consideration should be given to the following:

- The choice of vegetation – consideration should be given to the flammability of the plant and the relation of their location to their flammability and ongoing maintenance to remove flammable fuels.
- Trees as windbreaks/firebreaks – Trees in the landscaping can be used as windbreaks and also firebreaks by trapping embers and flying debris.
- Vegetation management – Maintain a garden that does not contribute to the spread of bushfire.
- Maintenance of property – Maintenance of the property is an important factor in the prevention of losses from bushfire.

Appendix 4 of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2019, contains standards that are applicable to the provision and maintenance of Asset Protection Zones.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at the NSW RFS Website www.rfs.nsw.gov.au.

3.2 Construction of Buildings

3.2.1 General

The relevant Bushfire Attack Level and Construction Requirements have been determined in accordance with PBP, 2019 and AS 3959 (2018).

3.2.2 AS3959 – 2018, PBP 2019, Construction of Buildings in Bushfire Prone Areas

The following construction requirements in accordance with AS 3959 – 2019 Construction of Buildings in Bushfire Prone Areas and PBP 2019 is required for the bushfire attack categories.

Table 7

Bushfire Attack Level (BAL)
BAL - LOW No construction requirements under AS 3959-2018
BAL - 12.5
BAL - 19
BAL - 29
BAL - 40
BAL - FZ

The following table indicates the Bushfire Attack Levels applicable:

Table 8 - Categories of Attack/Construction Standard Assessment

Aspect	Hazard	Slope	Distance to Hazard once Proposed APZ Provided	AS 3959-2018 Bushfire Attack Level (BAL)
North	Similar to rainforest	0° Flat	9m	BAL 29
East	Similar to rainforest	0-5° Downslope	11m	BAL 29
West	Similar to rainforest	0° Flat	9m	BAL 29

The minimum Asset Protection Zone contour lines (BAL 29 line) can be seen in **Appendix 2.**

4.0 STRATEGIC PLANNING

After discussions with the RFS and with consideration of the size of the proposal, no assessment was completed with respect to the Strategic Planning Section of PBP, 2019.

5.0 OTHER CONSIDERATIONS

Table 9

Environmental/Heritage Feature	Comment
Riparian Corridor	Not considered in this report
SEPP 14 – Coastal Wetland	Not considered in this report
SEPP 26 – Littoral	Not considered in this report
SEPP 44 – Koala Habitat	Not considered in this report
Areas of geological interest	Not considered in this report
Environment protection zones	Not considered in this report
Land slip	Not considered in this report
Flood prone land	Not considered in this report
National Park Estate or other reserves	Not considered in this report
Threatened Species, populations, endangered ecological communities and critical habitat	Not considered in this report
Aboriginal Heritage	Not considered in this report

6.0 RECOMMENDATIONS

The following recommendations are considered to be integral to this bush fire risk assessment:

1. The minimum Asset Protection Area and BAL 29 line are shown in **Appendix 2** of the report.
2. Access and Egress is to be provided as detailed in Section 3.1.2 of this report.
3. Services as detailed in Section 3.1.3 of this report is to be provided.
4. Adopt landscaping principles in accordance with Section 3.1.4 of the NSW Rural Fire Services, PBP, 2019.

7.0 CONCLUSION

It is suggested that with the implementation of this report, and its recommendations, that the bushfire risk is manageable and will be consistent with the acceptable bushfire protection measures as nominated in PBP, 2019.

This report is however contingent upon the following assumptions and limitations:

Assumptions

1. For a satisfactory level of bushfire safety to be achieved, regular inspection and testing of proposed measures, building elements and methods of construction, specifically nominated in this report, is essential and is assumed in the conclusion of this assessment.
2. There are no re-vegetation plans in respect to hazard vegetation and therefore the assumed fuel loading will not alter.
3. The vegetation characteristics of the subject site and surrounding land remains unchanged from that observed at the time of inspection.

Limitations

1. The data, methodologies, calculations and conclusions documented within this report specifically relate to the proposed planning proposal/subdivision and must not be used for any other purpose.
2. A reassessment will be required to verify consistency with this assessment if there are any alterations and/or additions, or changes to the risk reduction strategy contained in this report.

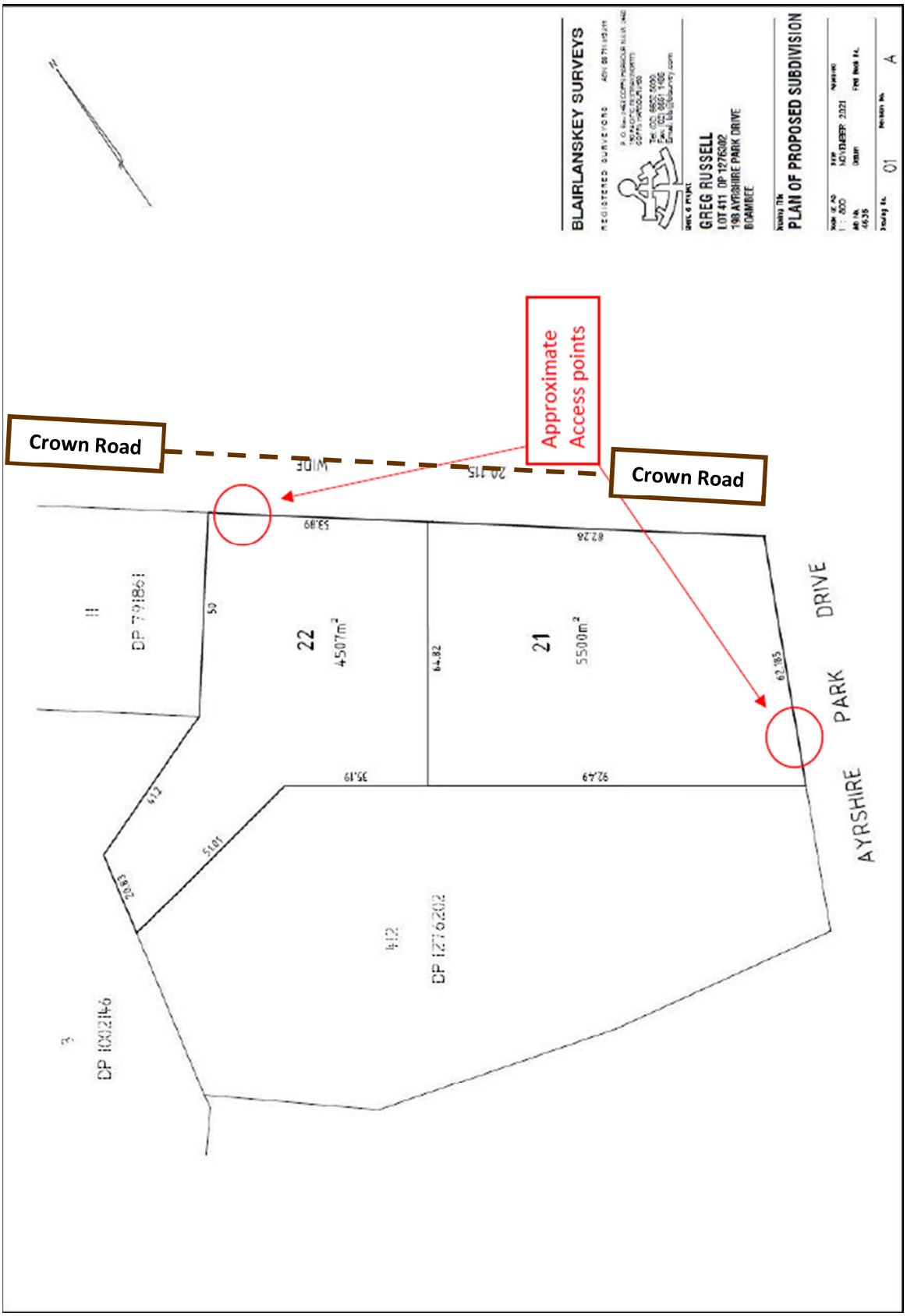
Regards

Tim Mecham
Midcoast Building and Environmental

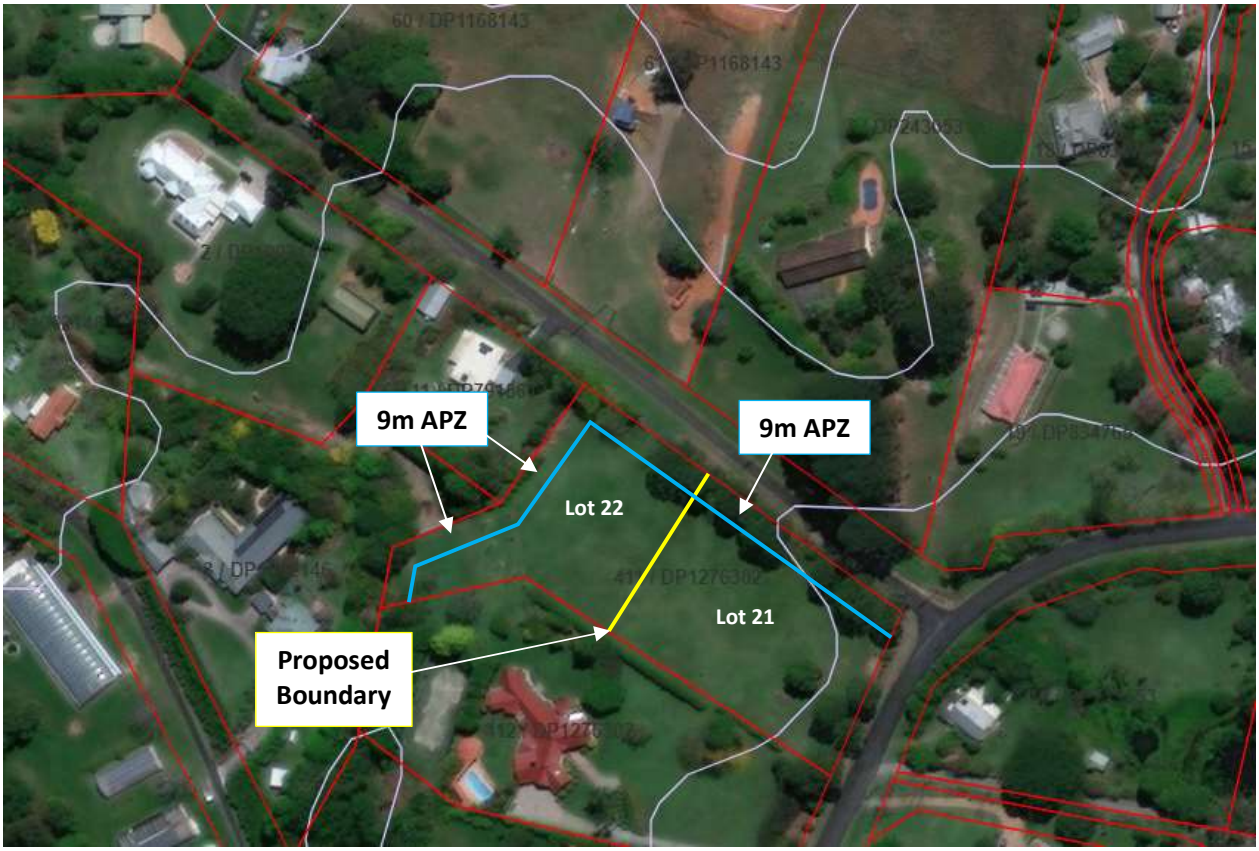
8.0 REFERENCES

NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2019
AS 3959-2018 ***Construction of Buildings in Bushfire Prone Areas***
Keith David 2004, Ocean ***Shores to Desert Dunes, The Native Vegetation of New South Wales and the ACT***, Department of Environment and Conservation
NSW State Government (1997) Rural Fires Act 1997
NSW Rural Fire Service – ***Guideline for Bushfire Prone Land Mapping 2002***

