Central Coast Council

Planning Proposal (Pre-Gateway Version)

Lot 5 DP 1228880

45 Mulloway Road

Chain Valley Bay

File No: RZ/3/2019; PP_201X_XX_XXX_XX

May 2020

Planning Proposal
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45 Mulloway Road
Chain Valley Bay

File No: RZ/3/2019; PP_201X_XX_XXX_XX
Date: May 2020
Version Pre-Gateway Determination
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Background & Locality Context

The subject site is described as Lot 5 DP 1228880, 45 Mulloway Road Chain Valley Bay.

The land is zoned E3 Environmental Management under *Wyong Local Environmental Plan 2013* (WLEP 2013). The site has an area of 10.61 Hectares (Ha) and can be divided into three distinct areas:

- a dwelling and ancillary development to the north of the site,
- a generally cleared area predominately used for rural purposes through the majority and centre of the site, and
- a heavily vegetated area along the southern boundary of the site.

Surrounding land uses include:

- a Manufactured Home Estate (MHE) to the west,
- State Recreation Area to the north,
- vacant vegetated land to the east and south currently subject to a planning proposal for residential development and ongoing conservation.

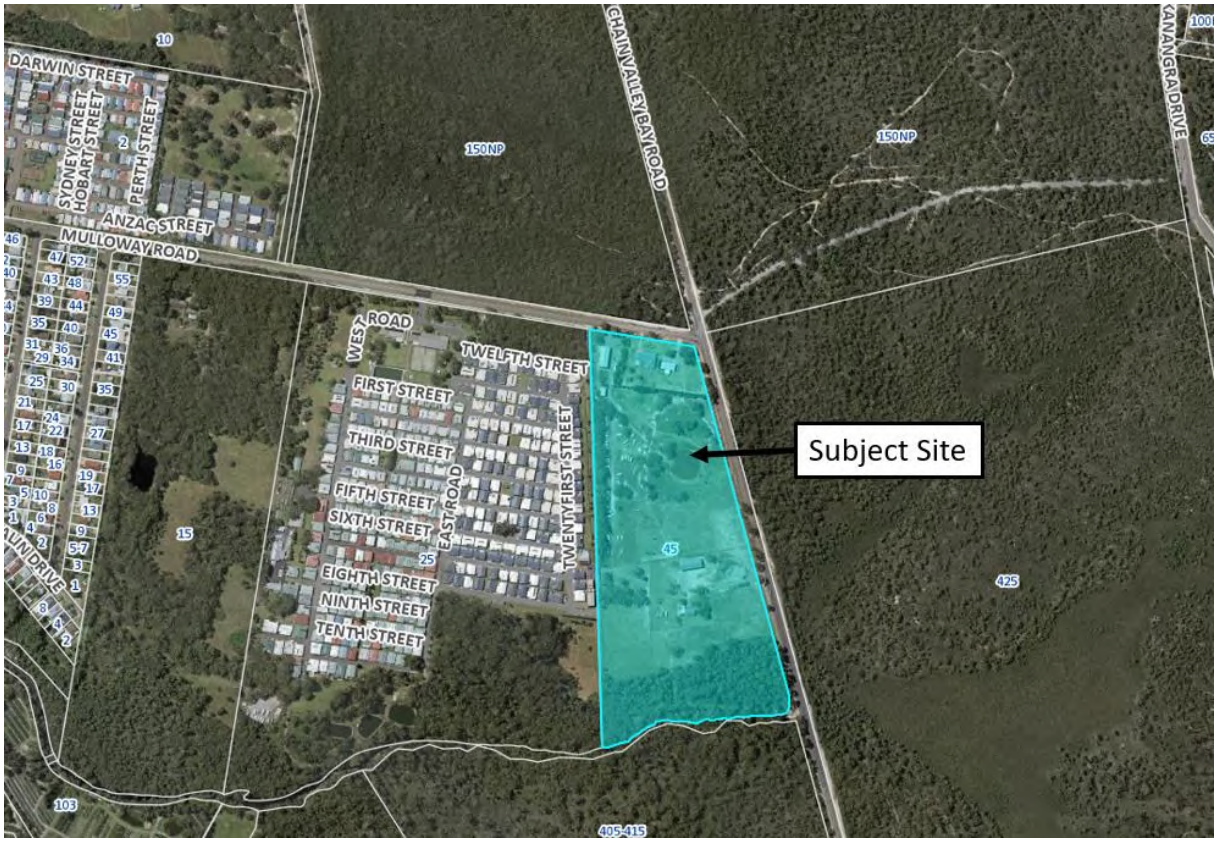


Figure 1 Locality Plan

Part 1 Objectives or Intended Outcomes

The objective of this proposal is to amend WLEP 2013 to enable the redevelopment of 45 Mulloway Road Chain Valley Bay for a MHE and to preserve the vegetated land toward the south of the site.

Part 2 Explanation of Provisions

The outcome will be facilitated by an amendment to WLEP 2013 at 45 Mulloway Road Chain Valley Bay in accordance with the proposed zoning map shown below.

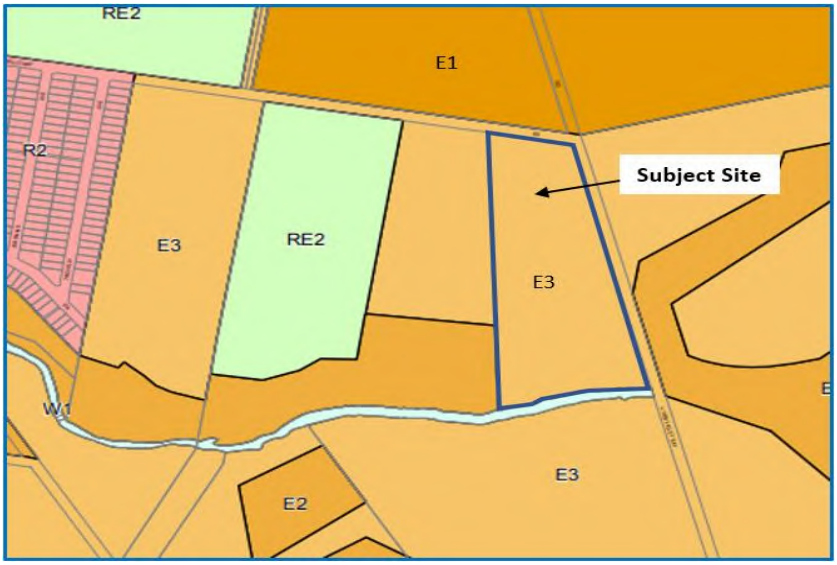


Figure 2 Existing Land Use Zones

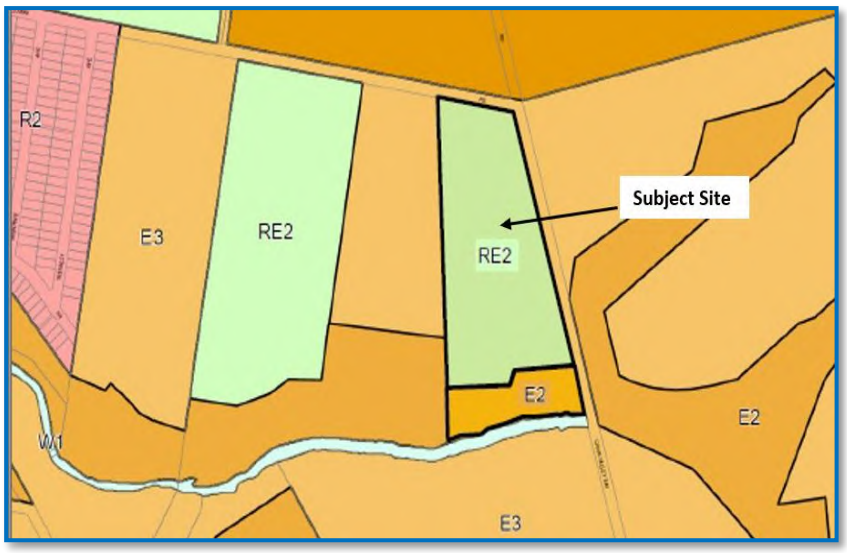


Figure 3 Proposed Land Use Zones

Part 3 Justification

Section A – Need for the Planning Proposal

1. Is the Planning Proposal a result of any Strategic Study or report?

The site is located in an identified as being appropriate for residential purposes in the *North Wyong Shire Structure Plan* (NWSSP) and the *draft Greater Lake Munmorah Structure Plan (dGLMSP)*. This is further discussed under Section B – Relationship to strategic planning framework.

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

The proponent is seeking to develop the site as a Manufactured Home Estate (MHE) MHE's are permissible where caravan parks are permissible under WLEP 2013. Caravan Parks are not permissible under WLEP 2013 in the E3 Environmental Management Zone. Therefore an alternative land use zoning is required to permit MHEs.

Section B – Relationship to strategic planning framework

3. Is the planning proposal consistent with the objectives and actions of the applicable regional, sub-regional or district plan or strategy (including any exhibited draft plans or strategies)?

Central Coast Regional Plan (2036)

An assessment of the proposal against the Central Coast Regional Plan (CCRP) is located under Section 01 Assessment and Endorsement attached to this proposal. The CCRP references the North Wyong Shire Structure Plan (NWSSP)

North Wyong Shire Structure Plan

The proposal is consistent with the requirements of the NWSSP. This plan identifies the site is required for future residential purposes.

Figure 4 – Extract from the North Wyong Shire Structure Plan

The NWSSP identifies the staging of the development within the long-range timeframe (land will not be zoned before 15 years), however this timing can be revised due to new information relating to underlying mining constraints which are no longer an impediment to surface land release. This means that the release of the land can be accelerated, subject to appropriate funding arrangements being put in place to manage infrastructure and servicing issues associated with increasing the population in the locality.

4. Is the planning proposal consistent a local Council's local strategy or other local strategic plan?

Draft Greater Lake Munmorah Structure Plan

The proposal is consistent with the Draft Greater Lake Munmorah Structure Plan (dGLMSP), The dGLMSP was publicly exhibited between 1 April 2019 to 26 May 2019.

The area to be rezoned is identified within the dGLMSP within Precinct 7 Chain Valley Bay (see Figure 5 below).

The dGLMSP facilitates the delivery of 2,885 additional lots. The subject proposal will provide an additional 190 home sites.

The site is partially nominated as a green corridor and habitat network by the NWSSP. Preservation of this land is reflected in the dGLMSP. The portion of the site proposed to be zoned E2 Environmental Conservation aligns with the boundary of the green corridor.

Figure 5 – Draft Greater Lake Munmorah Structure Plan, Precinct 7 – Chain Valley Bay

Community Strategic Plan

The proposal is consistent with the themes of the Community Strategic Plan (CSP). An assessment of the proposal against the CSP is located under Section 01 Assessment and Endorsement attached to this proposal.

5. Is the planning proposal consistent with applicable State Environmental Planning Policies?

The proposal has been considered against the relevant State Environmental Planning Policies (SEPPs). An assessment of the proposal against the CSP is located under Section 01 Assessment and Endorsement attached to this proposal.

The proposal is considered to be consistent with the applicable SEPPs.

6. Is the planning proposal consistent with applicable Ministerial Directions (s.9.1 directions)?

The proposal has been considered against the relevant Ministerial Section 9.1 Directions as summarised below. The full assessment of these Directions is contained within the supporting documentation of this proposal.

Table 2: S9.1 Ministerial Direction Compliance

No.	Direction	Applicable	Consistent
Employment & Resources			
1.1	Business & Industrial Zones	N	N/A
1.2	Rural Zones	N	N/A
1.3	Mining, Petroleum Production and Extractive Industries	Y	Y
1.4	Oyster Aquaculture	N	N/A
1.5	Rural Lands	N	N/A
Environment & Heritage			
2.1	Environmental Protection Zones	Y	TBD
2.2	Coastal Protection	N	N/A
2.3	Heritage Conservation	Y	Y
2.4	Recreation Vehicle Areas	Y	Y
2.5	Application of E2 & E3 Zones and Environmental Overlays in the Far North Coast LEPS	N	N/A
Housing, Infrastructure & Urban Development			
3.1	Residential Zones	Y	Y
3.2	Caravan Parks and Manufactured Home Estates	Y	Y
3.3	Home Occupations	Y	Y
3.4	Integrating Land Use & Transport	Y	Y
3.5	Development Near Regulated Airports and Defence Airfields	Y	N/A
3.6	Shooting Ranges	N	N/A

No.	Direction	Applicable	Consistent
3.7	Reduction in non – hosted short term rental accommodation	N	N/A
Hazard & Risk			
4.1	Acid Sulfate Soils	Y	Y
4.2	Mine Subsidence and Unstable Land	Y	Y
4.3	Flood Prone Land	Y	Y
4.4	Planning for Bushfire Protection	Y	TBD
Regional Planning			
5.1	Implementation of Regional Strategies	N	N/A
5.2	Sydney Drinking Water Catchments	N	N/A
5.3	Farmland of State and Regional Significance on the NSW Far North Coast	N	N/A
5.4	Commercial and Retail Development along the Pacific Highway, North Coast	N	N/A
5.9	North West Rail Link Corridor Strategy	N	N/A
5.10	Implementation of Regional Plans	Y	Y
5.11	Development of Aboriginal Land Council Land	N	N/A
Local Plan Making			
6.1	Approval and Referral Requirements	Y	Y
6.2	Reserving Land for Public Purposes	Y	Y
6.3	Site Specific Provisions	Y	Y
Metropolitan Planning			
7.1	Implementation of A Plan for Growing Sydney	N	N/A
7.2	Implementation of Greater Macarthur Land Release Investigation	N	N/A
7.3	Parramatta Road Corridor Urban Transformation Strategy	N	N/A

No.	Direction	Applicable	Consistent
7.4	Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	N	N/A
7.5	Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N	N/A
7.6	Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N	N/A
7.7	Implementation of Glenfield to Macarthur Urban Renewal Corridor	N	N/A
7.8	Implementation of Western Sydney Aerotropolis Interim Land Use and Infrastructure Implementation Plan	N	N/A
7.9	Implementation of Bayside West Precincts 2036 Plan	N	N/A
7.10	Implementation of Planning Principles for the Cooks Cove Precinct	N	N/A

Section C – Environmental, Social and Economic Impact

7. 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?

Refer to Ecology comments below.

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

Ecology

Clearing of vegetation would be required to facilitate the proposed development of the site for a MHE.

While vegetation removal would generally occur as part of a development application process that would follow the completion of the planning proposal, Council must be satisfied that the proposal can reasonably meet the requirements of the SEPP and the *Biodiversity Conservation Act 2016.*

An ecological constraints report submitted in support of the application indicates that the proposal seeks to impact on approximately 0.32 ha of Swamp Sclerophyll Forest Ecologically Endangered Community (EEC) and 0.92 ha of Narrabeen Doyalson Coastal Woodland. The vegetated southern end of the site is highlighted on the biodiversity values (BV) map published by the NSW Office of Environment and Heritage. The proposal triggers entry into the Biodiversity Offset Scheme (BOS) through potentially impacting areas highlighted on the BV map and exceeding the area clearing threshold.

The site is partially nominated as a green corridor and habitat network under the NWSSP. The portion of the site proposed to be zoned E2 Environmental Conservation closely aligns with the boundary of the green corridor.

As the area of the site over which development is proposed is not densely vegetated it is reasonable that required offsetting or redesign can be undertaken and the proposal can meet the requirement of the SEPP. Additional information on how the requirements of the SEPP will be achieved may be required following Gateway Determination.