APPENDIX 1 – Subdivision Layout



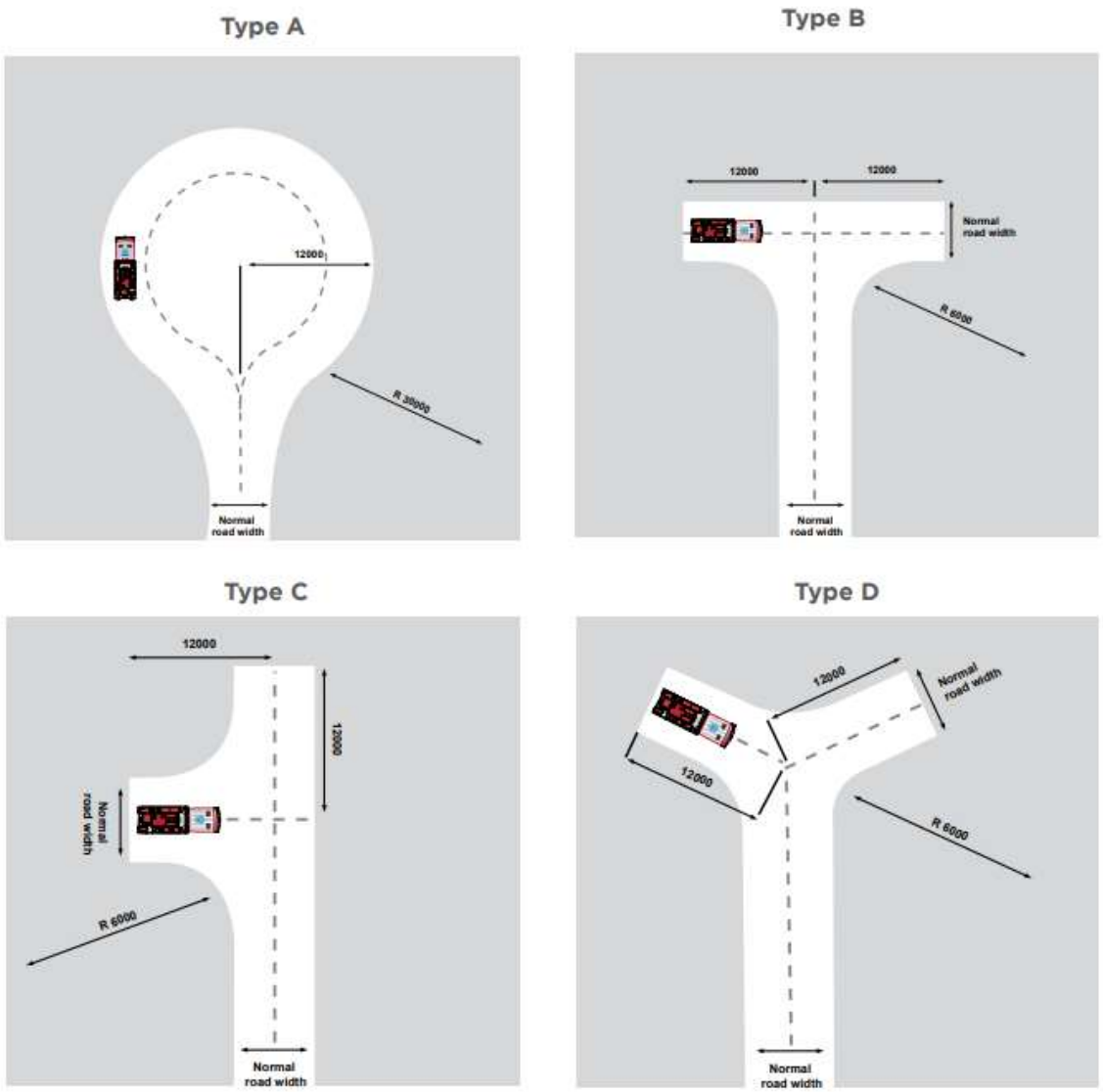
APPENDIX 2: BAL 29 Contour Lines



APPENDIX 3 – Turning Head Options

Figure A3.3

Multipoint turning options.



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Bonville Local Environment Study

Wastewater Assessment

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Document Control Sheet

Document and Project Details	
Document Title:	Bonville Local Environment Study – Wastewater Assessment
Authors:	Shann Mitchell & Jasmin Kable
Project Manager:	Strider Duerinckx
Date of Issue:	21 November 2013
Job Reference:	1098
Synopsis:	Assess the limitations for wastewater management and the potential for rural residential subdivision in the township of Bonville
Client Details	
Client:	Coffs Harbour City Council
Primary Contact:	Harpreet Jenkins

Document Distribution

Version Number	**Date**	**Status**	**DISTRIBUTION – NUMBER OF COPIES** (p – print copy; e – electronic copy)		
			Client	Council	Other
1098-1	22/7/13	DRAFT	1e	-	-
1098-2	22/11/13	FINAL	1e		

Document Verification

Checked by: ***Joe Whitehead***	***Issued by:*** ***Shann Mitchell***

Disclaimer

The information contained in this report is based on independent research undertaken by Shann Mitchell and Jasmin Kable of Whitehead & Associates Environmental Consultants Pty Ltd. To our knowledge, it does not contain any false, misleading or incomplete information. Recommendations are based on an honest appraisal of the site's opportunities and constraints, subject to the limited scope and resources available for this project, and follow relevant best practice standards and guidelines where applicable, including:

- AS/NZS 1547: *On-site Domestic Wastewater Management* (Standards Australia / Standards New Zealand, 2012);
- NSW Department of Local Government (1998) *Environment & Health Protection Guidelines: Onsite Sewage Management for Single Households*; and

Copyright Note

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Tables

Figures

Appendices

1. Introduction

Bonville was identified as a priority release area for the Coffs Harbour Rural Residential Strategy (RRS) (2009) to allow rezoning of land for rural residential subdivision. This report forms part of a broad Local Environment Study for the preparation of a planning proposal to form an amendment to the Coffs Harbour City Local Environment Plan (LEP) 2000 and draft Coffs Harbour LEP 2012.

This Wastewater Assessment provides a hazard assessment of the study area in relation to site and soil limitations which can affect on-site wastewater management and the potential for subdivision. The report also provides a minimum lot size analysis and modelling to determine maximum lot density for subdivision.

1.1. The Study Area

Bonville is located on the Mid North Coast of New South Wales; approximately 13km south of Coffs Harbour to both the east and west of the Pacific Highway. Bonville was selected as a preferred area for rural residential subdivision because of its proximity to other town centres. It is proposed that approximately 420 hectares of land will be released in the area for rural residential/large lot residential subdivision. Preliminary assessments undertaken have determined the most suitable areas, with 17 Candidate Areas identified (CA1-17) for subdivision as shown in Figure 1.

W&A identified an average candidate area based on slopes, soil types and lot sizes upon which to undertake minimum lot size analysis upon. Candidate Area 2 (CA2) was adopted for these purposes. Ten lots were identified within this Candidate Area and minimum lot size analysis undertaken.

2. Site & Soil Assessment

2.1. Slope

Table K1 of *AS/NZS 1547:2012* (Standards Australia 2012) details a range of factors likely to limit the selection and applicability of land application systems; with slope/gradient identified as one critical factor. Steep slopes (>10-15%), particularly when combined with shallow or poorly drained soils, can lead to surface breakout of effluent downslope of the land application area. Conventional On-site Sewage Management (OSSM) systems will most likely be unsuitable and these lots will require a detailed site assessment and site specific design to enable a sustainable outcome. Steeply sloping sites are generally unsuitable for trenches and beds and can also be problematic for surface irrigation systems. Conversely, flat and gently sloping sites are less likely to experience such problems and are considered lower risk.

2.2. Soils

Soils and associated landform elements play a vital role in the design, operation and performance of OSSM systems. Key soil properties can be evaluated to assess a soil's capacity for absorption of wastewater, including soil texture, structure, permeability, drainage characteristics, total depth, and depth to limiting layers, such as bedrock, hardpans or water tables.

There are approximately sixteen (16) mapped soil landscapes within the Bonville Study Area; of which ten (10) soil landscapes fall within the Candidate Areas identified for potential subdivision. Most of the soil landscapes in the Candidate Areas are

characterised by a similar limiting subsoil horizon of light clay. No detailed soil investigations have been undertaken for this project but interpretation based on the Coffs Harbour 1:100,000 soil landscape series (Milford, 1999). Indicates a limiting soil of light clay at approximately 300–400mm depth. Table 1 summarises the soil landscapes within the adopted Candidate Area 2 and provides an overview of the limiting soil horizons. Figure 2 shows the distribution of soil landscapes throughout the study area.

Table 1: Summary of Soil Landscapes (Milford 1999)

Soil Landscape Name	Landscape	Slopes	Vegetation	Soils
Coffs Creek	level to gently undulating floodplains	0-5%	Completely cleared tall open forest	Loamy sand to sandy loam
				Loam
				Clay loam to light clay
				Clay loam to light clay
				Light to medium clay
Megan	Rolling low hills	5-20%	Partially cleared tall open forest and tall closed forest	Loam
				Clay loam
				Light clay
				Clay loam to light clay
Promised Land	Undulating to rolling low hills	3-15%	Extensively cleared tall open forest	Loam
				Clay loam to silty clay loam
				Light clay
				Light clay
				Light to medium clay
Ulong	Undulating to low rolling hills	5-20%	Partially cleared tall open forest and tall closed forest	Loam to silty loam with fine sand
				Clay loam to silty clay loam
				Light to medium clay
				Light to medium clay

The predominant and most limiting soil landscapes in the Candidate Area 2 are the Promised Land and Megan Soil Landscapes. The Megan and Promised Land Soil Landscapes are similarly characterised by dark reddish brown pedal loam to clay loam, moderately structured topsoil (up to 300mm thick) underlain by reddish brown pedal light clay moderately pedal subsoil (to 3.5m depth depending on location). Bedrock is typically greater than 1.5m depth.

Light clay is considered the most limiting soil for effluent application with a Design Loading Rate (DLR) of 5mm/day for trenches and a Design Irrigation Rate (DIR) of 3mm/day for secondary treatment with subsurface irrigation recommended by *AS/NZS 1547:2012.*

2.3. Climate

The nearest Bureau of Metrology (BoM) weather station to Bonville is Coffs Harbour (BoM number 059040). Coffs Harbour experiences a mean annual rainfall of 1,647mm, with a monthly high of 232mm in March and monthly low of 68.2mm in September. Coffs Harbour experiences mean annual pan evaporation of 1,602mm, with a monthly high of 192mm in January and a monthly low of 69mm in June.

Mean rainfall data was conservatively utilised for the modelling of effluent application at this broad scale of study. Selection of the appropriate rainfall data for site specific modelling will be dependent on the size of the development and risk assessment, and may be reduced to "median" rainfall, or increased to 70-90th percentile.

2.4. Water & Nutrient Balance

2.4.1 Primary Treatment with Trenches/Beds

Water balance modelling was undertaken to determine sustainable effluent application rates, and from this estimate the necessary size of the Effluent Management Area (EMA) required for effluent to be applied from a primary treatment system to trench or beds. The procedures used in the water balance generally follow the *AS/NZS 1547:2012* standard and DLG (1998) guideline. The water balance used is a monthly nominated area model. These calculations determined minimum EMAs for given effluent loads for each month of the year. The water balance can be expressed by the following equation:

Precipitation + Effluent Applied = Evapotranspiration + Percolation + Storage

Mean monthly rainfall data was conservatively utilised in the modelling. Mean data has a higher rainfall than median data typically adopted for domestic wastewater investigations. The water balance conservatively assumes a retained rainfall coefficient of 0.8; that is, generally 80% of rainfall will percolate into the soil and 20% will run off. Given the moderate slopes and good groundcover in Candidate Area 2, this is considered a conservative value. The rainfall hydraulic load is incorporated into the water balance to ensure that runoff from the EMA will not occur under typical (design) climate conditions.

Water balance modelling has been based on a four bedroom home on tank water in accordance with *AS/NZS 1547:2012* with a rate of 120L/p/day. The input data and results for the trench water balance are presented in Table 2, and calculation sheets in Appendix A.

A conservative nutrient balance was also undertaken, which calculates the minimum buffer around a trench to enable nutrients to be assimilated by the soils and vegetation. The nutrient balance used here is based on the simplistic DLG (1998) methodology, but improves this by more accurately accounting for natural nutrient cycles and processes. It acknowledges that a proportion of nitrogen will be retained in the soil through processes such as ammonification (the conversion of organic nitrogen to ammonia) and a certain amount will be lost by denitrification, microbial digestion and volatilisation (Patterson, 2003). Patterson (2002) estimates that these processes may account for up to 40% of total nitrogen loss from soil. In this case, a more conservative estimate of

20% is adopted for the nitrogen losses due to soil processes. A summary of the nutrient balance is provided in Table 3..

Table 2: Inputs for and Results of Hydraulic Modelling

Data Parameter	Units	Value	Comments
Hydraulic load	L/day	720	6 persons
Precipitation	mm/month	Coffs Harbour	BoM, mean monthly
Pan Evaporation	mm/month	Coffs Harbour	BoM, mean monthly
Retained rainfall	unitless	0.8	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 10% runoff.
Crop Factor	unitless	0.7-0.8	Expected annual range for vegetation based on monthly values.
Design Loading Rate (DLR)	mm/day	5	Maximum rate for design purposes, based on light clay subsoils.
Minimum trench basal area for hydraulic load (m^2)			**272m^2**

Table 3: Inputs for and Results of Nutrient Balance Modelling

Data Parameter	Units	Value	Comments
Effluent total nitrogen concentration	mg/L	60	Target effluent quality for primary treatment systems.
Nitrogen lost to soil processes (denitrification and volatilisation)	annual percentage	20	Patterson (2002).
Effluent total phosphorus concentration	mg/L	30	Target effluent quality for primary treatment systems.
Soil phosphorus sorption capacity	mg/kg	702	Value based on reported data for soil landscape.
Nitrogen uptake rate by plants	kg/Ha/yr	130	Conservative estimated value.
Phosphorus uptake rate by plants	kg/Ha/yr	25	Conservative estimated value.
Design life of system (for nutrient management)	years	50	Reasonable minimum service life for system.
Minimum irrigation area for total phosphorus load, without off-site export			**970m^2**
Minimum irrigation area for total nitrogen load, without off-site export			**761m^2**

2.4.2 Secondary Treatment with Irrigation

Water and nutrient balance modelling was also undertaken to determine sustainable sizing of irrigation EMAs. The procedures for this generally follow the DLG (1998) guidelines.

The water balance used is a monthly model adapted from the "Nominated Area Method" described in DLG (1998). These calculations determined minimum EMA sizes for given effluent loads for each month of the year. The water balance can be expressed by the following equation:

Precipitation + Effluent Applied = Evapotranspiration + Percolation + Storage

Irrigation areas are calculated to achieve no net excess of water and hence zero storage for all months.

A conservative nutrient balance has also been undertaken. The water and nutrient balances were modelled using the estimated average daily effluent load of 720L/day based on a four bedroom dwelling on tank water. Table 4 and Table 5 below contain the input data and results of the water and nutrient balances.

Table 4: Inputs for and Results of Water Balance Modelling

Data Parameter	Units	Value	Comments
Average effluent load	L/day	720	Design dwelling 4 bedrooms, 120 L/person/day.
Precipitation	mm/month	Coffs Harbour	BoM, mean Monthly
Pan Evaporation	mm/month	Coffs Harbour	BoM, mean Monthly
Retained rainfall	unitless	0.8	Proportion of rainfall that remains onsite and infiltrates the soil, allowing for 20% runoff.
Crop Factor	unitless	0.7-0.8	Expected annual range for vegetation based on monthly values.
Design Irrigation Rate (DIR)	mm/day	3	Maximum rate for design purposes, based on light clay subsoils.
Minimum irrigation area for hydraulic load, without wet weather storage (m^2)		**1,043**	Assuming zero wet weather storage.

Table 5: Inputs for and Results of Nutrient Balance Modelling

Data Parameter	Units	Value	Comments
Effluent total nitrogen concentration	mg/L	30	Target effluent quality for secondary treatment systems.
Nitrogen lost to soil processes (denitrification and volatilisation)	annual percentage	20	Patterson (2002).
Effluent total phosphorus concentration	mg/L	15	Target effluent quality for secondary treatment systems.

Data Parameter	Units	Value	Comments
Soil phosphorus sorption capacity	mg/kg	702	Value based on reported data for soil landscape.
Nitrogen uptake rate by plants	kg/Ha/yr	130	Conservative estimated value.
Phosphorus uptake rate by plants	kg/Ha/yr	25	Conservative estimated value.
Design life of system (for nutrient management)	years	50	Reasonable minimum service life for system.
Minimum irrigation area for total phosphorus load, without off-site export			**381m^2**
Minimum irrigation area for total nitrogen load, without off-site export			**486m^2**

As a result of the two water and nutrient balances undertaken for absorption trenches and irrigation areas, the most limiting balance has been used in calculating lot density in Section 4 below (Table 6). Based on the modelling, a minimum EMA of 1,043m^2 required for secondary treatment with subsurface irrigation has been adopted.

Table 6: Minimum Land Application Area Required

LAA system	Area Required
Trench/Bed Absorption System	970m^2
Subsurface Irrigation	1,043m^2

2.5. Buffer Distances

Buffer distances from EMAs are typically enforced to minimise risk to public health, maintain public amenity and protect sensitive environments. Generally, adopted environmental buffers for subsurface irrigation based on DLG (1998), are:

- 250m from domestic groundwater bores;
- 100m from permanent watercourses;
- 40m from downslope intermittent watercourses and dams;
- 12m from property boundaries; and
- 6m if area up-gradient and 3m if area down-gradient of buildings.

These buffer distances have been applied to our Minimum Lot Size Analysis for all future OSSM systems in the assessed Candidate Area. Figure 3 highlights the buffers to watercourses within the Bonville LES study area.

3. Minimum Lot Size Analysis

3.1. Methodology

When considering the suitability for a lot to sustainably manage wastewater on-site, we typically refer to 'adequate available area'. This broadly refers to available areas (i.e. not built out or used for a conflicting purpose) where OSSM will not be unduly constrained by underlying site and soil characteristics. Available area on a developed (or potentially developable) lot is determined by the following factors:

- total building area (including dwellings, sheds, pools etc.);
- driveways and paths (impervious areas), and gardens/vegetated areas unsuitable for effluent reuse;
- dams, intermittent and permanent watercourses running through lots; and
- maintenance of appropriate setback distances from property boundaries, buildings, driveways and paths, dams and watercourses.

Available areas may also be unsuitable or constrained for OSSM, due to other factors, including (but not limited to):

- excessive slope;
- excessively shallow soils;
- heavy (clay) soils with low permeability;
- excessively poor drainage and/or stormwater run-on; and
- excessive shading by vegetation.

Ten (10) representative lots were selected that have already been subdivided to ~1ha or less lot sizes (zoned R5) from the Bonville LES study area associated with Grandis Road and Faviell Drive (Figure 4). Selected lots typically included a dwelling, garage/shed, pool, trees and shrubs and impervious surfaces (driveways, tanks etc). It is assumed that this existing development style will be similar to that proposed for the Candidate Areas and therefore minimum lot size and development potential should be consistent.

The residual areas (areas not otherwise occupied by improvements, buffers or conservation vegetation) were then calculated for the selected lots (eg. Figure 5), and the results recorded. A percentage of the total lot area that is available for effluent disposal was then determined and the lowest percentage of available area to lot size was then used to conservatively determine the minimum lot size.

3.2. Results

Table 7 shows the assessment of available area for each lot. As is evident the variability of lot sizes and on-lot improvements of developed lots in the study area makes selection of a "typical" lot difficult, however, we have adopted a conservative approach to define minimum sustainable lot size as many lots are affected by watercourses which were not always evident within the 10 lots assessed.

From the sample selection of lots investigated the minimum percentage of the lot available for effluent disposal is 27%. The corresponding minimum lot size (for sustainable irrigation of secondary effluent) is 3,863m^2. Thus, a conservative minimum lot size for subdivision in the study area would be ~4,000m^2. This lot size allows for development of the site with a four bedroom (or smaller) dwelling together with

associated driveways, sheds, paths and pool, whilst still providing sufficient area for secondary wastewater treatment and sustainable land application.

The selection of 4,000m^2 as the minimum lot size presents a conservative approach that is similar in comparison to lot sizes that have been calculated for other catchments that have been assessed on the mid north coast. As can be seen by the variability in results, some lots may be capable of being developed to a smaller lot size. In addition, we assumed secondary treatment without full nutrient reduction capabilities, and use of mean rainfall rather than median rainfall which has resulted in larger required EMAs than could be achieved with site specific assessment and design.

Table 7: Minimum Lot Size Assessment Results

Lot	Lot Area (m^2)	Developed Area (m^2)	Available Area (m^2)	Percentage of Lot Available for Eff. Disp. (%)	Area required for Secondary Treatment (m^2)	Minimum Lot Size (m^2)
1	20,106	14,257	5,849	30	1,043	3,585
2	19,051	11,392	7,659	40	1,043	2,594
3	6,842	4,858	1,984	29	1,043	3,597
4	7,018	3,727	3,291	47	1,043	2,224
5	4,387	3,088	1,299	30	1,043	3,522
6	10,591	6,844	3,747	35	1,043	2,948
7	4,407	3,227	1,180	27	1,043	3,895
8	4,387	3,151	1,236	28	1,043	3,702
9	20,077	4,154	15,923	80	1,043	1,315
10	13,122	5,460	7,662	58	1043	1,786

4. Maximum Lot Density

The maximum number of 4,000m^2 lots was assessed for each of the lots within Candidate Area 2 (CA2) based on the lesser of the amount derived from total lot size or the amount derived following an aerial photograph review of available area. CA2 was selected due to its large variety of lot sizes, large total area and number of surface water features which may affect future development.