Bushfire

The subject land is mapped as bushfire prone land. A draft bushfire report has been submitted with the planning proposal. Consultation will occur with the NSW Rural Fire Service (RFS) in accordance with any Gateway Determination. It is unlikely that bushfire issues will preclude the development of the site for a MHE.

Natural Resources

No impact on agriculture or drinking water catchments. Both DPIE – Division of Resource and Geoscience and Subsidence Advisory NSW have provided conditional support for the proposal and would be further consulted in accordance with any Gateway Determination.

Indigenous and Non-Indigenous Cultural Heritage Items

There are no items of non-indigenous heritage identified on the site.

An Aboriginal Cultural Heritage Assessment (ACHA) has been provided in support of the application and indicates that there are no archaeological sites in the project area. Further consideration of Aboriginal Cultural Heritage will be undertaken in accordance with the Gateway Determination.

Contaminated Land and Acid Sulfate Soils

A Phase 1 Contaminated Lands Assessment has been undertaken by a suitably qualified geotechnical engineer to demonstrate compliance with the requirements of SEPP No, 55 Remediation of Land. The findings of this contamination assessment recommends that a detailed contamination assessment be undertaken with remedial actions, where necessary. It has been determined that if all "Areas of Concern" are addressed the land can be remediated to a suitable condition for residential use.

Part of the subject site is identified in Council's Acid Sulfate Soils Map. In the Preliminary Site Investigation by Douglas Partners provided with the application it is indicated that the site is located in an area mapped as having no known occurrence of acid sulfate soils (ASS). It is indicated that if ASS are found to be present they can be effectively managed through investigation and a site specific acid sulfate soil management plan.

Flooding and Drainage

Council's existing flood mapping does not extend to this site exemplified by the fact that the existing creek at the rear of the site is not identified on the existing flood maps. Draft Flood Mapping for Lake Macquarie identifies that the limit of the Probable Maximum Flood (PMF) generally aligns with land proposed to be preserved under the E2 zoning and the development footprint can be restricted to land not impacted by the PMF event.

Mine Subsidence

The site is located within a Mines Subsidence District. Both DPIE – Division of Resource and Geoscience and Subsidence Advisory NSW have provided conditional support for the proposal and will be further consulted in accordance with any Gateway Determination issued.

9. Has the planning proposal adequately addressed any social and economic impacts?

Social Issues

It has been identified that the area is currently under-serviced. The need for the development of the dGLMSP to address the shortfall of servicing in the area has been identified by Council. The DGLMSP envisages the development of this site and surrounding sites and provides for improved servicing of the area.

Economic Impacts

It is likely that the proposal will have a positive economic impact through construction and ongoing employment and an increase in local spending.

Section D – State and Commonwealth Interests

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

Traffic

It has been acknowledged that the intersection of Pacific Highway and Chain Valley Road is already at capacity and requires a significant upgrade. The Roads and Maritime Services (RMS) will not support the creation of additional lots requiring access to this intersection until the intersection has been upgraded. There are several planning proposals concurrently being considered in this area and all parties are to contribute to the completion of the required works though agreement with Transport for NSW.

The proposal is also likely to require contribution to the improvement of local roads.

Water

The site is connected to mains water supply. There may be a requirement for infrastructure upgrade depending on the eventual scale of development.

Sewer

The site is connected to a nearby sewer main and pumping station. There may be a requirement for infrastructure upgrade depending on the eventual scale of development

Electricity and Gas

The site is connected to the power grid.

Internet/NBN

The site is identified as being connected to the National Broadband Network.

11. What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

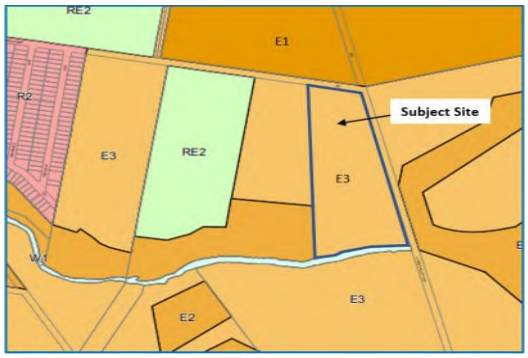
TBA

Part 4 Mapping

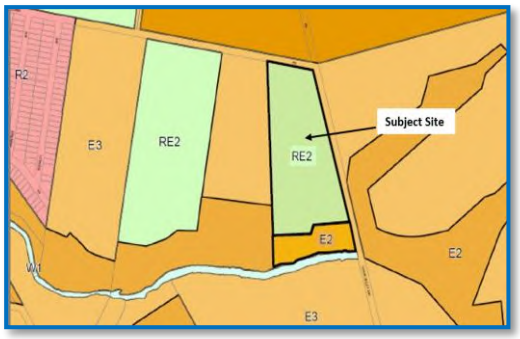
Table 4: Existing and Proposed Provisions (note: no other mapping changes proposed)

Map	Map Title
A.	Locality Plan
Existing Provisions	
B.	Land Zoning Map LZN_ 017
Proposed Provisions	
A.	Land Zoning Map LZN_ 017

A Locality Plan



B Existing Land Use Zoning Map (Extract)



C Proposed Land Use Zoning Map (Extract)

Part 5 Community Consultation

The proposal will be made available for community/agency consultation and undertaken in accordance with any determinations made by the Gateway. It is noted that this may vary depending on the impact that COVID -19 related restrictions are having at the time of exhibition.

Part 6 Project Timeline

Table 5: Key Project Timeframes

Action	Period	Start Date	End Date
Anticipated commencement date (date of Gateway Determination)	28 days	6 May 2020	3 June 2020
Anticipated timeframe for the completion of required technical information	5 months	4 June 2020	4 November 2020
Timeframe for government agency consultation (pre and post exhibition as required by Gateway determination)	21 days	11 June 2020	1 July 2020
Commencement and completion dates for public exhibition	TBD	November 2020	December 2020
Dates for public hearing (if required)	N/A		
Timeframe for consideration of submissions	1 month	December 2020	January 2021
Timeframe for consideration of a proposal post exhibition	2 Months	February 2021	March 2021
Date of submission to the Department to finalise LEP	1 Month	April 2021	May 2011
Anticipated date RPA will make the plan (if delegated)	1 Week	May 2021	May 2021
Anticipated date RPA will forward to the Department for notification	2 Weeks	May 2021	June 2021

Supporting Documentation

Table 6: Supporting Documentation to the Planning Proposal

No.	Document
01 Assessment and Endorsement	
A.	Council Report and Minutes – 27 April 2020
B.	Central Coast Regional Plan 2036 Assessment
C.	State Environmental Planning Policy Assessment
D.	Section 9.1 Ministerial Direction Assessment
03 Agency Consultation	
A.	GSNSW (letter to applicant)
05 Supporting Studies	
A.	Ecological Constraints Report
B.	Traffic Impact Assessment and Addendum
C.	Bushfire Assessment
D.	Preliminary Site Investigation
E.	Social Impact Assessment
F.	Aboriginal Cultural Heritage Assessment

01

Assessment & Endorsement

Council Report and Minutes

Item No:	2.1
Title:	Planning Proposal Application - RZ/3/2019 - 45 Mulloway Road Chain Valley Bay
Department:	Environment and Planning

23 March 2020 Ordinary Council Meeting

Trim Reference:	RZ/3/2019 - D13749206
Author:	Rodney Mergan, Senior Strategic Planner
Manager:	Karen Tucker, Acting Unit Manager, Strategic Planning
Executive:	Scott Cox, Director Environment and Planning

Report Purpose

The purpose of this report is for Council to consider a request to prepare a Planning Proposal to amend *Wyong Local Environmental Plan 2013* (WLEP) or *draft Central Coast Council Local Environmental Plan* (CCLEP) (if in effect) for 45 Mulloway Road, Chain Valley Bay.

This report recommends that Council prepare a Planning Proposal and request a Gateway Determination from the Department of Planning, Industry and Environment (DPIE).

Recommendation

1 That Council, pursuant to Section 3.33 of the Environmental Planning and Assessment Act, 1979, prepare a Planning Proposal applying to Lot 5 DP 1228880 (45 Mulloway Road, Chain Valley Bay) to rezone the subject sites from E3 Environmental Management to RE2 Private Recreation and E2 Environmental Conservation by amending the Wyong Local Environmental Plan 2013 (or Central Coast Local Environmental Plan), whichever is in effect at the time.

2 That Council, pursuant to Section 3.34 of the Environmental Planning and Assessment Act, 1979, forward the Planning Proposal to the Minister requesting a Gateway Determination.

3 That Council request delegation for Council to finalise and make the draft Local Environmental Plan, pursuant to Section 3.36 of the Environmental Planning and Assessment Act 1979.

4 That Council undertakes public authority and community consultation in accordance with the Gateway Determination requirements.

5 That Council authorise staff to negotiate, prepare and exhibit a Planning Agreement with respect to any aspect of the proposal to support the development of the subject land.

6 That Council authorise staff to prepare and exhibit site specific development controls with respect to any aspect of the proposal to support the development of the subject land.

7 That Council consider a further report on the results of public authority and community consultation.

The Site

The subject land (figure 1) is known as 45 Mulloway Road Chain Valley Bay, Lot 5 DP 1228880.

The site has an area of 10.61 Hectares (Ha) and can be divided into three distinct areas:

- a dwelling and ancillary development to the north of the site,
- a generally cleared area predominately used for rural purposes through the majority or middle of the site, and
- a heavily vegetated area along the southern boundary of the site.

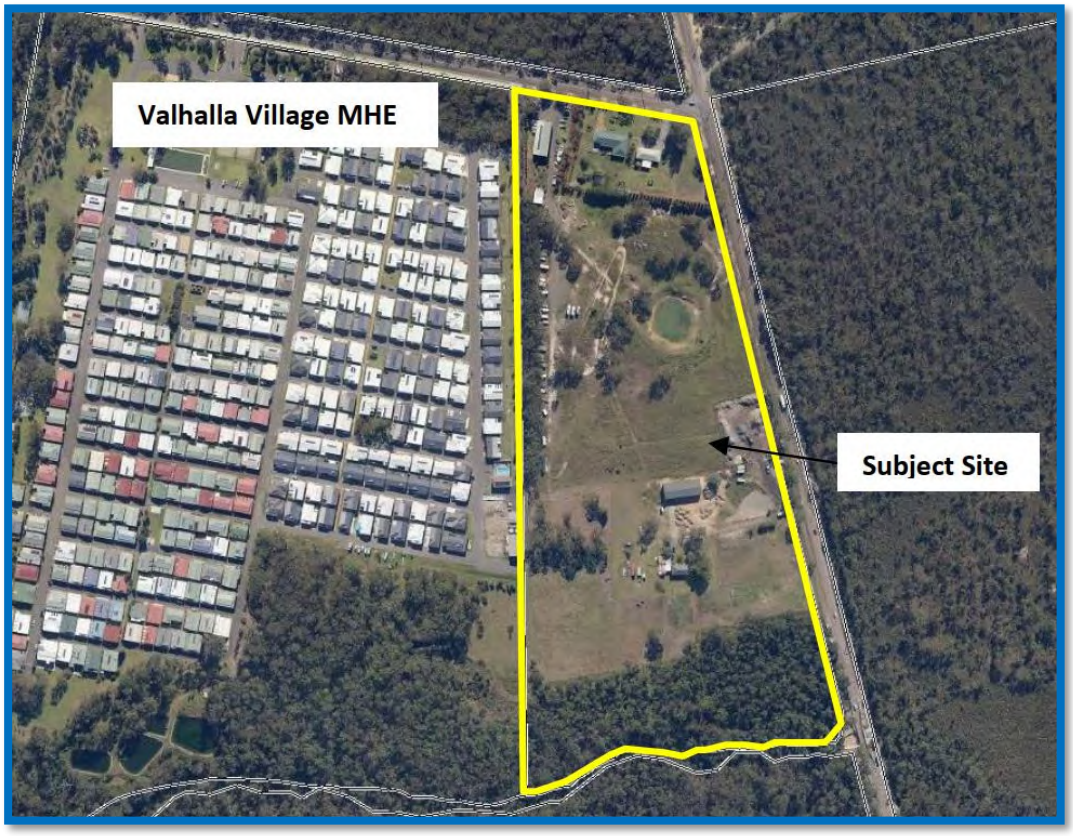


Figure 1- Aerial Photo - Subject site and surrounding land

Surrounding land uses include:

- a Manufactured Home Estate (MHE) to the west,
- State Recreation Area to the north,
- vacant vegetated land to the east and south currently subject to a planning proposal for residential development. Land to the south is separated from the subject site by Karignan Creek.

The Proposal

The proposal seeks to amend the *Wyong Local Environmental Plan 2013* (WLEP 2013) or future Central Coast Local Environmental Plan (CCLEP) as follows:

- Rezone the subject sites from E3 Environmental Management to part RE2 Private Recreation and part E2 Environmental Conservation.

The proposal does not propose to alter the existing minimum lot size applicable to the subject site, being 40 ha.

The intended outcome is to enable the construction of a MHE on the site. The proposal looks to accommodate approximately 190 home sites, communal open space, communal hall and recreation facilities.