Table 8 provides the results of this assessment. In total, for the about 1,191.7ha CA2, 373 lots could be sustainably generated at a rate of 1.94lots/ha.

Table 8: Maximum Lot Density Assessment

Lot Number *	Total Lot Area m^2	Available Area m^2	Max No. Lots Using Lot size	Max No. Lots Using Min OSSM	Maximum Subdivision Potential for Lot
1	115,222	26,690	28.81	25.42	25
2	8,398	5,909	2.10	5.63	2
3	15,552	199	3.89	0.19	0
4	8,972	2,597	2.24	2.47	2
5	50,336	5,545	12.58	5.28	5
6	43,406	3,952	10.85	3.76	4
7	16,557	11,067	4.14	10.54	4
8	29,123	11,628	7.28	11.07	7
9	4,138	791	1.03	0.75	1
10	3,753	909	0.94	0.87	1
11	16,767	11,111	4.19	10.58	4
12	29,238	14,845	7.31	14.14	7
13	20,608	11,540	5.15	10.99	5
14	2,004	2,004	0.50	1.91	1
15	16,954	16,401	4.24	15.62	4
16	22,974	22,974	5.74	21.88	6
17	20,944	20,944	5.24	19.95	5
18	52,751	37,198	13.19	35.43	13
19	50,100	36,851	12.53	35.10	13
20	41,021	17,111	10.26	16.30	10
21	38,711	26,221	9.68	24.97	10
22	40,337	23,813	10.08	22.68	10
23	4,098	4,098	1.02	3.90	1
24	40,782	7,383	10.20	7.03	7
25	40,160	8,973	10.04	8.55	9
26	3,700	1,932	0.93	1.84	1
27	22,486	9,612	5.62	9.15	6
28	24,480	16,555	6.12	15.77	6
29	3,865	3,865	0.97	3.68	4
30	14,973	13,603	3.74	12.96	4
31	4,165	4,165	1.04	3.97	1
32	3,693	1,303	0.92	1.24	1
33	21,233	19,637	5.31	18.70	5
34	197,360	24,029	49.34	22.88	23
35	70,776	6,079	17.69	5.79	6
36	44,391	34,811	11.10	33.15	11
37	280,275	45,368	70.07	43.21	43
38	283,211	79,769	70.80	75.97	71
39	54,207	2,926	13.55	2.79	3
40	156,183	34,233	39.05	32.60	33

Note:
* Lot numbers are an identifier for assessment purposes only. They are not actual Lot/DP numbers.

5. Cumulative Impact Assessment

5.1. Rationale and Methodology

We assessed the sustainability of the lot density for application of wastewater on the local receiving environment from OSSM systems. Desktop data was used to model OSSM operation and pollutant discharge to groundwater and sensitive surface receptors for CA2 using the Decentralised Sewer Model (DSM) as described below.

5.2. Decentralised Sewerage Model

The DSM is a GIS based tool designed to compare a range of wastewater servicing options and has the ability to assess long term environmental and human health performance of wastewater systems.

The DSM was developed by W&A for the purpose of providing a rapid-assessment tool to predict the performance of on-site and decentralised wastewater management systems under varying environmental conditions. It does this by simulating the movement of pollutants (nitrogen, phosphorus and pathogens) within the effluent load as it travels from the point source (on-site or community-scale systems) down the catchment as surface or subsurface flows. The model simulates a 72 year period and is designed to provide conservative estimates of OSSM system performance CA2.

The DSM has five modules, an on-lot performance module, a particle tracking module, a node-link module, a central management components module and a costing module.

It is important to note that the OLPM makes the conservative assumption that the entire, non-attenuated pollutant load is transported down the catchment and that no dilution occurs within the receiving waters. The key model inputs are provided in Table 9 below. The raw data as used in the DSM has been included in Appendix B as well as the raw outputs.

Table 9: Input Data Summary for DSM

Input Parameter	Unit	On-site Scenario
Average Wastewater Flow per system	L/day (m^3/day)	720 (0.72)
Total Average Wastewater Flow per system	ML/year	0.02628
EMA Type	-	Future Development - SSI 325 systems Existing Development - Trenches 43 systems not upgraded
Application Type	-	No storage with fixed rate
Storage Type	-	No storage
Effluent Total Nitrogen Concentration	mg/L	SSI - 30 Trench - 60
Effluent Total Phosphorus Concentration	mg/L	15
Effluent Virus Concentration[1]	MPN/100mL	SSI – 100 Trench – 10,000,000
Average Annual Rainfall	mm	1,647
Average Annual Evaporation	mm	1,602

Input Parameter	Unit	On-site Scenario
Average Air Temperature (in lieu of ground temperature)	ºC	21.8
Crop Factor [2]	unitless	0.7-0.8 grass
Buffer From Dam/Intermittent Waterway	m	40
Buffer From Property Boundaries	m	12
Buffer From Driveways	m	6
Slope	%	5-20
Required Effluent Application Area	m^2	SSI - 1043 Trench - 272
Soil Phosphorus Adsorption (P-sorb) Capacity	mg/kg	702
Soil Depth for P-sorb	mm	800
Fixed Application Rate	Mm/day	SSI - 3 Trench - 5
Crop Nitrogen Uptake [3]	kg/ha/year	130
Crop Phosphorus Uptake [3]	kg/ha/year	25
Attenuation Rate for Total Phosphorus	%	94
Attenuation Rate for Total Nitrogen	%	93
Attenuation Rate for Viruses	%	97
Attenuation for Surface Flow	%	0.6

5.3. DSM Results

The predicted deep drainage of nutrients and viruses from the developed CA2 that reaches Bonville Creek was compared to expected background deep drainage from an agricultural catchment. Figure 6 provides an overview of the layout of the DSM model for CA2. A summary of the results of the DSM is provided in Table 10 below.

The results from the DSM modelling indicated that mean annual nutrient concentrations in deep drainage represented less than a 1% increase on existing background pollutant levels, and there were no net increase in nutrients in surface runoff. The DSM modelling also indicates that virus surface runoff would not occur at the applied loading rate and that virus deep drainage is very low.

Based on this, by improving the level of treatment and land application of OSSM an increase in lot density is predicted to have negligible effect on nutrient and virus export from the catchments and that the predicted maximum lot density is sustainable.

Table 10: Average Daily Modelled Deep Drainage

(For Candidate Area 2)	TP kg/day	TN kg/day	Virus MPN/m^2/day
Background Pollutants (Fletcher, 2004)	1.27	5.39	-
W&A DSM Model Deep Drainage	$3.7x10^{-5}$	$2.3x10^{-4}$	0.03
% increase from background levels	0.0029	0.0043	-
W&A DSM Model Surface Discharge	0	0	0
% increase from background levels	0	0	0

* All percentages are relative to the total background load generated annually (Fletcher et al., 2004)

5.4. Discussion

Whilst the DSM modelling undertaken has shown that one system per 4,000m^2 is sustainable, the limitations of this study should be noted. This study has been undertaken and based on a desktop analysis of site and soil data, there were no provisions for soil sampling and confirmation of site conditions throughout the study area and therefore individual site conditions may vary. As a consequence conservative modelling was undertaken using assumed soil and climate parameters to overestimate the minimum areas and maximum lot densities achievable.

Therefore is would still be necessary to undertake detailed land capability assessments for each lot prior to subdivision to ensure that there is sufficient available area OSSM land application plus improvements for each lot within a proposed subdivision which meets Council requirements.

6. Conclusions

This report provides a desktop hazard assessment of the study area in relation to site and soil limitations which can effect on-site wastewater management and the potential for subdivision.

The recommended minimum lot size for future subdivision is 4,000m^2 and DSM modelling indicates that lot density for subdivision allows one onsite wastewater management system per 4,000m^2. Due to the unique locality and minimum available area for effluent management identified within the CA2 we recommend that all future subdivision require a detailed land capability assessment for onsite wastewater management to ensure any proposed subdivision can be sustainable.

7. References

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FIGURES

Figure 1:
Existing Planning Scheme Zones Map Showing Selected Candidate Area and Lots for Assessment

CHCC Planning Zones (2009)

- R5
- R1
- Wetlands
- National Parks
- Roads
- Creeks
- RU2
- W2
- Forests
- W1
- SP2
- RU3
- R2
- E2
- E1
- RE1

- Bonville Study Area
- Candidate Areas 1-17
- Selected Candidate Areas and Lots for Assessment

Project: Bonville LES- Wastewater Assessment
Drawn: Jasmin Kable
Date: 17 July 2013
Scale: Not to Scale

N

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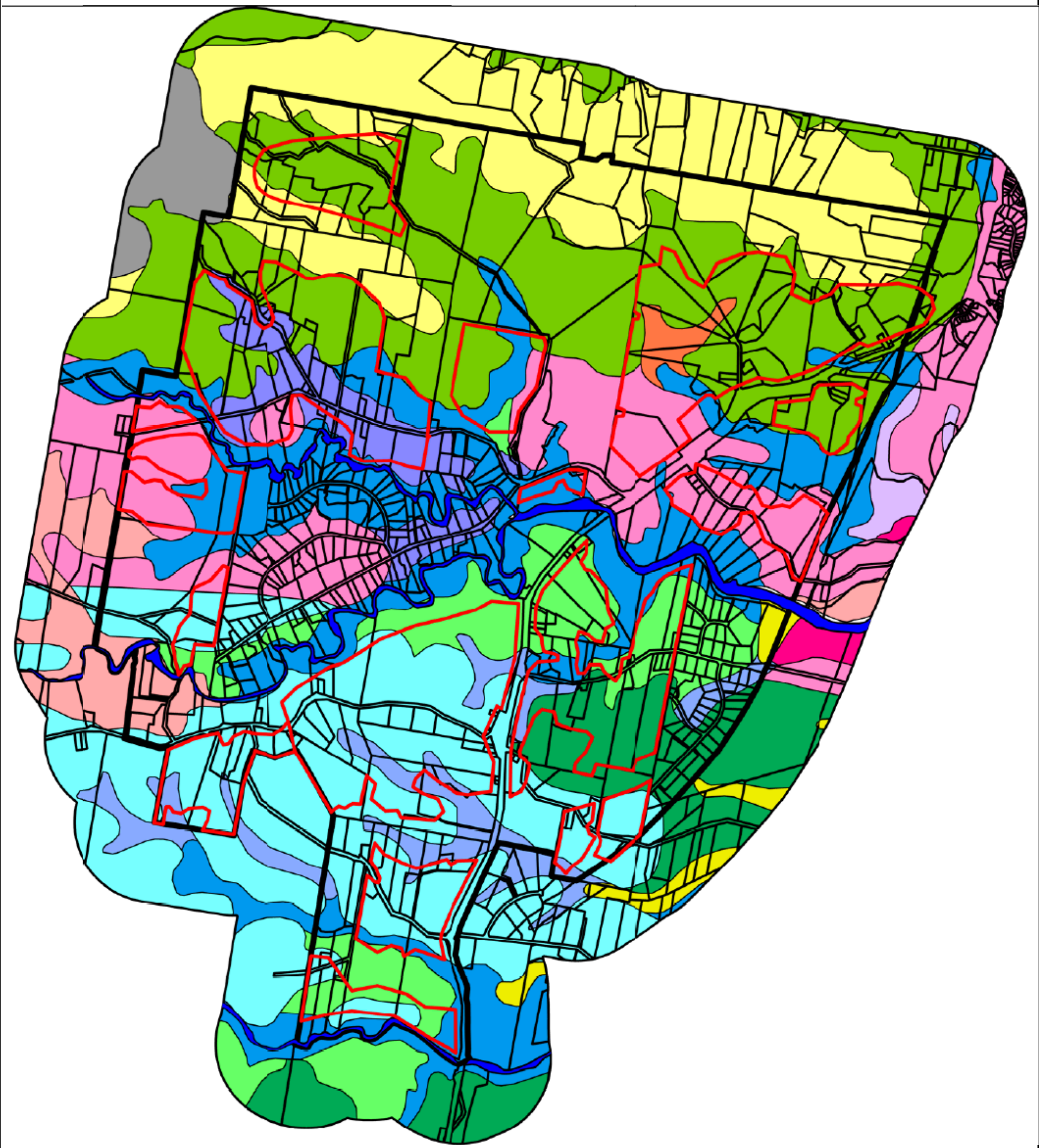

Figure 2:
Soil Landscape Map of Bonville

NEWRY
COFFS CREEK
SUICIDE
MEGAN
NEVER NEVER
TOORMINA
PINE CREEK
DAIRYVILLE
ULONG
GLENIFFER
PROMISED LAND
BONVILLE
COFFS HARBOUR
COFFS CREEK variant a
Bonville Study Area
Candidate Areas

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Figure 3:
Buffer Analysis of Bonville Showing Available Areas for OSSM

Bonville Study Area
Candidate Areas
Buffers
Cadastre
Creeks
Surface Water Features

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Scale: Not to Scale

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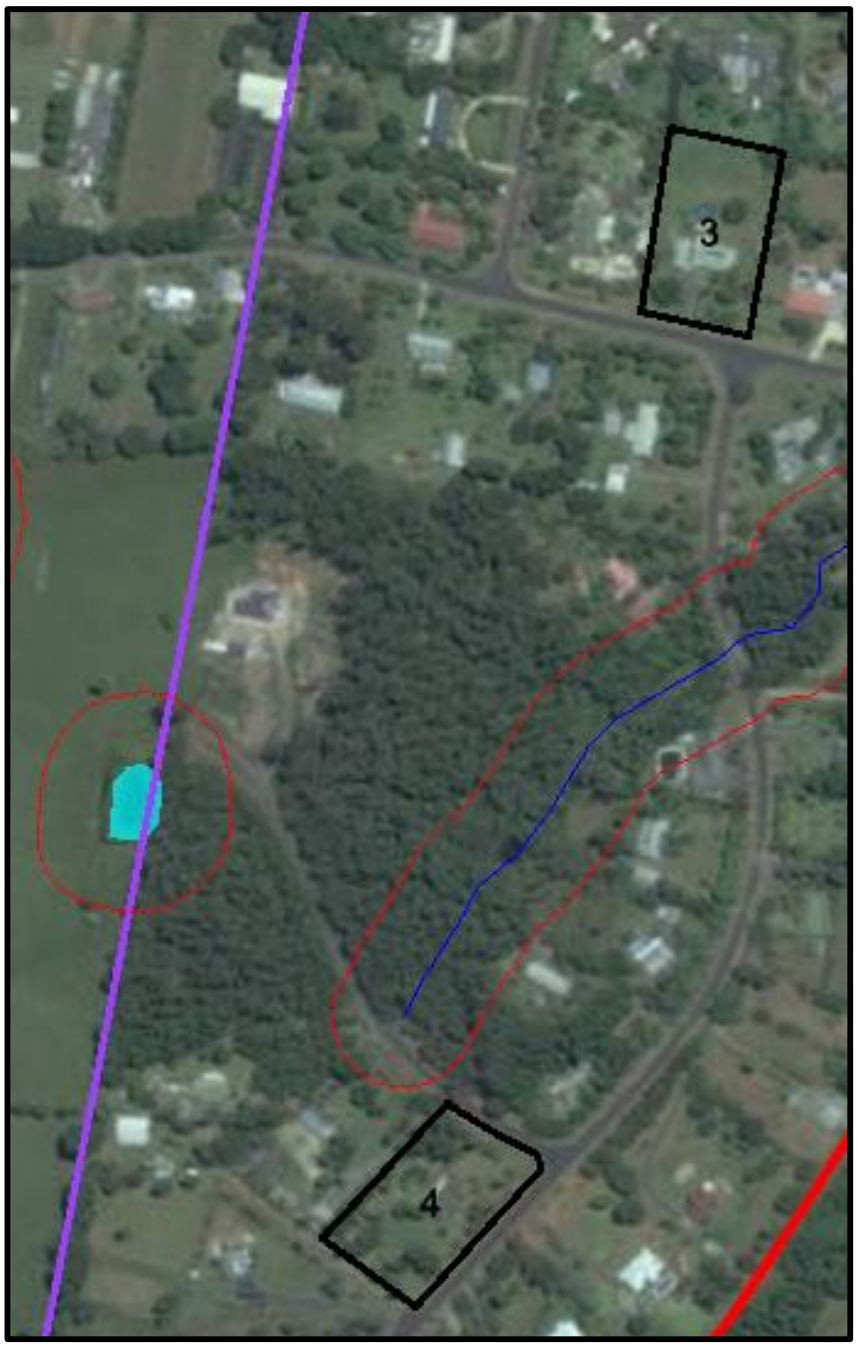

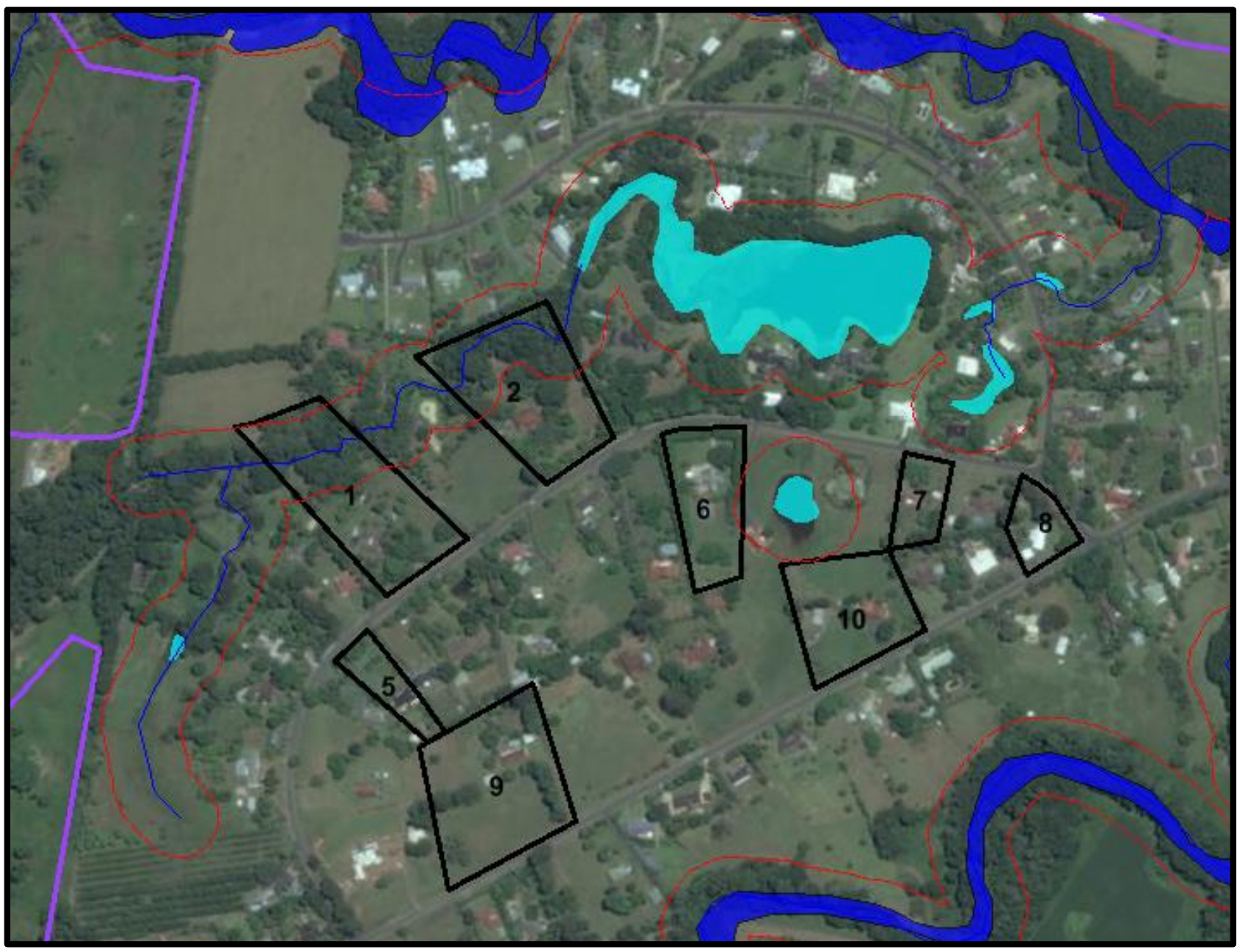

Figure 4:
Overview of Minimum Lot Size Analysis

Candidate Area Boundary
Lot Boundary
Buffers
Creeks
Surface Water Features

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Figure 5:
Minimum Lot Size Analysis- Lot 1

Lot Boundary
Buffers
Available Area for OSSM
Creeks
Surface Water Features

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Figure 6:
Decentralised Sewage Model, Bonville

Selected Candidate Area
Buffers
Cadastre
Creeks
Surface Water Features
*Soil Landscapes as labelled

Link
Receiving Node
Site Point (Individual OSSM systems)

*Digital Elevation Model underlay (red is highest elevation and dark blue is the lowest elevation)

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Scale: Not to Scale

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APPENDIX A

Water & Nutrient Balances

Nominated Area Water Balance & Storage Calculations - Trench/Bed Design

Whitehead & Associates
Environmental Consultants Pty Ltd

Site Address: **Bonville Subdivision**

INPUT DATA

Design Wastewater Flow	Q	720	L/day	Estimated daily flow from residence with tank water
Daily DLR		5.0	mm/day	Litres per sq.m. per day - recommended max loading rate based on AS/NZS 1547:2012 for primary effluent
Nominated Land Application Area	L	272	m sq	Used for iterative purposes to determine storage requirements based on nominated trench/bed bottom area
Crop Factor	C	0.7	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type
Retained Rainfall	RR	0.8	unitless	Proportion of rainfall that remains onsite and infiltrates; function of slope/cover, allowing for any runoff
Void Space Ratio	V	0.3	unitless	Proportion of bed/trench that is available for storage
Rainfall Data		BOM Coffs Harbour		Mean Monthly data
Evaporation Data		BOM Coffs Harbour		Mean Monthly data