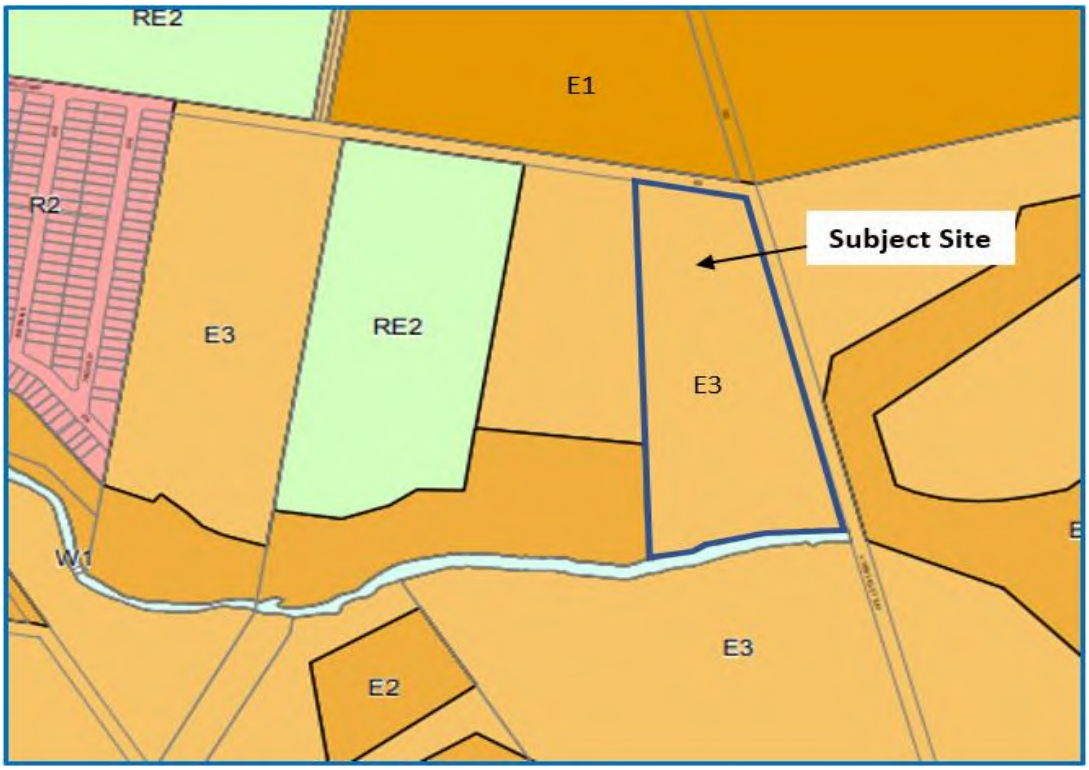


Figure 2 – Current Zoning Map

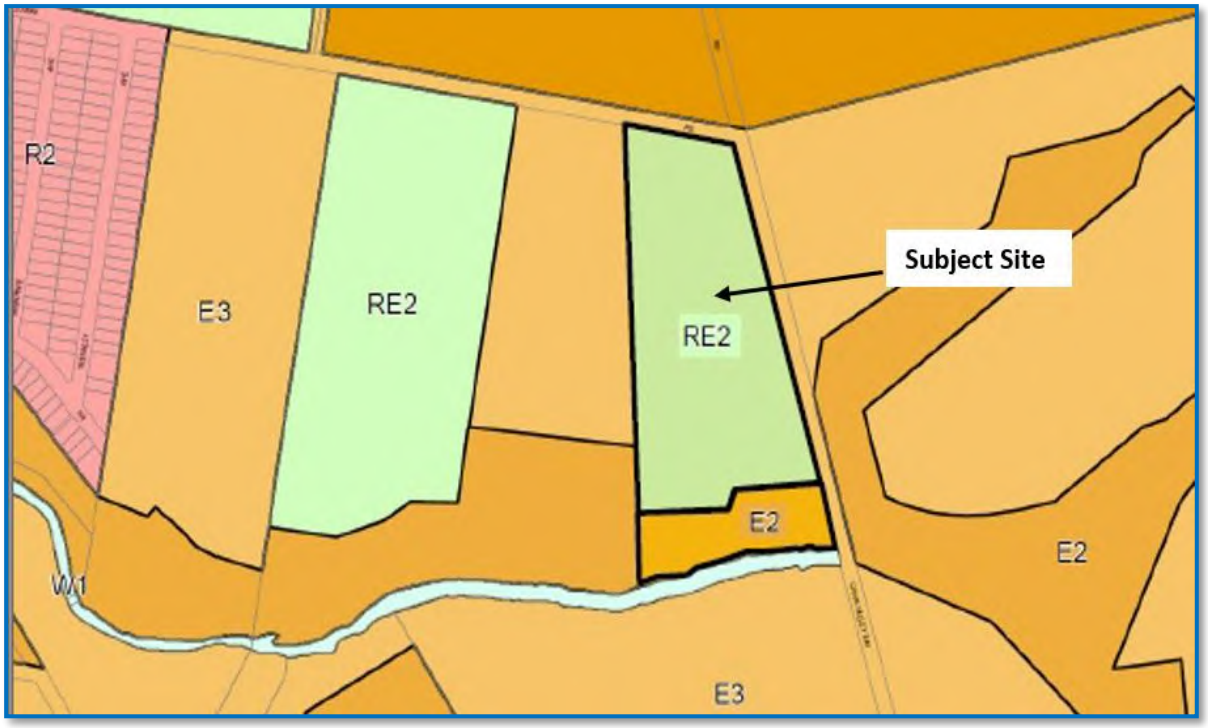


Figure 3 – Proposed Zoning

Assessment

The rezoning of the subject land to RE2 Private Recreation and E2 Environmental Conservation has strategic merit on the basis that:

- The proposed amendment is consistent with actions in the *Central Coast Regional Plan (CCRP) 2036*, aligning specifically with Goal 3- Well-connected communities and attractive lifestyles and Goal 4- A variety of housing choice to suit needs and lifestyles.

- The proposal is consistent with the requirements of the Department Planning, Industry and Environment (DPIE's) North Wyong Shire Structure Plan (NWSSP), see Figure 4.

  This plan identifies the site is required for future residential purposes. The current timing had identified the staging of the development within the long-range timeframe (land will not be zoned before 15 years), this timing can be revised due to new information relating to underlying mining constraints which are no longer an impediment to surface land release. This means that the release of the land can be accelerated, subject to appropriate funding arrangements being put in place to manage infrastructure and servicing issues associated with increasing the population in the locality.

Figure 4 – Extract – North Wyong Shire Structure Plan

- The proposal is consistent with the draft Greater Lake Munmorah Structure plan, see Figure 5, which was publicly exhibited between 1 April 2019 to 26 May 2019.

  The area to be rezoned is identified within the Draft Greater Lake Munmorah Structure Plan located within Precinct 7 Chain Valley Bay,

  The draft Greater Lake Munmorah Structure Plan facilitates the delivery of 2,885 additional lots, the subject proposal will provide an additional 190 home sites.

  The site is partially nominated as a green corridor and habitat network by the NWSSP. That portion of the site proposed to be zoned E2 Environmental Conservation aligns with the high level mapped boundary of the green corridor.

Figure 5 – Draft Greater Lake Munmorah Structure Plan, Precinct 7 – Chain Valley Bay

- The applicant has provided relevant supporting studies. These studies have been reviewed through the internal consultation process and are considered appropriate for submission with a request for a Gateway Determination. Once a suitable degree of certainty is provided by a Gateway Determination being issued, appropriate draft planning agreements to address issues such as roadworks and servicing can be completed prior to public consultation.

Internal Consultation

Internal consultation has been undertaken regarding the proposed Planning Proposal and is summarised below.

Environmental Strategies

Clearing of vegetation would be required to facilitate the proposed development of the site for a MHE. While vegetation removal would generally occur as part of a development application process that would follow the completion of the planning proposal, Council must be satisfied that the proposal can reasonably meet the requirements of *State Environmental Planning Policy* (SEPP) *(Vegetation in Non-Rural Areas) 2017* and the *Biodiversity Conservation Act 2016*.

A review of information submitted in support of the proposal has confirmed that the proposal seeks to impact on approximately 0.32 ha of Swamp Sclerophyll Forest and 0.92 ha of Narrabeen Doyalson Coastal Woodland and potentially impact on the vegetated southern end of the site. The proposal triggers entry into the Biodiversity Offset Scheme (BOS) via impacting areas highlighted on the BV map and exceeding the area clearing threshold.

Water Planning and Development

The site is connected to mains water supply.

The site is connected to a nearby sewer main and pumping station. Upgrade works in this area are identified in the Development Servicing Plan with the timing of this upgrade to be confirmed. Any additional contributions for upgrade works can be negotiated through an agreement between Council and the applicant.

Environmental Health - Land Contamination

The proponent has addressed the requirements under *SEPP No. 55 - Remediation of Land* by providing a Preliminary Contamination Assessment.

The findings of this contamination assessment recommend a detailed contamination assessment be undertaken with remedial actions, where necessary. It has been determined that if all "Areas of Concern" identified in the report are addressed prior to the release of any subdivision certificate the land can be remediated to a suitable condition for the proposed MHE.

Social Planning

There is concern relating to residents being unable to access the services they need due to the large population increase in an area that is already underserviced and while there is need for more affordable housing on the Central Coast, it must be well planned and well located to avoid negatively impacting on residents.

Contributions

The site is subject to the Northern Districts Section 7.11 Contribution plan. Contributions will be payable for manufactured home sites for Open Space, Community Facilities and Administration.

Any road upgrades required as a result of this development would be subject to agreement between the applicant, Council or Transport for NSW depending on the works required.

Development Engineering (Traffic)

It has been acknowledged that the intersection of Pacific Highway and Chain Valley Road is already at capacity and requires a significant upgrade. The Roads and Maritime Services (RMS) will not support the creation of additional lots requiring access to this intersection until the intersection has been upgraded. There are several planning proposals concurrently being considered in this area and all parties are to contribute to the completion of the required works though agreement with Transport for NSW.

In addition, there will be local road and associated upgrades required to facilitate the proposed MHE, the cost of which will be borne by the applicant through conditions of consent.

Council Site Inspection

A site inspection was undertaken on 2 March 2020. The site inspection was attended by Council staff and the following Councillors:

- Mayor – Councillor Lisa Matthews
- Deputy Mayor - Councillor Jane Smith
- Councillor Chris Holstein

The following matters were raised and discussed during the site inspection:

1. The southern area of the site is identified as a Regional Wildlife Corridor. What width is this corridor and could it be widened on this site?

   The subject site includes a small part of a regional wildlife corridor which includes vegetated land north of the creek. The regional corridor identified in the CCRP is also located on land owned by the Darkinjung LALC to the south of the site. The final width of the regional wildlife corridor is not yet agreed upon in this location and is a relevant consideration in developing a Structure Plan for the DLALC Lake Munmorah residential rezoning (further to the south). Regional wildlife corridors are generally wider than local corridors and are normally several hundred metres in width.

   It was confirmed that an increase in corridor (E2 zone) width on the site could be discussed with the applicant (with a splayed design response to better align with the position of E2 zones on adjoining land).

2. Can Council lobby for an improvement in public transportation servicing in the area given the impact that this and other proposals in the area may have?

   The State Government are aware of emerging issues in the area and this proposal is one of several developments which will be contributing to required intersection upgrades at the intersection of Chain Valley Bay Rd and the Pacific Highway.

   The proposal will be referred to Transport for NSW for comment/consideration and will address the need for a coordinated approach to public transport in the area.

3. Are there plans for improve recreation facilities and other services for this area?

Facilitated for in the draft GLMSP and a revision of the relevant S7.11 Contribution Plan is also underway.

4. Will the existing residential accommodation and ancillary structures be staying?

   The entire site is proposed to be zoned RE2 and eventually all existing development will be replaced.

External Consultation

Government agency and public consultation requirements will be detailed in the Gateway Determination and undertaken accordingly.

It is anticipated due to the existing development, the proposal and the location that several external agencies including the following will need to be consulted:

- Department of Transport (formerly Transport NSW and Roads and Maritime Services)
- Department of Planning, Industry and Environment
- Department of Family and Community and Justice (former Rural Fire Service NSW)
- Subsidence Advisory NSW
- Darkinjung Local Aboriginal Land Council
- Guringai Tribal Link

It expected that the Planning Proposal will be publicly exhibited for a period of 28 days.

Statutory compliance and strategic justification

The Planning Proposal has been assessed having regard for relevant State Environmental Planning Policies (SEPPs), Ministerial Section 9.1 Directions and relevant guidelines set out within the regional and local plans, including the Central Coast Regional Plan (Attachment 2). The proposal is considered to be generally consistent with the applicable directions and SEPPs.

Financial Impact

The direct cost to Council is the preparation of the Planning Proposal and Council's fee has been paid for this service. Council's Fees and Charges allow for an hourly rate for staff time beyond the scheduled fee to be charged where required.

Social Impacts

It has been identified that the area is currently quite poorly serviced and is not equipped to accommodate the increase in population envisaged by the development of this type.

It is noted that the draft Lake Munmorah Structure Plan envisages the development of this site and surrounding sites and provides for improved servicing of the area.

Environmental Impacts

Some clearing of vegetation would be required to facilitate the proposed development of the site for a MHE. As the area of the site over which development is proposed is not densely vegetated, it is considered that required offsetting or redesign can be undertaken and further addressed following Gateway Determination.

The site is partially nominated as a green corridor and habitat network by the NWSSP. That portion of the site proposed to be zoned E2 Environmental Conservation aligns with the high level mapped boundary of the green corridor.

Link to Community Strategic Plan

Theme 3: Green

Goal F: Cherished and protected natural beauty

G-F2: Promote greening and the wellbeing of communities through the protection of local bushland, urban trees, and expansion of the Coastal Open Space System (COSS).

Theme 4: Responsible

Goal I: Balanced and sustainable development

R-I3: Ensure land use planning and development is sustainable and environmentally sound and considers the importance of local habitat, green corridors, energy efficiency and stormwater management.

Risk Management

There have been no risks identified to the natural and built environment associated with the proposed amendment to WLEP 2013 or the CCLEP.

Conclusion

The request to rezone the subject land is considered to have strategic merit, subject to being supported by appropriate studies and infrastructure funding arrangements being in place to manage impacts associated with the additional population arising from future development.

It is recommended that a Planning Proposal be prepared and forwarded to the Minister for Planning for a Gateway Determination.

Subject: Planning Proposal Application - RZ/3/2019 - 45 Mulloway Rd Chain Valley Bay

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Moved: ***Councillor Best***
Seconded: ***Councillor Holstein***

Resolved

288/20 ***That Council, pursuant to Section 3.33 of the Environmental Planning and Assessment Act, 1979, prepare a Planning Proposal applying to Lot 5 DP 1228880 (45 Mulloway Road, Chain Valley Bay) to rezone the subject sites from E3 Environmental Management to RE2 Private Recreation and E2 Environmental Conservation by amending the Wyong Local Environmental Plan 2013 (or Central Coast Local Environmental Plan), whichever is in effect at the time.***

289/20 ***That Council, pursuant to Section 3.34 of the Environmental Planning and Assessment Act, 1979, forward the Planning Proposal to the Minister requesting a Gateway Determination.***

290/20 ***That Council request delegation for Council to finalise and make the draft Local Environmental Plan, pursuant to Section 3.36 of the Environmental Planning and Assessment Act 1979.***

291/20 ***That Council undertakes public authority and community consultation in accordance with the Gateway Determination requirements.***

292/20 ***That Council authorise staff to negotiate, prepare and exhibit a Planning Agreement with respect to any aspect of the proposal to support the development of the subject land.***

293/20 ***That Council authorise staff to prepare and exhibit site specific development controls with respect to any aspect of the proposal to support the development of the subject land.***

294/20 ***That Council consider a further report on the results of public authority and community consultation.***

295/20 ***That Council notes the need for Roads and Maritime Services to upgrade the intersection of Pacific Highway and Chain Valley Road.***

For:	***Against:***
Mayor Matthews, Councillors Best, Burke, Gale, Greenaway, Holstein, Marquart, McLachlan, Mehrtens, Pilon, Smith and Sundstrom	***Councillors Hogan and MacGregor***

Central Coast Regional Plan Assessment

Direction	Applicable	Assessment/Comment
1. *Grow Gosford City Centre as the region's capital*	N/A	The subject site is not located in the proximity of Gosford City Centre
2. *Focus economic development in the Southern and Northern Growth Corridors*	N/A	The proposal seeks to rezone the subject site from E3 Environmental Management to RE2 Private Recreation and E2 Environmental Conservation. The subject proposal does not conflict with the location of economic development.
3. *Support priority economic sectors*	N/A	The proposal does not conflict with priority economic sectors.
4. *Strengthen inter-regional and intra-regional connections for business*	N/A	The proposal does not include any business related uses or zones.
5. *Support new and expanded industrial activity*	N/A	The proposal does not include any industrial activity or zone.
6. *Strengthen the economic self-determination of Aboriginal communities*	N/A	If a Gateway Determination is issued for this proposal, the local aboriginal land council along with other interest groups will be requested to comment on the proposal.
7. *Increase job containment in the region*	N/A	The proposal does not relate to job containment
8. *Recognise the cultural landscape of the Central Coast*	Yes	The subject site contains land with environmental value suitable for retention. The vegetation at the rear of the site presents high amenity and environmental value. The proposal is considered to respect the cultural value of the area. An Aboriginal Cultural Heritage Assessment ACHA has been provided and indicates that there are no archaeological sites in the project area.
9. *Protect and enhance productive agricultural land*	N/A	The site is not within the proximity to, or identified as, productive agricultural land.
10. *Secure the productivity and capacity of resource lands*	Yes	The subject site is covered by a Consolidated Coal Lease and has been subject to underground mining. Both DPIE – Division of Resource and Geoscience and Subsidence Advisory NSW

Direction	Applicable	Assessment/Comment
		have provided conditional support for the proposal and are likely to be identified for further consultation if a Gateway Determination is issued.
11. *Sustain and balance productive landscapes west of the M1*	N/A	The subject site is not located to the west of the M1 Motorway.
12. *Protect and manage environmental values*	Yes	The proposal seeks to rezone land from E3 Environmental Management to RE2 Private Recreation and apply the E2 Environmental Conservation zone to land with high environmental value. This ensures the retention of existing connectivity to other surrounding land of high environmental value. Impacts of any vegetation loss to facilitate the proposal will need to be addressed in accordance with the *Biodiversity Conservation Act 2016.*
13. *Sustain water quality and security*	N/A	The site is not located within a drinking water catchment. Any proposal will be required to address all applicable stormwater quality controls.
14. *Protect the coast and manage natural hazards and climate change*	Yes	The site is not susceptible to coastal hazards. Land in the area of the creek line to the south of the site located below the probable maximum flood level is proposed to be zoned E2 Environmental Conservation and will not be developed. Subsidence Advisory NSW have provided conditional support for the proposal and are likely to be further consulted if a Gateway Determination is issued. A Phase 1 Contaminated Lands Assessment has been undertaken by a suitably qualified geotechnical engineer. The findings of this contamination assessment recommends that a detailed contamination assessment be undertaken with remedial actions, where necessary. It has been determined that if all "Areas of Concern" are addressed the land can be remediated to a suitable condition for residential use.