WW Flow Allowance	120	L/p/d
No. of Bedrooms	4	Bdrm
Occupancy	1.5	p/Bdrm

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	**365.0**
Rainfall	R	\	mm/month	169.3	207	232	189	138.4	129.9	93.9	81.3	68.2	95.7	104.4	136.8	169.3	207.0	232.0	189.0	138.4	129.9	**1,647**
Evaporation	E	\	mm/month	192.2	156.8	148.8	117	86.8	69	77.5	102	139.5	161.2	171	192.2	192.2	156.8	148.8	117.0	86.8	69.0	**1,602**
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.80	0.70	0.70	0.70	
OUTPUTS (LOSSES)																						
Evapotranspiration	ET	ExC	mm/month	154	125	119	82	61	48	54	71	98	129	137	154	154	125	119	82	61	48	**1,232.0**
Percolation	B	(DLR)xD	mm/month	155.0	140.0	155.0	150.0	155.0	150.0	155.0	155.0	150.0	155.0	150.0	155.0	155.0	140.0	155.0	150.0	155.0	150.0	**1,825.0**
Outputs		ET+B	mm/month	308.8	265.4	274.0	231.9	215.8	198.3	209.3	226.4	247.7	284.0	286.8	308.8	308.8	265.4	274.0	231.9	215.8	198.3	**3,057.0**
INPUTS (GAINS)																						
Retained Rainfall	Re	R*RR	mm/month	135.4	165.6	185.6	151.2	110.7	103.9	75.1	65.0	54.6	76.6	83.5	109.4	135.4	165.6	185.6	151.2	110.7	103.9	**1,316.7**
Applied Effluent	W	(QxD)/L	mm/month	82.1	74.1	82.1	79.4	82.1	79.4	82.1	82.1	79.4	82.1	79.4	82.1	82.1	74.1	82.1	79.4	82.1	79.4	**966.2**
Inputs		Re+W	mm/month	217.5	239.7	267.7	230.6	192.8	183.3	157.2	147.1	134.0	158.6	162.9	191.5	217.5	239.7	267.7	230.6	192.8	183.3	**2,282.9**
STORAGE CALCULATION (Δ)																						
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(Re+W)-(ET+B))^	mm/month	-304.2	-85.7	-21.3	-4.3	-76.6	-49.9	-173.6	-264.3	-378.9	-417.8	-412.9	-390.9	-304.2	-85.7	-21.3	-4.3	-76.6	-49.9	**-2,580.4**
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Maximum Storage Depth for Nominated Area	N		mm	**0.0**																		
Maximum Storage Vol. for Nominated Area	V	NxL	L	**0**																		
BOTTOM AREA REQUIRED FOR ZERO STORAGE			m^2	129	202	252	268	212	229	166	138	112	108	106	112	129	202	252	268	212	229	

MINIMUM BOTTOM AREA REQUIRED FOR ZERO STORAGE: **267.7** m^2

Value is based on the worst month of the year, so the balance overestimates the storage requirement for all other months. Assumes zero effluent depth (storage) in trench/bed. Model is run for 18-months to ensure trench/bed empties at least once per cycle.

Nutrient Balance

Site Address: **Bonville**

Whitehead & Associates
Environmental Consultants Pty Ltd

Please read the attached notes before using this spreadsheet.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED ON THE MOST LIMITING BALANCE = **970 m^2**

INPUT DATA [1]

Wastewater Loading			Nutrient Crop Uptake					
Hydraulic Load	720	L/Day	Crop N Uptake	130	kg/ha/yr	which equals	36	$mg/m^2/day$
Effluent N Concentration	60	mg/L	Crop P Uptake	25	kg/ha/yr	which equals	7	$mg/m^2/day$
% Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal	**Phosphorus Sorption**					
Total N Loss to Soil	8,640	mg/day	P-sorption result	702	mg/kg	which equals	7,862	kg/ha
Remaining N Load after soil loss	34,560	mg/day	Bulk Density	1.4	g/cm3			
Effluent P Concentration	30	mg/L	Depth of Soil	0.8	m			
Design Life of System	50	yrs	% of Predicted P-sorp. [2]	0.5	Decimal			

METHOD 1: NUTRIENT BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer		
Nitrogen	970.34	m^2
Phosphorus	760.83	m^2

Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)		
Nominated LAA Size	1,044.00	m^2
Predicted N Export from LAA	-0.96	kg/year
Predicted P Export from LAA	-2.93	kg/year
Phosphorus Longevity for LAA	78	Years
Minimum Buffer Required for excess nutrient	0	m^2

PHOSPHORUS BALANCE
STEP 1: Using the nominated LAA Size

Nominated LAA Size	1,044	m^2				
Daily P Load	0.0216	kg/day	→	Phosphorus generated over life of system	394.2	kg
Daily Uptake	0.007151	kg/day	→	Phosphorus vegetative uptake for life of system	0.125	kg/m^2
Measured p-sorption capacity	0.78624	kg/m^2				
Assumed p-sorption capacity	0.393	kg/m^2	→	Phosphorus adsorbed in 50 years	0.393	kg/m^2
Site P-sorption capacity	410.42	kg	→	Desired Annual P Application Rate	10.818	kg/year
				which equals	0.02964	kg/day
P-load to be sorbed	5.27	kg/year				

NOTES

Nominated Area Water Balance & Storage Calculations

Site Address: Bonville

Whitehead & Associates
Environmental Consultants Pty Ltd

INPUT DATA

Design Wastewater Flow	Q	720	L/day	
Design Percolation Rate	DIPR	21	mm/week	
Daily DPR		3.0	mm/day	Litres per sq.m. per day - based on Table M1 AS/NZS 1547:2012 for secondary effluent
Nominated Land Application Area	L	1044	m sq	
Crop Factor	C	0.7-0.8	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type
Runoff Coefficient		0.8	untiless	Proportion of rainfall that remains onsite and infiltrates; function of slope/cover, allowing for any runoff
Rainfall Data		Coffs Harbour		Mean Monthly Data
Evaporation Data		Coffs Harbour		Mean Monthly Data

Flow Allowance	120	L/p/d
No. of bedrooms	4	
Occup Rate	1.5	

Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D	\	days	31	28	31	30	31	30	31	31	30	31	30	31	**365**
Rainfall	R	\	mm/month	169.3	207	232	189	138.4	129.9	93.9	81.3	68.2	95.7	104.4	136.8	**1,647**
Evaporation	E	\	mm/month	192.2	156.8	148.8	117	86.8	69	77.5	102	139.5	161.2	171	192.2	**1,602**
Daily Evaporation				6.2	5.6	4.8	3.9	2.8	2.3	2.5	3.3	4.7	5.2	5.7	6.2	
Crop Factor	C			0.80	0.80	0.80	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	154	125	119	82	61	48	54	71	98	129	137	154	**1232.0**
Percolation	B	(DPR/7)xD	mm/month	93.0	84	93.0	90.0	93.0	90.0	93.0	93.0	90.0	93.0	90.0	93.0	**1095.0**
Outputs		ET+B	mm/month	246.8	209.44	212.0	171.9	153.8	138.3	147.3	164.4	187.7	222.0	226.8	246.8	**2327.0**
INPUTS																
Retained Rainfall	RR	R*runoff coef	mm/month	135.44	165.6	185.6	151.2	110.72	103.92	75.12	65.04	54.56	76.56	83.52	109.44	**1316.7**
Effluent Irrigation	W	(QxD)/L	mm/month	21.4	19.3	21.4	20.7	21.4	20.7	21.4	21.4	20.7	21.4	20.7	21.4	**251.7**
Inputs		RR+W	mm/month	156.8	184.9	207.0	171.9	132.1	124.6	96.5	86.4	75.2	97.9	104.2	130.8	**1568.4**
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-89.9	-24.5	-5.1	0.0	-21.7	-13.7	-50.8	-78.0	-112.4	-124.0	-122.6	-115.9	**-193.7**
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Maximum Storage for Nominated Area	N		mm	**0.00**												
	V	NxL	L	**0**												
LAND AREA REQUIRED FOR ZERO STORAGE			m^2	201	460	844	1043	519	628	309	225	162	154	151	163	

MINIMUM AREA REQUIRED FOR ZERO STORAGE: **1,043** m^2

Nutrient Balance

Site Address: **Bonville**

Whitehead & Associates
Environmental Consultants Pty Ltd

Please read the attached notes before using this spreadsheet.

SUMMARY - LAND APPLICATION AREA REQUIRED BASED ON THE MOST LIMITING BALANCE = **485 m^2**

INPUT DATA [1]

Wastewater Loading			Nutrient Crop Uptake					
Hydraulic Load	720	L/Day	Crop N Uptake	130	kg/ha/yr	which equals	36	$mg/m^2/day$
Effluent N Concentration	30	mg/L	Crop P Uptake	25	kg/ha/yr	which equals	7	$mg/m^2/day$
% Lost to Soil Processes (Geary & Gardner 1996)	0.2	Decimal	**Phosphorus Sorption**					
Total N Loss to Soil	4,320	mg/day	P-sorption result	702	mg/kg	which equals	7,862	kg/ha
Remaining N Load after soil loss	17,280	mg/day	Bulk Density	1.4	g/cm3			
Effluent P Concentration	15	mg/L	Depth of Soil	0.8	m			
Design Life of System	50	yrs	% of Predicted P-sorp. [2]	0.5	Decimal			

METHOD 1: NUTRIENT BALANCE BASED ON ANNUAL CROP UPTAKE RATES

Minimum Area required with zero buffer		
Nitrogen	485.17	m^2
Phosphorus	380.41	m^2

Determination of Buffer Zone Size for a Nominated Land Application Area (LAA)		
Nominated LAA Size	1,044.00	m^2
Predicted N Export from LAA	-7.26	kg/year
Predicted P Export from LAA	-6.88	kg/year
Phosphorus Longevity for LAA	308	Years
Minimum Buffer Required for excess nutrient	0	m^2

PHOSPHORUS BALANCE
STEP 1: Using the nominated LAA Size

Nominated LAA Size	1,044	m^2				
Daily P Load	0.0108	kg/day	→	Phosphorus generated over life of system	197.1	kg
Daily Uptake	0.007151	kg/day	→	Phosphorus vegetative uptake for life of system	0.125	kg/m^2
Measured p-sorption capacity	0.78624	kg/m^2				
Assumed p-sorption capacity	0.393	kg/m^2	→	Phosphorus adsorbed in 50 years	0.393	kg/m^2
Site P-sorption capacity	410.42	kg	→	Desired Annual P Application Rate	10.818	kg/year
				which equals	0.02964	kg/day
P-load to be sorbed	1.33	kg/year				

NOTES

APPENDIX B

DSM Model Inputs and Outputs

Project Dir = C:\Users\JasminKable\Desktop\
Output Dir = C:\Users\JasminKable\Desktop\Outputs\
Table Dir = C:\Users\JasminKable\Desktop\Tables\
MU Filenames =
MU1.csv
RN Filenames =
receiving node creek.csv
nUnits = 1
nNodes = 1
nSites = 368
nLinks = 1
nSoils = 8
nCrops = 1
nData = 26664
StartDate = 1/01/1940
EndDate = ########