Direction	Applicable	Assessment/Comment
15. *Create a well-planned, compact settlement pattern*	Yes	The site is located within an identified development precinct under the State Government endorsed North Wyong Shire Structure Plan. Servicing for this and surrounding precincts has been identified as a priority by Council and is currently being considered through the completion of the Greater Lake Munmorah Structure Plan The Central Coast Council's Draft Greater Lake Munmorah Structure Plan will set a coherent framework for development, facilitating the future growth and prosperity of the area, and will identify: • Appropriate development footprints for new residential and employment land, and any relevant staging requirements; and • Appropriate transport, environmental and open space networks to cater for expected population growth.
16. *Grow investment opportunities in the region's centres*	N/A	The proposal is for residential development and the site is not located within a centre.
17 *Align land use and infrastructure planning*	Applicability	The proposal is located within an identified development precinct and would be subject to developer Contributions under the Northern Districts Section (7.11) 94 Contribution plan. Any road upgrades required as a result of this development would be subject to a Planning Agreement between the land owner Council or Transport for NSW depending of the works needed.
18. *Create places that are inclusive, well-designed and offer attractive lifestyles*	Yes	The primary purpose of the proposed rezoning is to facilitate the development of a Manufactured Housing Estate (MHE) which provides for a lifestyle that is in demand and considered attractive to a growing section of the community.
19. *Accelerate housing supply and improve housing choice*	Yes	The primary purpose of the proposed rezoning is to facilitate the development of a MHE which provides for a lifestyle that is in demand and considered attractive to a growing section of the community. Any development for such a purpose would be

Direction	Applicable	Assessment/Comment
		subject to appropriate State and local development controls.
20. *Grow housing choice in and around local centres*	Yes	The site is located within an identified development precinct under the NSW State Government endorsed North Wyong Shire Structure Plan and is identified for residential development in the draft Greater Lake Munmorah Structure Plan.
21. *Provide housing choice to meet community needs*	Yes	The primary purpose of the proposed rezoning is to facilitate the development of a MHE which provides for a lifestyle that is in demand and considered attractive to a growing section of the community.
22. *Deliver housing in new release areas that are best suited to building new communities*	Yes	The site is located within an identified development precinct under the NSW State Government endorsed North Wyong Shire Structure Plan. The primary purpose of the proposed rezoning is to facilitate the development of a MHE which provides for a lifestyle that is in demand and considered attractive to a growing section of the community.
23. *Manage rural lifestyles*	N/A	The proposal does not relate to rural lifestyles.

State and Sydney Region Environmental Planning Policy Assessment

State/Sydney Region Environmental Planning Policy	Comment
SREP 8 – Central Coast Plateau Areas	
	Not applicable to this proposal The site is not located in the Central Coast Plateau Areas.
SREP 20 - Hawkesbury Nepean River (No 2 – 1997)	
	Not applicable to this proposal.
SEPP No. 19 – Bushland in Urban Areas	
	This SEPP does not apply in the former Wyong Shire area of the Central Coast Local Government Area. Not applicable to the subject site.
SEPP No. 21 – Caravan Parks	
Aims to encourage: (a) the orderly and economic use and development of land used or intended to be used as a caravan park catering exclusively or predominantly for short-term residents (such as tourists) or for long-term residents, or catering for both, and (b) the proper management and development of land so used, for the purpose of promoting the social and economic welfare of the community, and (c) the provision of community facilities for land so used, and (d) the protection of the environment of, and in the vicinity of, land so used.	The proposal does not relate to caravan park development. Development for the purposes of a MHE may be carried out pursuant to this Policy on any land on which development for the purposes of a caravan park may be carried out.
SEPP No. 36 – Manufactured Home Estates	
(1) The aims of this Policy are: (a) to facilitate the establishment of manufactured home estates as a contemporary form of medium density	The SEPP provides controls that help to ensure that the considerations of issues such as layout and environmental impact are adequately considered in the design of MHEs.

State/Sydney Region Environmental Planning Policy	Comment
residential development that provides an alternative to traditional housing arrangements, and (b) to provide immediate development opportunities for manufactured home estates on the commencement of this Policy, and (c) to encourage the provision of affordable housing in well designed estates, and (d) to ensure that manufactured home estates are situated only in suitable locations and not on land having important resources or having landscape, scenic or ecological qualities that should be preserved, and (e) to ensure that manufactured home estates are adequately serviced and have access to essential community facilities and services, and (f) to protect the environment surrounding manufactured home estates, and (g) to provide measures which will facilitate security of tenure for residents of manufactured home estates.	The proposal demonstrates that consistency with the SEPP can be achieved through the submission and assessment of a suitable development application.
SEPP No. 44 – Koala Habitat	
Aims 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	Koala feed trees Scribbly Gum (*Eucalyptus haemastoma*) and Swamp Mahogany *(Eucalyptus robusta)* make up the only eucalypt trees on site and comprise more than 15% of trees within the Coastal Woodland and Riparian Forest communities respectively. Therefore these communities comprise Potential Koala Habitat (PKH) under the definitions of SEPP 44. The ecological report provided in support of the application indicates that koalas have not been recorded during survey to date and are considered with an unlikely potential to occur. Further targeted Koala survey incorporating scat searches will be undertaken during future, to provide a final conclusion on if the site comprises Core Koala Habitat under the definitions of SEPP

State/Sydney Region Environmental Planning Policy	Comment
	44. If so, restrictions may be applied to the development footprint. The information provided is consistent with the requirements of SEPP 44, has been considered by Council's Ecologist and indicates that the proposal can be progressed.
SEPP 55 – Remediation of Land	
Aims 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 (c) by requiring that a remediation work meet certain standards and notification requirements.	A Phase 1 Contaminated Lands Assessment has been undertaken by a suitably qualified geotechnical engineer to demonstrate compliance with the requirements of SEPP 55. The findings of this contamination assessment recommends that a detailed contamination assessment be undertaken with remedial actions, where necessary. It has been determined that if all "Areas of Concern" are addressed the land can be remediated to a suitable condition for residential use and that the information provided indicates that the proposal can be advanced.
SEPP 62 – Sustainable Aquaculture	
	Not applicable to this proposal
SEPP 64 – Advertising and Signage	
This Policy aims: (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	The proposed use as a manufactured home estate may require some signage and the provisions of the SEPP will apply. This SEPP will be considered in detail when a development application involving signage is lodged.

State/Sydney Region Environmental Planning Policy	Comment
(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.	
SEPP (Coastal Management) 2018	
Aims: The aim of this Policy is to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with 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 and 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 site is not within the Coastal Zone as defined under SEPP Coastal Management. The extent of the Coastal Zone abuts the western boundary of the site. No coastal wetlands or rainforests are identified as occurring on this site.
SEPP – (Mining, Petroleum & Extractive Industries) 2007	
Aims: (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	The subject site is covered by a Consolidated Coal Lease and has been subject to underground mining. Both DPIE – Division of Resource and Geoscience and Subsidence Advisory NSW have provided conditional support for the proposal and are likely to be further consulted if a Gateway Determination is issued.

State/Sydney Region Environmental Planning Policy	Comment
(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.	
SEPP (Vegetation in Non-Rural Areas) 2017	
The aims of this 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	In accordance with Cl.5(1)(b) this Policy applies to land zoned E3 – Environmental Management. Clearing of vegetation would be required to facilitate the proposed development of the site for a MHE. While vegetation removal would generally occur as part of a development application process that would follow the completion of the planning proposal, Council must be satisfied that the proposal can reasonably meet the requirements of the SEPP and the *Biodiversity Conservation Act 2016*. The proposal seeks to impact on approximately 0.32 ha of Swamp Sclerophyll Forest EEC and 0.92 ha of Narrabeen Doyalson Coastal Woodland. The vegetated southern end of the site is identified on the biodiversity values (BV) map published by the NSW Office of Environment and Heritage. The proposal (as submitted) triggers entry into the Biodiversity Offset Scheme (BOS) via impacting areas

State/Sydney Region Environmental Planning Policy	Comment
	highlighted on the BV map and exceeding the area clearing threshold. The subject site is located in close proximity to the CCRP biodiversity corridor which connects the coast to the foothills and provides inter-regional landscape connectivity. The site is partially nominated as a green corridor and habitat network by the NWSSP. That portion of the site proposed to be zoned E2 Environmental Conservation closely aligns with the high level mapped boundary of the green corridor. As the development site is not densely vegetated it is reasonable that required offsetting or redesign can be undertaken and the proposal can meet the requirement of the SEPP. Additional information on how the requirements of the SEPP will be achieved may be required following Gateway Determination.

Ministerial Section 9.1 Directions

Direction	Comment
Employment & Resources	
1.1 Business & Industrial Zones	
Aims to encourage employment growth in suitable locations, protect employment land in business and industrial zones and to support the viability of identified strategic centres. Applies when a planning proposal affects land within an existing or proposed business or industrial zone.	Not Applicable Subject area is not within an existing or proposed industrial or business zone.
1.2 Rural Zones	
Aims to protect the agricultural production value of rural land. Applies when a planning proposal affects land within an existing or proposed rural zone.	Not Applicable
1.3 Mining, Petroleum Production and Extractive Industries	
Aims to ensure that the future extraction of State or regionally significant reserves of coal, other minerals, petroleum and extractive materials are not compromised by inappropriate development. Applies when a planning proposal would have the effect of prohibiting the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials, or restricting the potential of development resources of coal, other mineral, 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.	Applicable The subject site is covered by a Consolidated Coal Lease and has been subject to underground mining. Both Department of Planning Infrastructure and Environment (DPIE) – Division of Resource and Geoscience and Subsidence Advisory NSW have provided conditional support for the proposal and will be further consulted in accordance with any Gateway Determination.
1.4 Oyster Aquaculture	
	Not Applicable
1.5 Rural Lands	
Aims to protect the agricultural production value of rural land; and facilitate the orderly and economic development of rural lands for rural and related purposes. Applies to local government areas to which State Environmental Planning Policy (Rural Lands) 2008 applies and prepares a planning proposal that affects land within an existing or proposed rural or environment protection zone.	Not Applicable This Direction does not apply to the Central Coast Local Government Area (or former Wyong or Gosford LGAs).

Direction	Comment
Environment & Heritage	
2.1 Environmental Protection Zones	
Aims to protect and conserve environmentally sensitive areas. Applies when the relevant planning authority prepares a planning proposal. What a relevant planning authority must do if this direction applies: • A planning proposal must include provisions that facilitate the protection and conservation of environmentally sensitive areas. • A planning proposal that applies to land within an environment protection zone or land otherwise identified for environment protection purposes in a LEP must not reduce the environmental protection 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 clause (5) of Direction 1.5 "Rural Lands" A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning that the provisions of the planning proposal that are inconsistent are: (a) justified by a strategy which: (i) gives consideration to the objectives of this direction, (ii) identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), and (iii) is approved by the Director-General of the Department of Planning, 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 Sub-Regional Strategy prepared by the	Applicable The proposal is potentially inconsistent with this Direction as the site is zoned E3 Environmental Management and the proposal is to rezone the majority of the site to RE2 Private Recreation. The subject site is identified as a development precinct under the NSW State Government endorsed North Wyong Shire Structure Plan (NWSSP). The subject site is located in close proximity to the CCRP biodiversity corridor. The site is partially nominated as a green corridor and habitat network by the NWSSP. That portion of the site proposed to be zoned E2 Environmental Conservation closely aligns with the high level mapped boundary of the green corridor. The proposal seeks to impact on approximately 0.32 ha of Swamp Sclerophyll Forest Endangered Ecological Community (EEC) and 0.92 ha of Narrabeen Doyalson Coastal Woodland. The vegetated southern end of the site is highlighted on the biodiversity values map published by the NSW Office of Environment and Heritage and the proposal layout appears to impact on areas highlighted on the map. Thus, the proposal triggers entry into the Biodiversity Offset Scheme. As the development site is not densely vegetated it is reasonable that required offsetting or redesign can be undertaken without affecting the viability of this proposal.

Direction	Comment
Department of Planning which gives consideration to the objective of this direction, or (d) is of minor significance	
2.2 Coastal Management	
Aims to implement the principles in the NSW Coastal Policy. Applies when a planning proposal applies to land in the *Coastal Zone*.	Not Applicable The site is not within the Coastal Zone
2.3 Heritage Conservation	
Aims to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance. Applies when the relevant planning authority prepares a planning proposal.	Applicable There are no items of European heritage identified on the site. An Aboriginal Cultural Heritage Assessment has been provided and indicates that there are no archaeological sites in the project area.
2.4 Recreational Vehicle Areas	
Aims to protect sensitive land or land with significant conservation values from adverse impacts from recreational vehicles. Applies when the relevant planning authority prepares a planning proposal.	Applicable It is not proposed to enable the land to be developed for the purpose of a recreation area.
2.5 Application of E2 and E3 Zones and Environmental Overlays in Far North Coast LEPs	
Aims to ensure that a balanced and consistent approach is taken when applying environmental protection zones and overlays to land on the NSW Far North Coast.	Not Applicable
Housing, Infrastructure and Urban Development	
3.1 Residential Zones	
Aims to encourage a variety and choice of housing types to provide for existing and future housing needs, to make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services, and to minimise the impact of residential development on the environmental and resource lands. Applies when a planning proposal affects land within an existing or proposed residential zone, and any other zone in which significant residential development is permitted or proposed to be permitted.	Applicable The proposal seeks to facilitate a Manufactured Home Estate (MHE) which provides for a form a housing that is considered to be in demand and provides for a relatively dense form of detached housing. The satisfactory servicing of the land will need to be arranged to the satisfaction of Council and other relevant authorities through the planning proposal assessment process.
3.2 Caravan Parks and Manufactured Home Estates	

Direction	Comment
Aims to provide for a variety of housing types and provide opportunities for caravan parks and manufactured home estates. Applies when the relevant planning authority prepares a planning proposal. (5) In identifying suitable zones, locations and provisions for manufactured home estates (MHEs) in a planning proposal, the relevant planning authority must:	Applicable – see individual considerations below:
(a) take into account the categories of land set out in Schedule 2 of SEPP 36 as to where MHEs should not be located,	In general the SEPP looks to restrict the development of MHEs on environmentally sensitive land or land identified for another strategic planning purpose. The site is identified within a development precinct under the NWSSP.
b) take into account the principles listed in clause 9 of SEPP 36 (which relevant planning authorities are required to consider when assessing and determining the development and subdivision proposals),	In general the SEPP looks to ensure that land to be developed for a MHE is adequality serviced. Servicing of the land will need to be arranged to the satisfaction of Council and other relevant authorities through the planning proposal and subsequent development application assessment process.
(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.	The relevant LEP does not restrict leasing arrangements nor restrict Community Title Subdivision in the proposed RE2 Private Recreation zone and subdivision of MHEs is provided for under Cl. 8 of SEPP 36.
3.3 Home Occupations	
Aims to encourage the carrying out of low impact small business in dwelling houses. Applies when the relevant planning authority prepares a planning proposal. If this Direction applies - Planning proposals must permit home occupations to be carried out in dwelling houses without the need for development consent.	Applicable Dwelling houses are not permissible in the RE2 – Private Recreation Zone.
3.4 Integrating Land Use & Transport	
Aims to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts to achieve: improving access to housing, jobs and services by walking, cycling and public transport; increasing choice of available transport and reducing transport on cars; reducing travel demand;	Applicable The site is located within a development precinct identified in the NWSSP and will provide for access to public transport. The draft Greater Lake Munmorah Structure Plan identifies transportation improvements for the area

Direction	Comment
supporting efficient and viable public transport services; and provide for efficient movement of freight. Applies when a planning proposal creates alters or moves a zone or provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes.	in response to the predicted population growth for this locality.
3.5 Development Near Licensed Aerodromes	
Aims to ensure the effective and safe operation of aerodromes, their operation is not compromised by development which constitutes an obstruction, hazard or potential hazard to aircraft flying in the vicinity, development for residential purposes or human occupation (within the ANEF contours between 20 & 25) incorporates appropriate mitigation measures so that the development is not adversely affected by aircraft noise. Applies when a planning proposal creates, alters or removes a zone or provision relating to land in the vicinity of a licensed aerodrome.	Not Applicable The site is not in the vicinity of a licenced aerodrome.
3.6 Shooting Ranges	
Aims to maintain appropriate levels of public safety and amenity when rezoning land adjacent to an existing shooting range, to reduce land use conflict arising between existing shooting ranges and rezoning of adjacent land, and to identify issues that must be addressed when giving consideration to rezoning land adjacent to an existing shooting range. Applies when a relevant planning authority prepares 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.	Not Applicable Subject site is not adjacent to and/or adjoining an existing shooting range.
3.7 Reduction in non- hosted short term rental accommodation period	
Applies to Byron Bay Shire Council	Not Applicable
Hazard & Risk	
4.1 Acid Sulfate Soils	
Aims to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils. Applies when a planning proposal applies to land having a probability of containing acid sulfate soils on the Acid Sulfate Soils Planning Maps.	Applicable Part of the subject site is identified in Council's Acid Sulfate Soils Map. In the *Preliminary Site Investigation* provided with the application it is indicated that the site is located in an area having no known occurrence of acid sulfate soils (ASS) and

Direction	Comment
	if ASS are found to be present they can be effectively managed through investigation and a site specific acid sulfate soil management plan.
4.2 Mine Subsidence & Unstable Land	
Aims to prevent damage to life, property and the environmental on land identified as unstable or potentially subject to mine subsidence. Applies when a planning proposal permits development on land which is within a mine subsidence district or identified as unstable in a study or assessment undertaken by or on behalf of the relevant planning authority or other public authority and provided to the relevant planning authority.	The site is identified as being within the Swansea North Entrance Mines Subsidence District. The subject site is covered by a Consolidated Coal Lease and has been subject to underground mining. Both DPIE – Division of Resource and Geoscience and Subsidence Advisory NSW have provided conditional support for the proposal and are likely to be further consulted if a Gateway Determination is issued.
4.3 Flood Prone Land	
Aims to ensure: development on flood prone land is consistent with NSW Government's Flood Prone Land Policy and principles of the Floodplain Development Manual 2005; and provisions of an LEP on flood prone land are commensurate with flood hazard and include consideration of the potential flood impacts both on and off the subject land. Applies when a planning proposal creates, removes or alters a zone or provision that affects flood prone land.	Applicable Council's existing flood mapping does not extend to this site exemplified by the fact that the existing creek at the rear of the site is not identified on the existing flood maps. Draft Flood Mapping for Lake Macquarie identifies that the limit of the Probable Maximum Flood (PMF) generally aligns with land proposed to be preserved under the E2 zoning. As the proposal does not rezone land within a flood planning area to the proposed special use zone it is considered consistent with this Direction.
4.4 Planning for Bushfire Protection	
Aims to protect life, property and the environment from bushfire hazards, and encourage sound management of bushfire prone areas. Applies when a planning proposal affects or is in proximity to land mapped as bushfire prone land.	Applicable The subject land is mapped as bushfire prone land. A draft bushfire report has been submitted with the planning proposal. As required by the direction, consultation will occur with the NSW Rural Fire Service following issue of a Gateway determination.
Regional Planning	
5.2 Sydney Drinking Water Catchments	
Aims to protect water quality in the hydrological catchment. Applies when a relevant planning authority prepares a planning proposal that applies to Sydney's hydrological catchment.	Not Applicable. This Direction does not apply to the Central Coast Local Government Area (or former Wyong or Gosford LGAs).

Direction	Comment
5.3 Farmland of State and Regional Significance on the NSW Far North Coast	
Applies to Ballina, Byron, Kyogle, and Tweed Shire Councils, Lismore City Council and Richmond Valley Council.	Not Applicable.
5.4 Commercial and Retail Development along the Pacific Highway, North Coast	
Applies to all councils between and inclusive of Port Stephens and Tweed Shire Councils.	Not Applicable.
5.8 Second Sydney Airport: Badgerys Creek	
	Not Applicable.
5.9 North West Rail Link Corridor Strategy	
Applies to the This Direction applies to Hornsby Shire Council, The Hills Shire Council and Blacktown City Council.	Not Applicable
5.10 Implementation of Regional Plans	
Aims to give legal effect to the vision, land use strategy, goals, directions and actions contained within Regional Plans. Applies when the relevant planning authority prepares a planning proposal.	Applicable A full assessment of this proposal against the considerations of the Central Coast Regional Plan 2036 is contained within this Strategic Assessment document. The proposal is considered to be consistent with the Regional Plan.
5.11 Development of Aboriginal Land Council Land	
Aims to provide for the consideration of development delivery plans prepared under the State Environmental Planning Policy (Aboriginal Land) 2019. Applies when the relevant planning authority prepares a planning proposal for land shown on the Land Application Map of the SEPP (Aboriginal Lands) 2019.	Not applicable
Local Plan Making	
6.1 Approval and Referral Requirements	
Aims to ensure that LEP provisions encourage the efficient and appropriate assessment of development. Applies when the relevant planning authority prepares a planning proposal.	The proposal does not seek to introduce any referral or concurrence provisions and is consistent with the provisions of the direction.
6.2 Reserving Land for Public Purposes	
Aims to facilitate the provision of public services and facilities by reserving land for public purposes and facilitate the removal of reservations of land for public purposes where land is no longer required for acquisition.	Applicable The proposal does not create, alter or reduce existing zonings or reservations of land for public purposes

Direction	Comment
Applies when the relevant planning authority prepares a planning proposal.	
6.3 Site Specific Provisions	
Aims to discourage unnecessarily restrictive site specific planning controls. Applies when the relevant planning authority prepares a planning proposal to allow particular development to be carried out.	Applicable The proposal does not require the implementation of site specific controls. Required controls can be provided through appropriate zoning and lot size controls and existing controls applying to the land use.
Metropolitan Planning	
7.1 Implementation of A Plan for Growing Sydney	
Aims to give legal effect to the planning principles, directions and priorities for sub regions, strategic centres and transport gateways contained in A Plan for Growing Sydney	Not Applicable. This Direction does not apply to the Central Coast Local Government Area (or former Wyong or Gosford LGAs).
7.2 Implementation of Greater Macarthur Land Release Investigations	
	Not Applicable.
7.3 Parramatta Road Corridor Urban Transformation Strategy	
	Not Applicable.
7.4 Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	
Aims to facilitate development within the Parramatta Road Corridor	Not Applicable.
7.5 Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	
	Not Applicable.
7.6 Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	
	Not Applicable.
7.7 Implementation of Glenfield to Macarthur Urban Renewal Corridor	
	Not Applicable.
7.8 Implementation of Western Sydney Aerotropolis Interim Land Use and Infrastructure Implementation Plan	
This direction applies to Liverpool, Penrith Blue Mountains, Blacktown Campbelltown City Council and Fairfield City Councils, Camden Council and Wollondilly Shire Council.	Not Applicable.

Direction	Comment
7.9 Implementation of Bayside West Precincts 2036 Plan	
This direction applies to land within the Bayside local government area.	Not Applicable.
7.10 Implementation of Planning Principles for the Cooks Cove Precinct	
	Not Applicable.

Wyong Shire Settlement Strategy/Gosford Residential Strategy/Gosford City Centre Strategy Assessment

Objective/Requirement	Comment
The objectives of the North Wyong Shire Structure Plan (NWSSP) are to: • Identify sufficient land for regional greenfield housing and employment targets to be met, as a minimum; • Identify and protect important environmental assets, landscape values and natural resources; • Provide greater certainty for the community, local government, industry groups and commerce on the location of future development and conservation areas; and • Consider key infrastructure requirements to support new precincts and ensure that new urban land release contributes to infrastructure costs. It is noted that the Wyong Shire Settlement Strategy (2013) reflects the objectives and requirements of the NWSSP with regard to this site.	The proposal relies on its consistency with the NWSSP in so far as the site is identified within the Chain Valley East (Residential) Precinct. The area was originally designated as a long-term development precinct based on mining and servicing constraints. Since the development of the NWSSP these issues have been addressed and development in this area has accelerated. This is reflected in the draft Greater Lake Munmorah Structure Plan (GLMSP) which envisages the development of the subject land for residential purposes. The GLMSP will assist in achieving the objectives of the NWSSP by setting a coherent framework for development, facilitating the future growth and prosperity of the area. The GLMSP will identify: • Appropriate development footprints for new residential and employment land, and any relevant staging requirements; and • Appropriate transport, environmental and open space networks to cater for expected population growth.

Community Strategic Plan Assessment

Objective/Requirement		Comment
BELONGING		
OUR COMMUNITY SPIRIT IS OUR STRENGTH		
	A1 Work within our communities to connect people, build capacity and create local solutions and initiatives	If initially supported by Council and DPIE, public consultation with respect to this proposal will be conducted
	A2 Celebrate and continue to create opportunities for inclusion where all people feel welcome and participate in community life	Not Applicable
	A3 Work together to solve a range of social and health issues that may impact community wellbeing and vulnerable people	Not Applicable
	A4 Enhance community safety within neighbourhoods, public spaces and places	Not Applicable
CREATIVITY, CONNECTION AND LOCAL IDENTITY		
	B1 Support reconciliation through the celebration of Aboriginal and Torres Strait Islander cultures	Not Applicable
	B2 Promote and provide more sporting, community and cultural events and festivals, day and night, throughout the year	Not Applicable
	B3 Foster creative and performing arts through theatres, galleries and creative spaces, by integrating art and performance into public life	Not Applicable
	B4 Activate spaces and places to complement activity around town centres, foreshores, lakes and green spaces for families, community and visitors	Should the proposal proceed as intended, development contributions will be required to be paid which will be used to embellish the local area.
SMART		
A GROWING AND COMPETITIVE REGION		
	C1 Target economic development in growth areas and major centres and provide incentives to attract businesses to the Central Coast	Not Applicable
	C2 Revitalise Gosford City Centre, Gosford Waterfront and town centres as key destinations and attractors for businesses, local residents, visitors and tourists	Not Applicable
	C3 Facilitate economic development to increase local employment opportunities and provide a range of jobs for all residents	The proposal will provide local job opportunities in construction as well as generate 12-15 ongoing operational jobs
	C4 Promote and grow tourism that celebrates the natural and cultural assets of the Central Coast in a way that is accessible, sustainable and eco-friendly	Not Applicable
A PLACE OF OPPORTUNITY FOR PEOPLE		
	D1 Foster innovation and partnerships to develop local entrepreneurs and support start-ups	Not Applicable
	D2 Support local business growth by providing incentives, streamlining processes and encouraging social enterprises	Not Applicable

Objective/Requirement		Comment
	D3 Invest in broadening local education and learning pathways linking industry with Universities, TAFE and other training providers	Not Applicable
	D4 Support businesses and local leaders to mentor young people in skills development through traineeships, apprenticeships and volunteering	Not Applicable
GREEN		
ENVIRONMENTAL RESOURCES FOR THE FUTURE		
	E1 Educate the community on the value and importance of natural areas and biodiversity and encourage community involvement in caring for our natural environment	Not Applicable
	E2 Improve water quality for beaches, lakes and waterways including minimising pollutants and preventing litter entering our waterways	Any proposal will be required not to have a negative impact on waterways
	E3 Reduce littering, minimise waste to landfill and educate to strengthen positive environmental behaviours	Not Applicable
	E4 Incorporate renewable energy and energy efficiency in future design and planning and ensure responsible use of water and other resources	Not Applicable
CHERISHED AND PROTECTED NATURAL BEAUTY		
	F1 Protect our rich environmental heritage by conserving beaches, waterways, bushland, wildlife corridors and inland areas and the diversity of local native species	The proposal will be required to maintain land of high environmental value.
	F2 Promote greening and ensure the wellbeing of communities through the protection of local bushland, urban trees, tree canopies and expansion of the Coastal Open Space System (COSS)	The proposal will be required to maintain land of high environmental value.
	F3 Improve enforcement for all types of environmental non-compliance including littering and illegal dumping and encourage excellence in industry practices to protect and enhance environmental health	Not Applicable
	F4 Address climate change and its impacts through collaborative strategic planning and responsible land management and consider targets and actions	Not Applicable
RESPONSIBLE		
GOOD GOVERNANCE AND GREAT PARTNERSHIPS		
	G1 Build strong relationships and ensure our partners and community share the responsibilities and benefits of putting plans into practice	Not Applicable
	G2 Communicate openly and honestly with the community to build a relationship based on transparency, understanding, trust and respect	Applicable The proposal will be publicly exhibited for the appropriate time period, providing the community with an opportunity to comment.
	G3 Engage with the community in meaningful dialogue and demonstrate how community participation is being used to inform decisions	Applicable See above.