SiteID	X_coord	Y_coord	LAA	WWF	WWF_File	TN	TP	Virus	StorageTy	LAAType	AppMethod	SC	SD	SKsat	FAD	SWT	AAD	CropN	CropP	CropFactor
1	501577.9	6641069	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
2	501543.6	6641043	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
3	501771.9	6640978	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
4	501753.6	6641131	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
5	501676	6641109	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
6	501762	6641065	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
7	501683.1	6641056	1043	0.72		30	15	100	1	2	1	0	0	0	5	0	0	130	25	Grass
8	501693	6640985	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	DEFAULT
9	501828.7	6641028	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
10	501877.1	6641140	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
11	501823.5	6641163	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
12	501832.5	6641098	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
13	501881.3	6640981	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
14	501907.2	6641048	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
15	501893.1	6641200	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
16	501942.9	6641112	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
17	501946.2	6641196	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
18	502136.4	6641179	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
19	502183.4	6641137	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
20	502290.5	6641080	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
21	502334.2	6641098	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
22	502360	6641033	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
23	502359.1	6640966	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
24	502339.8	6640917	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
25	502407.5	6641030	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
26	502501.9	6640991	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
27	502559.7	6640990	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
28	502444.6	6641018	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
29	502555	6640924	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
30	502493.4	6640939	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
31	502438	6640952	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
32	502432.4	6640893	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
33	502510.3	6640877	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
34	502622.6	6640833	272	0.72		60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
35	502600.5	6640875	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
36	502609.5	6640928	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
37	502617	6640990	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
38	502674.8	6640984	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
39	502666.8	6640918	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
40	502661.1	6640862	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
41	502712.8	6641047	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
42	502737.7	6640954	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
43	502724.1	6640880	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
44	502632.5	6641078	272	0.72		60	15	10000000	1	1	1	0	0	0	0	0	0	130	25	Grass
45	501631	6641067	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
46	501639.4	6641018	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
47	501579.7	6641099	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
48	501534.2	6641092	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
49	501616.4	6640991	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
50	501605.1	6641084	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
51	501716.5	6641116	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
52	501725.4	6641060	1043	0.72		30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

53	501732	6640983	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
54	501817.9	6640960	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
55	501869.1	6641070	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
56	501846.1	6641131	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
57	501801	6641140	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
58	501804.8	6641079	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
59	501900.6	6641067	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
60	501925	6641064	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
61	501954.6	6641056	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
62	501939.1	6641036	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
63	501923.6	6640998	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
64	501914.7	6641025	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
65	502114.8	6641196	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
66	502075.8	6641221	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
67	501932.5	6641143	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
68	501954.6	6641219	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
69	501988.9	6641248	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
70	502043.9	6641239	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
71	502221.9	6641113	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
72	502273.1	6641116	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
73	502330	6641071	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
74	502327.1	6641040	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
75	502545.6	6640892	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
76	502469.9	6640910	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
77	502456.8	6641046	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
78	502650.8	6641342	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
79	502552.6	6641139	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
80	502583.6	6641134	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
81	502678.5	6641046	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
82	502734	6641040	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
83	502764.5	6641029	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
84	502771.5	6640979	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
85	502762.1	6640938	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
86	502757.9	6640901	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
87	502742.4	6640983	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
88	502734	6640919	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
89	502720.3	6640859	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
90	502712.3	6640820	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
91	502741.9	6640808	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
92	502707.2	6640993	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
93	502703.9	6640968	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
94	502697.8	6640937	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
95	502692.6	6640901	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
96	502689.8	6640873	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
97	502686.5	6640845	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
98	502684.6	6640822	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
99	502651.7	6641002	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
100	502643.8	6640967	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
101	502639.1	6640935	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
102	502634.8	6640905	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
103	502627.8	6640881	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
104	502625.9	6640863	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
105	502653.6	6640833	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
106	502615.6	6640955	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
107	502628.7	6641009	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
108	502583.2	6640856	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
109	502545.1	6641320	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
110	502497.2	6641166	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
111	502524	6641157	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
112	502486.4	6641124	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
113	502519.7	6641121	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
114	502426.7	6641164	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
115	502390.1	6641236	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
116	502465.2	6641153	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
117	502460.5	6641129	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
118	502415.5	6641129	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
119	502442.2	6641139	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
120	502453.5	6641108	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
121	502435.7	6641426	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

122	502438	6641401	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
123	502401.4	6641418	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
124	502368.9	6641413	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
125	502340.3	6641413	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
126	502310.7	6641455	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
127	502452.1	6641577	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
128	502452.6	6641607	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
129	502467.6	6641636	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
130	502485.5	6641662	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
131	502492.5	6641701	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
132	502352	6641688	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
133	502409.3	6641816	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
134	502419.7	6641837	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
135	502427.7	6641852	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
136	502297.5	6641238	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
137	502353	6641249	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
138	502339.8	6641199	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
139	502335.6	6641163	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
140	502305.5	6641190	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
141	502275	6641203	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
142	502400.9	6641192	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
143	502198.9	6641267	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
144	502218.1	6641222	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
145	502240.2	6641349	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
146	502181.5	6641365	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
147	502207.1	6641317	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
148	502099.7	6641349	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
149	502136.8	6641378	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
150	502096.7	6641390	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
151	502102.5	6641446	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
152	501992.2	6641558	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
153	502023.5	6641518	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
154	502003.2	6641488	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
155	502046.1	6641501	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
156	502026.4	6641465	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
157	502061.8	6641471	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
158	502050.8	6641411	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
159	502088.6	6641678	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
160	501886.8	6641724	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
161	501948	6641670	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
162	501939.3	6641635	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
163	501952.6	6641588	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
164	502064.7	6641289	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
165	502001.7	6641322	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
166	501913.7	6641504	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
167	501935.2	6641452	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
168	501957.8	6641407	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
169	501982.2	6641364	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
170	501840.4	6641450	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
171	501867.2	6641488	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
172	501905.6	6641365	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
173	501867.2	6641332	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
174	501906.1	6641294	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
175	501692.4	6641484	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
176	501745.2	6641180	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
177	501798.1	6641211	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
178	501850.4	6641236	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
179	501738.2	6641248	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
180	501784.7	6641266	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
181	501838.2	6641288	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
182	501716.8	6641313	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
183	501763.8	6641325	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
184	501825.4	6641340	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
185	501709.2	6641376	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
186	501778.9	6641373	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
187	501810.9	6641443	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
188	501667.3	6641316	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
189	501632.5	6641481	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
190	501611.6	6641441	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

191	501649.9	6641445	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
192	501601.7	6641392	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
193	501666.8	6641397	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
194	501644.7	6641355	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
195	501703.4	6641200	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
196	501577.9	6641223	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
197	501547.7	6641149	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
198	501639.5	6641167	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
199	501640.6	6641220	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
200	501357.7	6641354	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
201	501359.5	6641368	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
202	501374	6641342	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
203	501363	6641337	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
204	501379.2	6641323	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
205	501374.6	6641317	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
206	501382.7	6641305	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
207	501380.4	6641292	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
208	501392	6641276	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
209	501394.9	6641260	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
210	501400.1	6641249	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
211	501408.9	6641238	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
212	501413.5	6641228	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
213	501429.8	6641559	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
214	501492.5	6641134	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
215	501329.8	6641469	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
216	501363.5	6641469	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
217	501405.4	6641468	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
218	501329.8	6641446	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
219	501365.9	6641446	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
220	501414.7	6641448	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
221	501341.5	6641415	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
222	501375.7	6641418	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
223	501419.3	6641422	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
224	501356	6641389	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
225	501400.7	6641390	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
226	501457.1	6641397	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
227	501395.5	6641351	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
228	501435.6	6641360	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
229	501484.4	6641374	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
230	501394.9	6641317	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
231	501442.5	6641327	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
232	501475.7	6641333	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
233	501398.4	6641287	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
234	501443.1	6641297	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
235	501412.9	6641258	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
236	501448.9	6641268	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
237	501437.3	6641247	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
238	501381	6641371	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
239	501348.4	6641785	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
240	501382.7	6641772	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
241	501416.4	6641759	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
242	501336.8	6641734	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
243	501367.6	6641748	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
244	501450.1	6641756	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
245	501374.9	6641831	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
246	501641.8	6641793	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
247	501649.4	6641816	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
248	501658.1	6641842	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
249	501629	6641856	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
250	501618	6641831	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
251	501608.1	6641875	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
252	501595.9	6641848	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
253	501587.8	6641886	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
254	501571.5	6641861	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
255	501557	6641902	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
256	501532	6641878	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
257	501534.9	6641943	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
258	501512.8	6641924	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
259	501494.3	6641896	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

260	501487.3	6641946	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
261	501462.9	6641971	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
262	501425.7	6641994	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
263	501360.6	6641867	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
264	501390.8	6641856	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
265	501354.8	6641840	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
266	501346.7	6641814	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
267	501439.6	6641794	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
268	501461.1	6641777	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
269	501393.8	6641805	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
270	501684.3	6641776	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
271	501687.7	6641726	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
272	501649.6	6641561	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
273	501719.6	6641683	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
274	501753.4	6641649	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
275	501726	6641580	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
276	501712.7	6641632	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
277	501781.5	6641613	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
278	501765.6	6641577	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
279	501879.4	6641622	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
280	501905.6	6641564	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
281	501823.6	6641508	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
282	501842.8	6641771	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
283	501836.3	6641798	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
284	501849.3	6641844	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
285	501872.7	6641875	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
286	501902.1	6641847	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
287	501863.4	6641817	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
288	501897.7	6641892	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
289	501881.7	6641795	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
290	501982.2	6641975	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
291	501944.2	6642003	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
292	501948	6641981	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
293	501814.1	6641887	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
294	501792.6	6641935	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
295	501853.6	6642052	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
296	501806.2	6642054	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
297	501811.4	6641913	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
298	501784.4	6641898	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
299	502236	6641444	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
300	502108	6641487	272	0.72	60	15	10000000	1	1	1	0	0	0	5	0	0	130	25	Grass
301	502267.2	6641486	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
302	502274.2	6641526	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
303	502280	6641569	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
304	502286.9	6641618	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
305	502296.8	6641669	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
306	502300.3	6641704	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
307	502266	6641713	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
308	502255	6641654	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
309	502253.2	6641603	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
310	502244.5	6641551	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
311	502236.4	6641517	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
312	502240.5	6641738	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
313	502234.1	6641695	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
314	502219.5	6641655	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
315	502214.3	6641619	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
316	502208.5	6641758	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
317	502205	6641727	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
318	502191.7	6641693	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
319	502181.2	6641658	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
320	502141.7	6641640	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
321	502153.3	6641676	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
322	502162.6	6641709	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
323	502166.7	6641734	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
324	502176	6641770	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
325	502160.9	6641804	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
326	502148.7	6641770	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
327	502143.4	6641748	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
328	502137.1	6641716	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