Objective/Requirement		Comment
	G4 Serve the community by providing great customer experience, value for money and quality services	Not Applicable
DELIVERING ESSENTIAL INFRASTRUCTURE		
	H1 Solve road and drainage problem areas and partner with the State Government to improve road conditions across the region	For the proposal to advance there will be requirement to contribute to improvement of local and State roads in the locality.
	H2 Improve pedestrian movement safety, speed and vehicle congestion around schools, town centres, neighbourhoods, and community facilities	Not Applicable
	H3 Create parking options and solutions that address the needs of residents, visitors and businesses whilst keeping in mind near future technologies including fully autonomous vehicles	Not Applicable
	H4 Plan for adequate and sustainable infrastructure to meet future demand for transport, energy, telecommunications and a secure supply of drinking water	Applicable Part of the assessment of the proposal is to ensure that adequate infrastructure is provided.
BALANCED AND SUSTAINABLE DEVELOPMENT		
	I1 Preserve local character and protect our drinking water catchments, heritage and rural areas by concentrating development along transport corridors and town centres east of the M1	Applicable The site is located to the east of the M1 within an identified development precinct.
	I2 Ensure all new developments are well planned with good access to public transport, green space and community facilities and support active transport	The proposal will be specifically designed for the proposed use as an MHE.
	I3 Ensure land use planning and development is sustainable and environmentally sound and considers the importance of local habitat, green corridors, energy efficiency and stormwater management	The proposal maintains important environmental land on the site and will be required to meet applicable standards for energy efficiency and stormwater management.
	I4 Provide a range of housing options to meet the diverse and changing needs of the community including adequate affordable housing	The proposal responds to demand for MHE living.
LIVABLE		
RELIABLE PUBLIC TRANSPORT AND CONNECTIONS		
	J1 Create adequate, reliable and accessible train services and facilities to accommodate current and future passengers	Not applicable
	J2 Address commuter parking, drop-off zones, access and movement around transport hubs to support and increase use of public transport	Not applicable
	J3 Improve bus and ferry frequency and ensure networks link with train services to minimise journey times	Not applicable
	J4 Design long-term, innovative and sustainable transport management options for population growth and expansion	Not applicable
OUT AND ABOUT IN THE FRESH AIR		
	K1 Create a regional network of interconnected shared pathways and cycle ways to maximise access to key destinations and facilities	Not applicable

Objective/Requirement		Comment
	K2 Design and deliver pathways, walking trails and other pedestrian movement infrastructure to maximise access, inclusion and mobility to meet the needs of all community members	Not applicable
	K3 Provide signage, public facilities, amenities and playgrounds to encourage usage and enjoyment of public areas	Not applicable
	K4 Repair and maintain wharves, jetties, boat ramps and ocean baths to increase ease of access to and enjoyment of natural waterways and foreshores	Not applicable
HEALTHY LIFESTYLES FOR A GROWING COMMUNITY		
	L1 Promote healthy living and ensure sport, leisure, recreation and aquatic facilities and open spaces are well maintained and activated	Not applicable
	L2 Invest in health care solutions including infrastructure, services and preventative programs to keep people well for longer	Not applicable
	L3 Cultivate a love of learning and knowledge by providing facilities to support lifelong learning opportunities	Not applicable
	L4 Provide equitable, affordable, flexible and co-located community facilities based on community needs	Not applicable

02

Land Use Provisions

Wyong Local Environmental Plan 2013

Zone E3 Environmental Management

1 Objectives of zone

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.

2 Permitted without consent

Home occupations

3 Permitted with consent

Bed and breakfast accommodation; Building identification signs; Business identification signs; Community facilities; Dual occupancies; Dwelling houses; Eco-tourist facilities; Emergency services facilities; Environmental facilities; Environmental protection works; Extensive agriculture; Farm buildings; Farm stay accommodation; Flood mitigation works; Home-based child care; Home businesses; Home industries; Horticulture; Information and education facilities; Oyster aquaculture; Pond-based aquaculture; Recreation areas; Research stations; Roads; Roadside stalls; Secondary dwellings; Sewage treatment plants; Tank-based aquaculture; Water recreation structures; Water recycling facilities; Water supply systems

4 Prohibited

Industries; Multi dwelling housing; Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3

Wyong Local Environmental Plan 2013

Zone E2 Environmental Conservation

1 Objectives of zone

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

- To protect endangered ecological communities, coastal wetlands and littoral rainforests.
- To enable development of public works and environmental facilities if such development would not have a detrimental impact on ecological, scientific, cultural or aesthetic values.

2 Permitted without consent

Nil

3 Permitted with consent

Eco-tourist facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Oyster aquaculture; Recreation areas; Research stations; Roads; Water reticulation systems

4 Prohibited

Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Pond-based aquaculture; Recreation facilities (major); Residential flat buildings; Restricted premises; Retail premises; Seniors housing; Service stations; Tank-based aquaculture; Warehouse or distribution centres; Any other development not specified in item 2 or 3

Zone RE2 Private Recreation

1 Objectives of zone

- To enable land to be used for private open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.
- To offer opportunities for tourism development that is compatible with the natural environment.
- To allow for alternative uses of open space areas for community purposes that are compatible with surrounding areas.
- To enable land uses that are compatible with, and complementary to, recreational uses.

2 Permitted without consent

Nil

3 Permitted with consent

Amusement centres; Aquaculture; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Caravan parks; Charter and tourism boating facilities; Community facilities; Eco-tourist facilities; Emergency services facilities; Entertainment facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Food and drink premises; Function centres; Information and education facilities; Jetties; Kiosks; Marinas; Markets; Mooring pens; Moorings; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Roads; Sewerage systems; Water recreation structures; Water supply systems

4 Prohibited

Any development not specified in item 2 or 3

03

Agency Responses

29 August 2019

Tom Copping
Senior Planner
Vivacity Group Pty Ltd
Level 54, Governor Phillip Tower
1 Farrer Place
Sydney, NSW 2000

Emailed: Tom@vivacityproperty.com.au

Your Reference: email dated 5/8/2019
Our Reference: DOC19/734742

Dear Mr Copping,

RE: PROPOSED REZONING OF NO. 45 MULLOWAY ROAD, CHAIN VALLEY BAY – MANUFACTURED HOUSING ESTATE FOR OVER 55's.

Thank you for the opportunity to provide advice on the above matter as a pre-Gateway Consultation. This is a response from NSW Department of Planning & Environment – Division of Resources & Geoscience (the Division) – Geological Survey of New South Wales (GSNSW).

GSNSW understand the planning proposal seeks to rezone the subject site comprising Lot 5 DP 1228880, No. 45 Mulloway Road, Chain Valley Bay from E3 Environmental Management to E2 Environmental Conservation and RE2 Private Recreation and also amend the minimum subdivision lot size from 40 hectares to 1 hectare with the intention for a subsequent development application for a manufactured home estate composed of approximately 190 relocatable homes and community amenities.

The subject site is covered by Consolidated Coal Lease (CCL) 707 held by Great Southern Energy Pty Ltd. Large portions of the site have been subject to underground mining within the Wallarah seam. Accordingly, the subject area falls within the Swansea North Entrance Mine Subsidence District.

Recommendation:
The subject site is located within the Swansea North Entrance Mine Subsidence District. Accordingly, all proposed development in a mine subsidence district must be constructed in accordance with Subsidence Advisory NSW (SA NSW) approval. The contact email for Subsidence Advisory is: sa-mail@finance.nsw.gov.au.

Should Biodiversity Offsets (offsite) be considered for the proposal GSNSW requests they be consulted on the locations of these by the proponent to assess any potential for resource sterilisation.

GSNSW has no further resource issues to raise regarding the proposal.

Queries regarding the above information should be directed to the Division of Resources & Geoscience - Land Use team at landuse.minerals@geoscience.nsw.gov.au.

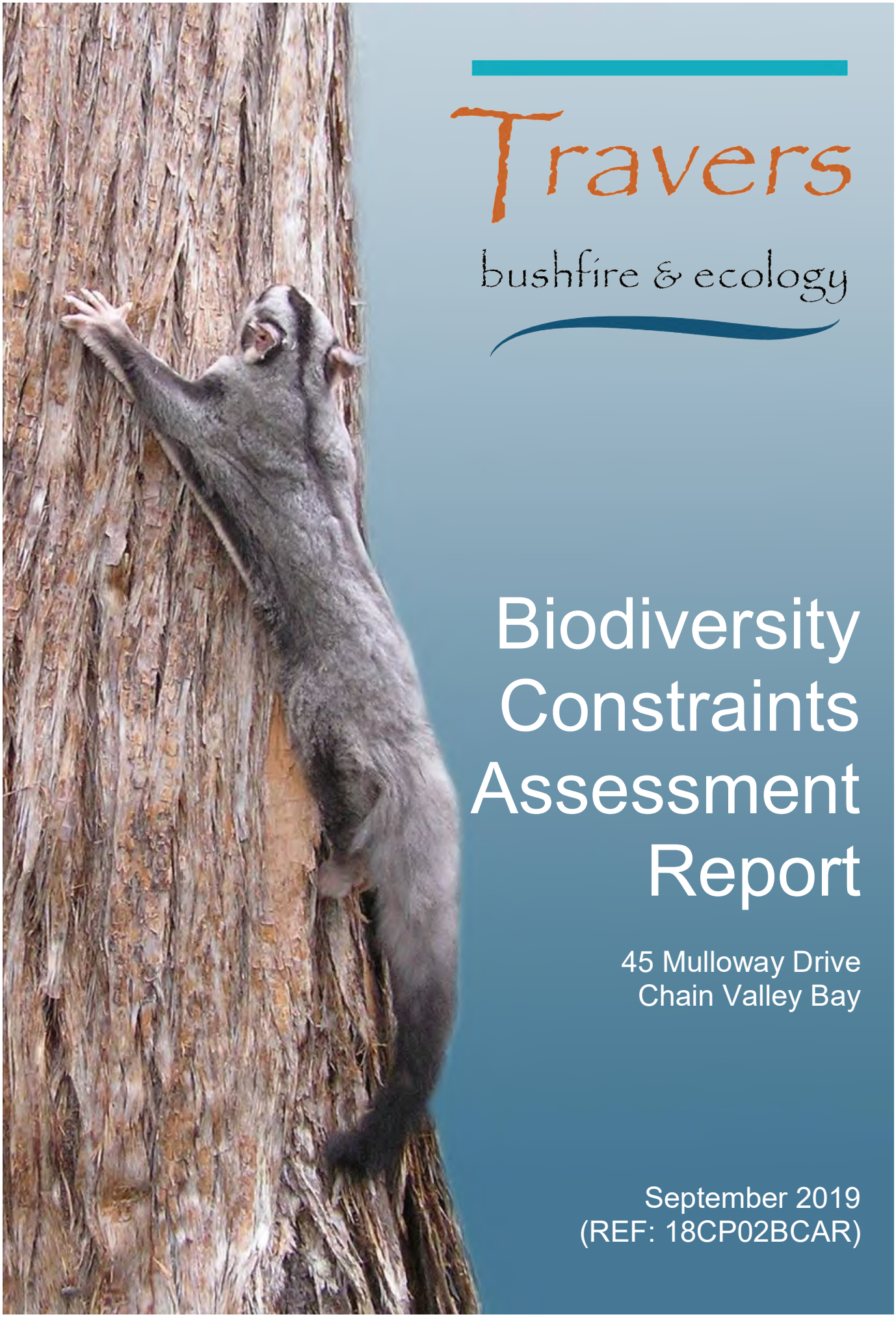
Yours sincerely

Andrew Helman
Senior Geoscientist - Land Use

05

Studies

05 A - ECOLOGICAL REPORT



Travers

bushfire & ecology

Biodiversity Constraints Assessment Report

45 Mulloway Drive
Chain Valley Bay

September 2019
(REF: 18CP02BCAR)

Biodiversity Constraints Assessment Report

45 Mulloway Drive
Chain Valley Bay

Report authors:	Michael Sheather-Reid B. Nat. Res. (Hons.) – Managing Director Accredited Assessor no. BAAS17085 George Plunkett B. Sc. (Hons.), PhD – Botanist – Accredited Assessor no. BAAS19010 Robert Sansom B. Sc. (Hons.) – Botanist Corey Mead B. App. Sc. – Senior Fauna Ecologist Bronte Talbot B. Env. Sc. Mgmt. – Ecologist
Plans prepared:	Sandy Cardow B. Sc. Bronte Talbot B. Env. Sc. Mgmt.
Approved by:	Michael Sheather-Reid (Accredited Assessor no. BAAS17085)
Date:	24/09/19
File:	18CP02BCAR

Disclaimer:

This report has been prepared to provide advice to the client on matters pertaining to the particular and specific development proposal as advised by the client and / or their authorised representatives. This report can be used by the client only for its intended purpose and for that purpose only. Should any other use of the advice be made by any person, including the client, then this firm advises that the advice should not be relied upon. The report and its attachments should be read as a whole and no individual part of the report or its attachments should be interpreted without reference to the entire report.

The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

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List of abbreviations

APZ	asset protection zone
BAM	Biodiversity Assessment Method
BAR	Biodiversity Assessment Report
BC Act	*Biodiversity Conservation Act (2016)*
BC Reg	*Biodiversity Conservation Regulation (2017)*
BCAR	Biodiversity Constraints Assessment Report
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
BPA	bushfire protection assessment
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically endangered ecological community
CM Act	*Coastal Management Act 2016*
DCP	development control plan
DEC	NSW Department of Environment and Conservation (superseded by DECC from April 2007)
DECC	NSW Department of Environment and Climate Change (superseded by DECCW from October 2009)
DECCW	NSW Department of Environment, Climate Change and Water (superseded by OEH from April 2011)
DEWHA	Commonwealth Department of Environment, Water, Heritage & the Arts (superseded by SEWPAC)
DOEE	Commonwealth Department of Environment & Energy
EEC	endangered ecological community
EPA	Environmental Protection Agency
EP&A Act	*Environmental Planning and Assessment Act (1979)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act (1999)*
FM Act	*Fisheries Management Act*
IBRA	Interim Biogeographic Regionalisation for Australia
LEP	local environmental plan
LGA	local government area
LLS Act	*Local Land Services Act (2013*)
NES	national environmental significance
NPW Act	*National Parks and Wildlife Act (1974)*
NSW DPI	NSW Department of Industry and Investment
OEH	Office of Environment and Heritage
PCT	plant community type
PFC	projected foliage cover
RFS	NSW Rural Fire Service
ROTAP	rare or threatened Australian plants
SAII	Serious And Irreversible Impacts
SEPP	State Environmental Planning Policy
SEWPAC	Commonwealth Dept. of Sustainability, Environment, Water, Population & Communities (superseded by DOEE)
SIS	species impact statement
SULE	safe useful life expectancy
TEC	threatened ecological community
TPZ	tree preservation zone
TSC Act	*Threatened Species Conservation Act (1995) – Superseded by the Biodiversity Conservation Act (2016)*
VMP	vegetation management plan

Biodiversity Assessment

1.0 Background

Travers bushfire & ecology has been engaged to undertake a biodiversity constraints assessment within Lot 5 DP 1228880, at 45 Mulloway Drive, Chain Valley Bay within the Central Coast local government area (LGA). The extent of this entire lot is shown in Figure 1. This lot is subject to a proposed retirement village development application and will hereafter be referred to as the 'study area'.

The area containing the proposed development and APZs is hereafter referred to as the 'subject site' (see Figure 1).

The proposal shall be assessed under the *Biodiversity Conservation Act* (BC Act), 2016.

Figure 1 – Study area (red) and subject site (yellow)

1.1 Proposed development

The concept proposal is shown in Figure 2 below. The layout seeks to provide an extension of the Valhalla development (by Gateway Lifestyle) which occurs on the western boundary, which is a retirement village. The concept plan will retain existing dwellings in the northern portion of the property, but will utilise the disturbed area in the central portions of the site. The vegetation near the southern boundary adjacent to Karignan Creek will be retained where possible.

Access to the site will be provided via two private access roads from the existing Valhalla development to the west and a single access directly onto Chain Valley Bay Road in the west as shown in Figure 2.

Figure 2 – Draft Masterplan
(Source – Mako Architecture Nov 2018 – Version 9 – November 2018)

1.2 Site description

Table 1 examines the landscape features of the proposed development site in accordance with the biodiversity assessment methodology (BAM). The proposal will be a Part 4 development (general).

Table 1 – Site features

Lot / DP	Lot 5 DP 1228880
Address	45 Mulloway Road, Chain Valley Bay
Local government area	Central Coast (formerly, Wyong)
Coordinates	367600E 6328200N (GDA94) AMG zone 56
Lot size	10.61ha
IBRA bioregions and subregions	Sydney Basin bioregion – Wyong subregion
NSW landscape region and area (ha)	Wyong; Gosford - Cooranbong Coastal Slopes.
Zoning	E3
Native vegetation extent in the 1,500m buffer area	70.3%
Cleared areas	The majority of the study area has been previously cleared for agricultural or pastoral usage. There are some existing dwellings in the study area, those in the northern portion will be retained. There are small pockets of disturbed vegetation across the property, largely along the western boundary, around the dam near the centre part of the site, and some scattered trees in the road reserve along the eastern boundary. The southern remnant of vegetation is moderate-good quality with good connectivity features and part of the Karignan Creek riparian corridor.
Evidence to support differences between mapped vegetation extent and aerial imagery	Ground-truthed vegetation closely matches aerial imagery. Interpretation of 'native vegetation' as per the *Local Land Services Act 2013* (*LS Act*) and *Biodiversity Conservation Act 2016* (*BC Act*) definition.
Connectivity features	The southern remnant has excellent connectivity features along Karignan Creek to the west of the site. It links to extensive vegetation to the east which is partly conserved within the Lake Macquarie State Conservation Area.
Patch size	Very extensive. 2,000ha was input into the calculator.
Areas of geological significance and soil hazard features	Geology; Munmorah Conglomerate across most of the site, Quaternary Alluvium in Karignan Creek. Soils: Doyalson Soil Landscape across most of the site, Wyong Soil Landscape or Tacoma Swamp Soil Landscape along Karignan Creek.
Identification of method applied (i.e. linear or site-based)	Site based assessment.

Figure 3 – Flora and Fauna Survey Effort and Results

2.0 Biodiversity Offsets Scheme (BOS)

The *BC Act* repeals the *Threatened Species Conservation Act 1995*, the *Nature Conservation Trust Act 2001* and the animal and plant provisions of the *National Parks and Wildlife Act 1974*.

Together with the *Biodiversity Conservation Regulation 2017*, the *BC Act* establishes a new regulatory framework for assessing and offsetting biodiversity impacts on proposed developments and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS). Where development consent is granted, the authority may impose as a condition of consent an obligation to retire a number and type of biodiversity credits determined under the new Biodiversity Assessment Method (BAM).

2.1 Threshold assessment

The BOS includes two (2) elements to the threshold test – an area trigger and a Sensitive Biodiversity Values Land Map trigger. If clearing exceeds either trigger, the BOS applies to the proposed clearing.

2.1.1 Sensitive Biodiversity Land Map

Sensitive Biodiversity Values Land has been mapped within the south of study area (purple areas in Figure 4) – an offset is required for any development within the mapped Biodiversity Values Land. Figure 4 shows the approximate position of the concept proposal (development area - blue) in relation to those areas (coloured purple) as having biodiversity values. Based on the current concept proposal, Biodiversity Values Land may be impacted and an offset will be required under this trigger.

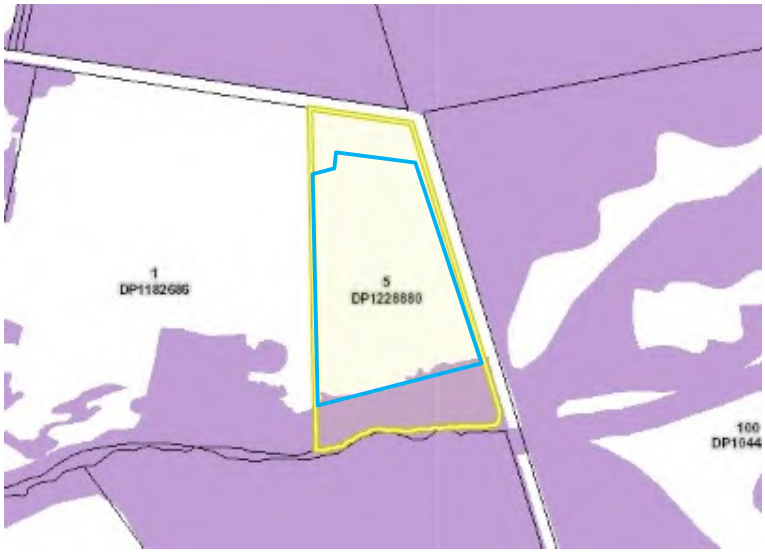


Figure 4 – Biodiversity value land (purple) relative to the study area (yellow)
(Source: OEH – Biodiversity Values Map – 4 July 2019)

2.1.2 Area clearing threshold

The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).

Table 2 – BOS entry threshold report

Date of Calculation	28/06/2019 11:02 AM	**BDAR Required***
Total Digitised Area	6.72 ha	
Minimum Lot Size Method	Lot size	
Minimum Lot Size	10.87 ha	
Area Clearing Threshold	0.5 ha	
Area clearing trigger Area of native vegetation cleared	Unknown #	Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no	no
Date of the 90 day Expiry	N/A	

Table 2 identifies that the BOS entry threshold report has determined the area threshold based on the actual lot size of 10.87ha, and the area clearing threshold for which the BOS applies is 0.5ha. Clearing of 'native vegetation' that exceeds 0.5ha will require a biodiversity offset to be obtained. Note that 'native vegetation' includes planted native species and remnant trees. The based on the concept proposal, the development will impact more than 0.5ha of remnant native vegetation within the study area, therefore offsetting will be required under this trigger.

Modification of the development layout to reduce the impact on native vegetation to below 0.5ha will avoid offsetting under this trigger.

2.2 Serious and irreversible impacts on biodiversity values

Development consent cannot be granted for non-State significant development under Part 4 of the *Environmental Planning and Assessment Act 1979* (NSW) if the consent authority is of the opinion it is likely to have serious and irreversible impacts (SAII) on biodiversity values.

The determination of SAII is to be made in accordance with principles prescribed section 6.7 of the *BC Regulation* (2017). The principles have been designed to capture those impacts which are likely to contribute significantly to the risk of extinction of a threatened species or ecological community in New South Wales.

Candidate SAII entities/species recorded or with potential to occur include:

- Eastern Bentwing-bat (recorded)
- Little Bentwing-bat (recorded)
- Swift Parrot
- Regent Honeyeater

The ecological data profiles of each of the above listed candidate species has been reviewed to determine any habitat constraints present. There is no presence of breeding habitat (caves) for the two Bentwing-bats and the proposal will not likely remove any important winter flowering trees for the two winter migratory bird species, therefore the proposal is not considered likely to cause serious and irreversible impacts.

3.0 Flora

3.1 Survey

A field inspection was previously undertaken by Botanist, Mr Robert Sansom (B. Sc. (Hons.)) on 24 November 2018 for constraints assessment purposes over the time frame of approximately 4hrs. This field inspection was restricted to the allotment as shown in Yellow within Figure 2 and was undertaken within the study area primarily to confirm the plant community types (PCTs) and to determine the ecological and habitat value of the site.

Two (2) 20 x 20 metre flora quadrats were undertaken within the existing native or remnant vegetation of the lot to assist in the identification of any PCT present.

Random meanders throughout the subject site were also undertaken to determine the value of native or non-native vegetation and to undertake habitat assessments and threatened species searches across the whole of the site for potential flora and fauna species.

Vegetation boundaries were drawn to the approximate extent of any drip line. Opportunistic threatened flora searches were undertaken during stratified surveys.

Botanical survey was undertaken to collect data for entry into the credit calculator on 14 February 2019 over a time frame of approximately 7hrs. This included the placement of three (3) BAM plots at selected locations and included some opportunistic survey for *Cryptostylis hunteriana* (may continue flowering to February but usually early summer), *Corunastylis sp. Charmhaven* (flowers Feb-Mar) and *Acacia bynoeana.* Survey was conducted over remnant patches in the proposed development area, but very restricted in the riparian area in the southern portion of the study area.

All naturally occurring species were identified to species level where possible, and are listed in Appendix 1.

3.2 Vegetation communities

Within the study area native vegetation occurs as scattered remnant trees within large areas of pastoral land or as large contiguous polygons along the western and southern boundaries of the lot. There are also areas (approximately 1.4ha) of household gardens surrounding the large shed and northern and central dwellings.

The vegetation in the locality and within the whole of the study area has been mapped within *The natural vegetation of the Wyong Local Government Area, Central Coast, New South Wales* (S. A. J. Bell, 2002) as Map Unit 31 – Narrabeen Doyalson Coastal Woodland.

The Coastal Woodland vegetation within the northern parts of the site corresponds to *Scribbly Gum – Red Bloodwood – Angophora inopina heathy woodland on lowlands of the Central Coas*t (PCT 1636).

The vegetation patch in the southern parts of the site contains Riparian Forest which is commensurate with Swamp Mahogany – Flaxleaved Paperbark swamp forest on coastal lowlands of the Central Coast (PCT 1718). Our quadrat and ecological survey results support these PCT classifications.

The Coastal Woodland vegetation within the study site (PCT 1636) is listed as being associated with the *Kincumber Scribbly Gum forest in the Sydney Basin Bioregion (Part)* Threatened Ecological Community (TEC) listed under the *Biodiversity Conservation Act 2016* (BC Act). However, Kincumber Scribbly Gum Forest is restricted to a small area on the Bouddi Peninsula on the NSW Central Coast south of Kincumber. It only occurs in the

Gosford LGA. Therefore the Coastal woodland vegetation within the study area does not correspond to the Kincumber Scribbly Gum Forest TEC.

The remaining vegetation in the study area occurs as planted trees, garden beds and managed cropping and pastoral areas.

3.3 Description of Vegetation

There are three (3) vegetation types present within the study area as shown in Figure 3. These are:

- Coastal Woodland
- Riparian Forest , and
- Household Gardens and Lawns

Coastal Woodland

This vegetation community describes all non-floodplain vegetation located within the study area, and occupies approximately 1.12 ha.

Canopy

Angophora costata, Eucalyptus haemastoma, Corymbia gummifera and *Eucalyptus capitellata* are the dominant species, 14-22m tall with a highly variable projected foliage cover between 2-40%.

Sub-canopy

Allocasuarina littoralis. Vegetation height to 12m tall.

Mid-storey

Acacia longifolia, Lambertia formosa, Hakea dactyloides, Banksia oblongifolia and within moister areas, *Melaleuca sieberi*.
Vegetation 1-4m tall and where present a highly variable projected foliage cover of 1-10%. Cover is variable due to the impacts of past and ongoing land uses.

Ground layer

Epacris pulchella, Gonocarpus teucrioides, Pimelea linifolia, Lomatia silaifolia, *Bossiaea heterophylla, Platysace linearifolia, Xanthorrhoea latifolia, Patersonia sericea, Lomandra obliqua, Dianella caerulea, Lindsaea linearis,* and *Actinotus minor*.
Grasses include *Entolasia stricta, Eragrostis brownii, Themeda triandra, Panicum simile, Oplismenus aemulus, Imperata cylindrica* and *Anisopogon avenaceus*.

Classification

The Coastal Woodland corresponds to PCT 1636 – Scribbly Gum – Red Bloodwood – *Angophora inopina* heathy woodland on lowlands of the Central Coast. This vegetation is also associated with the Threatened Ecological Community (TEC) known as Kincumber Scribbly Gum Forest in the Sydney Basin Bioregion (Part) as listed within the NSW *BC Act* (2016). However, Kincumber Scribbly Gum Forest is restricted to a small area on the Bouddi Peninsula on the NSW Central Coast south of Kincumber. It only occurs in the Gosford LGA. Therefore the Coastal woodland vegetation within the study area is not commensurate with the Kincumber Scribbly Gum Forest TEC.

Photo 1 – Coastal Woodland (PCT 1636) looking north from Quadrat 2, Note predominance of native species within the ground layer.

Photo 2 – Coastal Woodland (PCT 1636) located in a patch to the west of the large dam. Note the largely intact native ground layer

<u>Riparian Forest</u>

This vegetation community describes the floodplain vegetation in the southern portion of the study area. The vegetation is upon slightly hummocky grounds with small areas of intermittent soaks as well as mounds, thus there is a mixture of species that occur regularly in Swamp Sclerophyll vegetation as well as others that occur more regularly in drier locations but can handle the rare flood event. This vegetation community occupies approximately 2.3ha within the study area.

Canopy

Eucalyptus robusta, Angophora costata, Eucalyptus capitellata and *Melaleuca quinquenervia* are the dominant species 12-23m tall and with a projected foliage cover of 20-40%.

Mid-storey

Melaleuca sieberi, Melaleuca linariifolia, Acacia longifolia, Kunzea ambigua, Allocasuarina littoralis. Vegetation 1-12m tall and average projected foliage cover of 15-40%.

Ground layer

Gahnia spp., Pteridium esculentum, Centella asiatica, Goodenia heterophylla, Pimelea linifolia, Gonocarpus teucrioides, Pultenaea palacea.
Grasses include *Imperata cylindrica, Entolasia stricta* and *Panicum simile*.

Classification

The Riparian Forest (PCT 1718) vegetation community corresponds to the Endangered Ecological Community (EEC) known as *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South-east Corner Bioregions* as listed within the NSW Biodiversity Conservation Act (2016).

Photo 3 – Riparian Forest (PCT 1718) within Quadrat 1

<u>*Household Gardens and Lawns*</u>

This vegetation is typically found surrounding dwellings and consists of mostly exotic tree, shrub and ground layer species. There may be a few remnant native trees, however the exotic trees, shrubs and groundcovers are dominant or more numerous.

Canopy

Various horticultural, ornamental or exotic species including *Morus sp.* (Mulberry), *Callitris sp.*, *Jacaranda, Acer, Callistemon viminalis, Lagerstroemia sp.* (Crepe Myrtle), *Liquidambar, Acmena sp.* (Lillypilly), *Notelaea sp.* (Mock Olive), *Melia azedarach* and *Prunus sp*. were common species 6-14m tall and with a variable projected foliage cover of 3-40%. There were some remnant native trees in the north-eastern most corner of the study area.

Mid-storey

Buxus sp., Frangipani sp., Schefflera sp., various exotic palms, and a suite of fruit trees. Vegetation 3-8m tall and average projected foliage cover of 3-35%.

Ground layer

Various exotic garden plants such as *Canna sp., Agapanthus sp., Hedychium gardnerianum*, *Passiflora sp*., and weeds such as *Verbena, Conyza, Plantago, Taraxacum, Trifolium* and *Solanum.*
Grasses included *Cynodon dactylon, Paspalum dilatatum, Pennisetum clandestinum* and *Poa annua*.

Photo 4 – Household Gardens near the northern dwelling

Photo 5 – Household gardens and trees to the east of the central dwellin

3.4 Threatened flora species

The NSW Bionet database and the Commonwealth Protected Matters Search Tool were accessed to provide an indication of the threatened flora present within a 10km radius of the study area. Table 3 lists all recorded threatened flora species within 10km and whether they have potential habitat.

Table 3 – Threatened flora potential habitat

Scientific name	*BC Act* status	*EPBC Act* status	Potential to occur	Survey period (OEH)
Angophora inopina	V	V	✓	all months
Genoplesium insigne	E4A	CE	✓	Sept–Nov
Tetratheca juncea	V	V	✓	July–Dec
Callistemon linearifolius	V	-	low	Sept–March
Cryptostylis hunteriana	V	V	low	Nov–Jan
Diuris praecox	V	V	low	July–Sept
Eucalyptus camfieldii	V	V	low	all months
Rutidosis heterogama	V	V	unlikely	all months

No threatened flora species were observed within the study area during the initial biodiversity constraints inspection. There is potential habitat within the study area for several threatened flora species as listed in Table 3.

The native vegetation within the study area is limited to small patches of remnant Coastal Woodland and an area of Riparian Forest. The majority of the proposed development area has been disturbed by past and ongoing disturbances such as native vegetation clearing, pastoral land uses, invasion by exotic pasture species and trampling by hooved livestock.