329	502131.8	6641693	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
330	502127.2	6641660	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
331	502110.9	6641696	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
332	502120.2	6641734	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
333	502131.8	6641774	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
334	502137.6	6641801	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
335	502144.6	6641825	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
336	502092.9	6641709	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
337	502098.1	6641732	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
338	502102.8	6641759	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
339	502107.4	6641784	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
340	502117.3	6641820	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
341	502098.1	6641846	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
342	502088.3	6641822	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
343	502080.1	6641784	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
344	502067.3	6641752	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
345	502038.3	6641766	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
346	502048.8	6641789	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
347	502058.6	6641819	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
348	502065.6	6641845	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
349	502074.3	6641870	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
350	502017.4	6641777	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
351	502028.4	6641840	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
352	502041.8	6641879	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
353	502013.3	6641878	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
354	502023.8	6641915	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
355	502002.3	6641905	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
356	502008.1	6641955	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
357	502145.8	6641959	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
358	502186.4	6641966	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
359	502226.5	6641970	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
360	502272.4	6641964	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
361	502170.2	6641934	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
362	502205.6	6641940	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
363	502248	6641942	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
364	502270.7	6641920	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
365	502234.1	6641905	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
366	502275.3	6641888	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
367	502255.6	6641872	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass
368	502279.4	6641841	1043	0.72	30	15	100	1	2	1	0	0	0	3	0	0	130	25	Grass

LinkID	k_Flow_ov	k_TN_over	k_TP_over	k_Virus_ov	k_Flow_sui	k_TN_surf	k_TP_surf	k_Virus_su	k_Flc	k_TN_dd	k_TP_dd	k_Virus_dd
1	0.6	0.93	0.94	0.97	0.6	0.93	0.94	0.97	0.6	0.93	0.94	0.97

Date	R	ET	E	T				
26664	26664	26664	26664	26664				325
1/01/1940	0	5.3	6.2	23				43
2/01/1940	1.6	4.8	6.4	20.8				
3/01/1940	0	4.8	6.4	23.5				
4/01/1940	0	6	6.4	25.2				
5/01/1940	0.8	4.6	6.4	22.8				
6/01/1940	0	4.5	6.4	23.2				
7/01/1940	0	4.3	6.4	21.5				
8/01/1940	8.9	5.3	6.4	21.5				
9/01/1940	1.1	4.8	6.4	22				
10/01/1940	0	4.4	6.4	23.5				
11/01/1940	0	4.3	6.2	24				
12/01/1940	0	5	6.2	25				
13/01/1940	0	4.8	6.2	23.2				
14/01/1940	0.9	4.1	6	22.5				
15/01/1940	0.5	6.4	6.2	25.5				
16/01/1940	46.5	4.8	6.2	27				
17/01/1940	1.4	5.7	6.2	27.8				
18/01/1940	0.6	5.3	6	25.5				
19/01/1940	7.2	5.8	6.2	25.2				
20/01/1940	8.6	5.4	6.4	24.5				
21/01/1940	0	4.3	6.4	25.5				
22/01/1940	0.7	7.2	6.4	28				
23/01/1940	0	7.1	6.4	24.5				
24/01/1940	0	7.7	6.4	27.2				
25/01/1940	0	6.8	6.2	29				

DSM Soil Data Inputs

Data Input	Code	Value	Unit	Typical Source of Information
Bio-physical Data				
Soil water at effective saturation	SAT	mm	352-437	saturated capacity. need to represent a trench media if trench, but soil if irrig area. porosity *0.9 or 0.95
Field capacity	FC		130-240	field capacity. point at which soil stops draining. See Interp Soil Test Results (Hazelton 2007) table 2.5
Permanent Wilting Point	PWP		16-25	permanent wilting point. Point at which plants cannot obtain enough water. See Interp Soil Test Results (Hazelton 2007) table 2.5
Saturated hydraulic conductivity	SHC	mm/day	60-380	rate of percolation through the saturated soil profile. Use limiting layer
Soil depth for phosphorus sorption	SDP	mm	350-1500	soil depth for p sorp. Use limiting layer
Bulk density	BD	kg/m^3	1400-1600	bulk density. Average value based on soil depth
Initial depression storage	DS	mm	6	depression storage. Initial loss before infiltration
Dry soil infiltration rate	INF	mm/day	60-120	infiltration rate of water
Infiltration exponent	EXP1	dimensionless	5698	exponent 1. how slowly ifiltration decreases once soil gets wet.
Freundlich adsorption coefficient	A1	g/L	259	A1 is exp10 of intercept of isotherm with y axis
Freundlich adsorption exponent	B1	dimensionless	0.99	B1 is slope of log normal line
Freundlich desorption exponent	B2		0.495	B2 is half of B1

DSM Output Summary

DSM Outputs	**Receiving Node**
Mean Annual Surface Runoff (m3) =	0.00
Mean Annual Surface N (g) =	0.00
Mean Annual Surface P (g) =	0.00
Mean Annual Surface V (MPN) =	0.00
Mean Annual Deep Drainage (m3) =	315.45
Mean Annual Deep Drainage N (g) =	84.52
Mean Annual Deep Drainage P (g) =	13.61
Mean Annual Deep Drainage V (MPN) =	170921296.00

N: Total Nitrogen
P: Total Phosphorus
V: viruses (Most Probable Number).

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 010422

Client Service ID : 672518

Grahame Fry

10 Bailey Avenue
Coffs Harbour New South Wales 2450

Attention: Grahame Fry

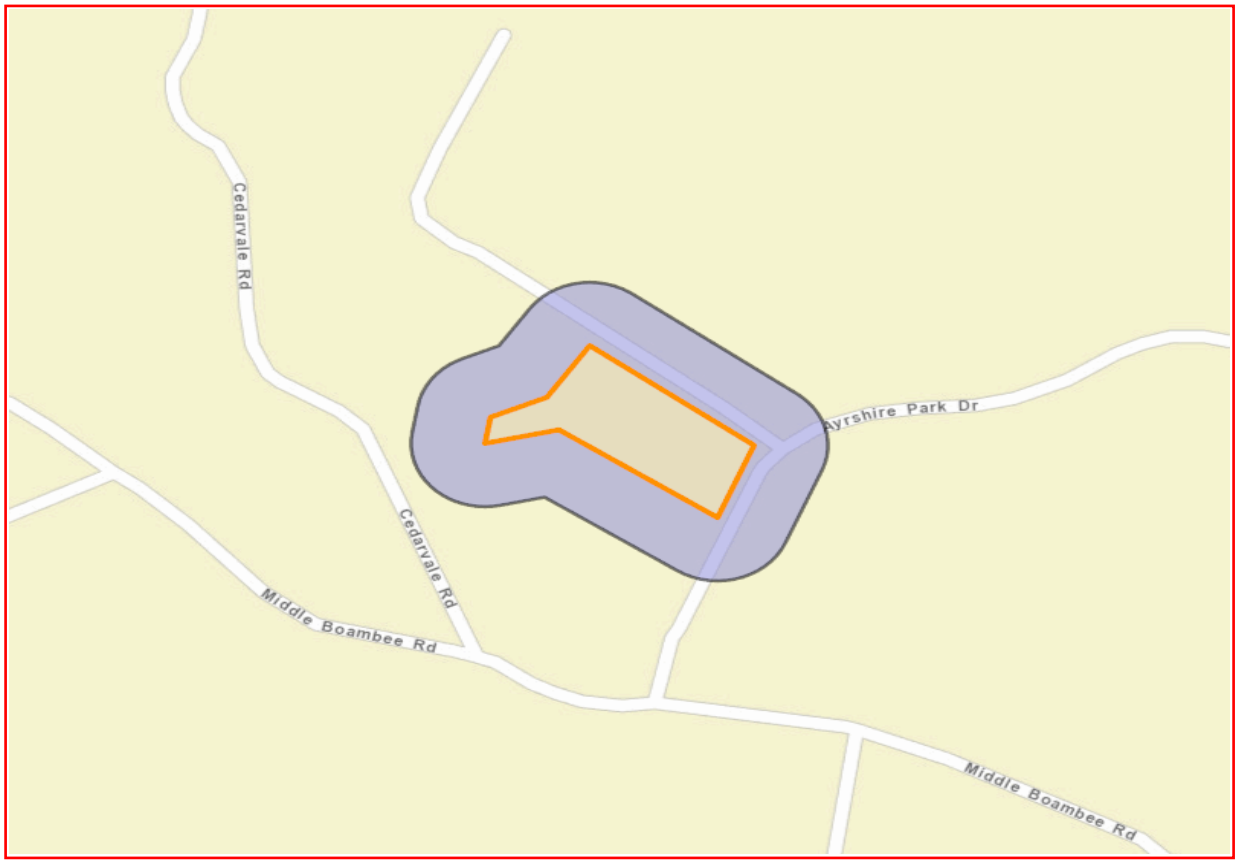
Email: grahamecfry@yahoo.com.au

Date: 01 April 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 411, DP:DP1276302, Section : - with a Buffer of 50 meters, conducted by Grahame Fry on 01 April 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Department of Planning, Housing and Infrastructure

Gateway Determination

***Planning proposal (Department Ref: PP-2022-4331)**: Reduce the minimum lot size of Lot 411 DP 1276302, 198 Ayrshire Park Drive, Boambee to 4500m^2*

I, the A/Director, Hunter and Northern Region, at the Department of Planning, Housing and Infrastructure, as delegate of the Minister for Planning and Public Spaces, have determined under section 3.34(2) of the *Environmental Planning and Assessment Act 1979* (the Act) that an amendment to the Coffs Harbour Local Environmental Plan 2013 to reduce the minimum lot size for Lot 411 DP 1276302, 198 Ayrshire Park Drive, Boambee to 4500m^2 should proceed subject to the following conditions.

The City of Coffs Harbour Council as planning proposal authority is authorised to exercise the functions of the local plan-making authority under section 3.36(2) of the Act subject to the following:

(a) The planning proposal authority has satisfied all the conditions of the gateway determination;

(b) The planning proposal is consistent with applicable directions of the Minister under section 9.1 of the Act, or the Secretary has agreed that any inconsistencies are justified; and

(c) There are no outstanding written objections from public authorities.

The LEP should be completed on or before 6 months of the date of this Gateway Determination.

Gateway Conditions

1. Public exhibition is required under section 3.34(2)(c) and clause 4 of Schedule 1 to the Act as follows:

   (a) The planning proposal is categorised as standard as described in the Local Environmental Plan Making Guideline (Department of Planning and Environment, August 2023) and must be made publicly available for a minimum of 20 working days; and

   (b) The planning proposal authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in Local Environmental Plan Making Guideline (Department of Planning and Environment, August 2023).

2. Consultation is required with NSW Rural Fire Service under section 3.34(2)(d) of the Act and/or to comply with the requirements of applicable directions of the Minister under section 9 of the Act.

   The public authority is to be provided with a copy of the planning proposal and any relevant supporting material via the NSW Planning Portal and given at least 30 working days to comment on the proposal.

Dated 14 June 2024

Craig Diss
Acting Director, Hunter and Northern Region
Local Planning and Council Support
Department of Planning, Housing and Infrastructure

Delegate of the Minister for Planning and Public Spaces