Therefore the disturbed parts of the study area provides limited habitat for any threatened flora species.

Additional targeted surveys for threatened flora will be required in the future depending on the proposed development. Note that some of the species are cryptic and may require adequate survey during flowering or fruiting at various times of the year, as shown in Table 3.

3.5 Endangered flora populations

One (1) threatened flora population is known within 10km. This population is:

- *Eucalyptus parramattensis C. Hall ssp. parramattensis* in the Wyong and Lake Macquarie local Government Areas.

No specimens of *Eucalyptus parramattensis subsp. parramattensis* were observed within the study area during the initial biodiversity constraints inspection. It is considered that the presence of this species within the study area is unlikely.

3.6 Threatened ecological communities

As stated previously, the Coastal Woodland (PCT 1636) has some affinity to Kincumber Scribbly Gum Forest (KSGF). However KSGF is restricted to a small area on the Bouddi Peninsula on the NSW Central Coast south of Kincumber. It only occurs in the Gosford LGA. Therefore the Coastal woodland vegetation within the study area does not correspond to the Kincumber Scribbly Gum Forest TEC.

The Riparian Forest (PCT 1718) vegetation community corresponds to the Threatened Ecological Community (TEC) known as *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South-east Corner Bioregions* as listed within the NSW Biodiversity Conservation Act (2016).

3.7 State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

The *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017* (Vegetation SEPP) was one of a suite of Land Management and Biodiversity Conservation (LMBC) reforms that commenced in New South Wales on 25 August 2017. The Vegetation SEPP (the SEPP) works together with the *Biodiversity Conservation Act 2016* and the *Local Land Services Amendment Act 2016* to create a framework for the regulation of clearing of native vegetation in NSW.

The SEPP will ensure the BOS (established under the Land Management and Biodiversity reforms) will apply to all clearing of native vegetation that exceeds the offset thresholds in urban areas and environmental conservation zones that does not require development consent.

Vegetation SEPP applies to the following local government areas: *Bayside, City of Blacktown, Burwood, Camden, City of Campbelltown, Canterbury-Bankstown, Canada Bay, Cumberland, City of Fairfield, Georges River, City of Hawkesbury, Hornsby, Hunter's Hill, Georges River, Inner West, Ku-ring-gai, Lane Cove, City of Liverpool, Mosman, Newcastle, North Sydney, Northern Beaches, City of Parramatta, City of Penrith, City of Randwick, City of Ryde, Strathfield, Sutherland Shire, City of Sydney, The Hills Shire, Waverley, City of Willoughby, Woollahra.*

As 'development consent' is required for the proposed works the Vegetation SEPP does not apply.

4.0 Fauna

4.1 Survey / Habitat assessment

Fauna diurnal survey was undertaken on the 26/6/19. Diurnal fauna survey included:

- 3x bird census points (out to a radius of 30-50m for 30 minutes),
- Opportunistic bird call and activity survey between census points,
- Mammal activity searches (scats, scratches, diggings, burrows, etc)
- Habitat tree survey within the subject site,
- Searches of significant habitat trees within the retained vegetation to the south

Significant habitat trees are defined as trees containing large hollows suitable for owls/cockatoos and/or two or more good quality medium hollows and/or several small hollows and/or a tree showing notable use by a threatened species (eg. sap feed tree, raptor nest tree, microbat roost, etc).

Weather conditions at the time of diurnal survey were 4/8 cloud, light SE wind, previous days rain, 17-19^{o}C between 11:00 – 16:00.

Nocturnal fauna survey was undertaken on the following day 27/6/19 and included:

- Stag-watching of habitat trees HT8 & HT12 during and following the dusk period,
- Spotlighting,
- Frog call identification,
- Ultrasonic microbat recording (x2 passive recording stations),
- Owl calling (Masked Owl)

Weather conditions at the time of nocturnal survey were 0/8 cloud, no wind, no rain (but previous week much rain), no moon, 16-14^{o}C between 17:00 – 19:20.

Specific survey effort locations and results are shown on Figure 3. All fauna species recorded during survey within the subject site and nearby surrounds are listed in Table A1.2 in Appendix 1.

A review of the Atlas of NSW Wildlife (OEH 2019) was undertaken prior to the site visit to determine threatened species previously recorded within 10km of the subject site.

The following notable habitat features were observed present:

- Trees containing mostly small (0-10cm) and some medium (10-30cm) hollows within the subject site,
- A patch of trees to the south containing large hollows suitable for large forest owls, most notably Masked Owl given their density, some being vertical spouts from broken trunks and the surrounding mosaic of dense and open understorey,
- Spring, summer and autumn flowering trees within the subject site,
- Winter flowering Swamp Mahogany within the natural vegetation in the southern study area,
- Seed producing *Allocasuarina* trees,
- Perenial drainage line with side soaks within the southern study area,
- Dense under-storey foliage areas within the southern study area, and
- Open water within the farm dam.

Fauna survey is limited by the following:

- Targeted Koala survey to effectively conclude on CKH under SEPP 44.
- A second night's fauna survey is considered to be required. Stag-watching of other hollows within the development landscape should also be undertaken at this time given potential use of the subject site by Squirrel Glider. Further checks on Wallum Froglet breeding activity areas in adjacent habitat is also advised at this time.

4.2 Hollow-bearing trees

Hollow-bearing trees within the subject site were surveyed during the fauna survey with a total of fifteen (15) trees containing hollows recorded. These trees were found to contain fifteen (15) small hollows (0-10cm in size) and four medium hollows (10-15cm in size).

Recorded hollows within the subject site are considered suitable for threatened microbats, Little Lorikeet and Squirrel Glider. Two hollow-dependent threatened microbat East-coast Freetail Bat and Large-footed Myotis were recorded during survey.

Hollow-bearing tree data for the subject site is provided in Table 3. Each of these hollows will require removal for the proposed development layout. Further stag-watching of hollows would be considered appropriate given their suitability for threatened species use to ensure that they are not of breeding value to threatened biodiversity. This is not necessarily expected based on current observations.

Table 2 – Hollow-bearing tree data

Tag No.	Common name	DBH (cm)	Height (m)	Spread (m)	Vigour (%)	Hollows recorded
HT1	Sribbly Gum	37	14	8	75	1x 0-5cm branch, 1x 0-5cm branch spout
HT2	Smooth-barked Apple	45	20	13	35	1x 5-10cm branch
HT3	Smooth-barked Apple	38	21	19	35	1x 0-5cm branch spout
HT4	Sribbly Gum	45	17	15	40	1x 10-15cm low trunk split possum scratches
HT5	Smooth-barked Apple	32	22	10	55	1x 5-10cm broken trunk
HT6	stag	60	6	2	0	3x 0-5cm low cut branch spouts
HT7	Sribbly Gum	42,38	15	12	65	1x 0-5cm branch spout
HT8	Stringybark	65	9	13	55	1x 5-10cm low broken trunk
HT9	Stringybark	60	14	12	80	1x 0-5cm branch (wear)
HT10	Stringybark	43,35	14	15	75	1x 0-5cm low branch
HT11	Sribbly Gum	85	14	11	40	1x 20-30cm low open trunk
HT12	Sribbly Gum	50,60	18	19	85	1x 0-5cm trunk split, 1x 5-10cm branch (good)
HT13	Swamp Oak	32	3	5	15	1x 5-10cm low broken trunk
HT14	Sribbly Gum	41,34	15	8	75	1x 10-15cm trunk (good) scratches around hole
HT15	stag	50	6	2	0	1x 15-20cm low open broken trunk

Recorded significant habitat trees containing large hollows located in the natural vegetated areas in the southern study area are expected to be utilised by the recorded Masked Owl. The individual recorded during initial survey responded quickly to calls suggesting it was

close by at this time. The large hollows are also aligned in an ideal scenario to support nesting by a female within a central high quality hollow, and nearby roosting by a male in various large surrounding hollows. The cluster of large hollows were considered ideal for Masked Owl before the initial recording. Hence the attempt to call in by mouth.

Whilst over six large hollows were observed in a cluster in this southern area, one stood out above others as an ideal nesting tree based on its tree size, foliage shelter, hollow character and central proximity to the other large hollows. This tree was suspected to be a nesting tree for Masked Owl. The locations of these trees in a cluster containing large hollows were identified by GPS during initial survey (refer to Figure 3 for these locations).

Based on this, owl expert John Young was engaged and undertook a site visit between 30/8/19 to 3/9/19. Just prior to his visit, all other large hollows within 300m of the suspected nest tree were then also identified by GPS with some considered higher quality than others. Mr Young confirmed that Masked Owl is using the suspected nest tree and also confirmed another large hollow to the south-east as being used for roosting by the male. My Young's report and locations of all recorded large hollows is provided in Appendix 3.

4.3 Threatened fauna species

BC Act – A search of the *Atlas of NSW Wildlife* (OEH, 2019) provided a list of threatened fauna species previously recorded within a 10km radius of the subject site. These species are listed in Appendix Table A2.2 and are considered for potential habitat within the subject site.

Fisheries Management Act (FM Act) – No habitats suitable for threatened aquatic species were observed within the subject site and as such the provisions of this act do not require any further consideration.

EPBC Act – A review of the schedules of the *EPBC Act* identified a list of threatened fauna species or species habitat likely to occur within a 10km radius of the subject site. These species have also been listed in Appendix Table A2.2.

In accordance with Table A2.2 the following state and nationally listed threatened fauna species are considered to have suitable habitat with varying potential to occur within the subject site. The state listed species will be considered in the significance of impact test (Appendix 3):

Table 3 – Threatened fauna species with suitable habitat present

Common name	*BC Act*	*EPBC Act*	Potential to occur
Masked Owl	V	-	recorded
East-coast Freetail Bat	V	-	recorded
Little Bentwing-bat	V	-	recorded
Eastern Bentwing-bat	V	-	recorded
Large-footed Myotis	V	-	recorded
Wallum Froglet	V	-	✓
White-bellied Sea Eagle	V	-	✓
Little Lorikeet	V	-	✓
Swift Parrot	E	E	✓
Powerful Owl	V	-	✓
Varied Sittella	V	-	✓
Spotted-tailed Quoll	V	E	✓

Common name	*BC Act*	*EPBC Act*	Potential to occur
Squirrel Glider	V	-	✓
Grey-headed Flying-fox	V	V	✓
Eastern Falsistrelle	V	-	✓
Greater Broad-nosed Bat	V	-	✓
Eastern Cave Bat	V	-	✓
Square-tailed Kite	V	-	low
Glossy Black-Cockatoo	V	-	low
Regent Honeyeater	E4A	CE	low
Yellow-bellied Sheathtail-bat	V	-	low
Little Eagle	V	-	unlikely
Barking Owl	V	-	unlikely
Dusky Woodswallow	V	-	unlikely
Koala	V	V	unlikely
Eastern Pygmy Possum	V	-	unlikely

Of the above listed and recorded threatened fauna the Masked Owl will cause most constraint to development. This is because large hollows to the south are being utilised by this species (as described in Section 4.2 above and confirmed by owl expert John Young).

In his owl expert report (Appendix 3) and following his site visit, John Young has recommended a non-development buffer of 100m be applied to an expected nest tree and also a 50m buffer from the nearest potential roost trees be applied as protection measures. These buffers are standard for forestry prescriptions by DPI. Two buffers overlap and pass marginally into the subject site area. Mr Young has drawn a line of the southernmost development edge outside of these buffers in his report. The development is therefore constrained by Masked Owl activity in this south-western corner of the study area and will need to be refined back.

Whilst Mr Young has allowed for the placement of any necessary stormwater detention pond within the buffer, he has also required a dense planting edge to provide a sound and light barrier between the road and development and the roost/nest trees. The dense planting may occur on either side of the stormwater basin.

The Masked Owl is a specialist on hunting small to moderate sized terrestrial prey items and therefore depends on a mosaic of understorey structure. It will forage along the open edges of dense understorey patches and therefore is expected to utilise the cleared edge of forest in the southern study area.

Given its low foraging nature, Masked Owls are also known to be susceptible to vehicle collisions which is of concern given that the proposed site entry road runs along the southern edge of the subdivision. Vehicle speed restrictions will need to be imposed. The current proposal provides a cleared and managed strip between the forest edge and the entry road for APZ purposes. This edge is preferable along the entirety of the forest edge to setback the road from foraging. The planting of a dense strip of vegetation to act as a noise and light barrier should therefore be in addition to the cleared strip.

All hollow trees within the subject site area itself will likely require removal based on the concept development layout. The two recorded hollow-dependent threatened microbats (and less potentially Squirrel Glider) may make use of these hollows. The two highest quality hollow-bearing trees were stag-watched during survey with no observations recorded. Whilst use is not necessarily expected, other hollows and a further night survey will be required to

ensure other hollows are not of importance. There may be scope to relocate any utilised hollow, depending on the species.

The Wallum Froglet is also known to occur and breed in locations directly across Chain Valley Bay Road. It is possible that individuals may disperse into the study area during ideal conditions, however the subject site itself is not of any likely importance for breeding, shelter or foraging for this species. The proposal will need to ensure adequate stormwater management measures are achieved within the subject site area, to prevent any water quality, quantity or erosion impacts on the adjacent natural drainage and habitat in the far southern reaches. There is some potential that the southern study area may be temporarily utilised by dispersing Wallum Froglet, given sinkholes retaining moisture present. These are not ideal or likely core breeding habitat for the local population but should nonetheless be protected from indirect impacts.

SEPP 44 Koala Habitat Protection – Koala feed trees Scribbly Gum (*Eucalyptus haemastoma*) and Swamp Mahogany (*Eucalyptus robusta*) make up the only eucalypt trees on site and comprise more than 15% of trees within the Coastal Woodland and Riparian Forest communities respectively. Therefore these communities comprise Potential Koala Habitat (PKH) under the definitions of SEPP 44.

Koalas have not been recorded during survey to date and are considered with an unlikely potential to occur. Further target Koala survey incorporating scat searches will be undertaken during future target owl surveys, to provide a final conclusion on if the site comprises Core Koala Habitat under the definitions of SEPP 44.

4.4 Protected migratory species (National)

The EPBC Act Protected Matters Report provides additionally listed terrestrial, wetland and marine migratory species of national significance likely to occur, or with habitat for these species likely to occur, within a 10km radius of the subject site. The habitat potential of migratory species is considered in Table A2.3 (Appendix 2). The habitat potential of threatened migratory species is considered in Table A2.3 Table A2.2 (Appendix 2).

One (1) nationally protected migratory bird species the Black-faced Monarch was recorded only to a ‘possible’ level of certainty from a brief distant call within the natural open forest vegetation on adjacent land to the south-west. The proposal will not directly impact on any potential breeding or important foraging habitat for this species.

Other migratory species protected under the EPBC also do not likely contain any breeding habitat or habitat otherwise of importance within the subject site. Therefore protected migratory species will not likely offer constraint to the proposal.

4.5 Endangered fauna populations

There are no endangered fauna populations within the Central Coast LGA.

4.6 Connectivity

The natural vegetation within the study area is confined to the far southern portion. Some small patches of remnant trees occur within the remaining managed areas as well as a narrow strip of good quality natural vegetation along the western boundary. Whilst containing natural hollows and of good quality through the middle reaches, this strip does not likely provide current connectivity for gliders as the southern and north limits have large separations to natural vegetation beyond the study area.

Figure 5 – Local connectivity

5.0 Watercourses and wetlands

5.1 Endangered wetland communities

A number of wetland communities have been listed as an 'endangered ecological community' under the NSW *BC Act*. We note that 'wetlands' are included in the definition of 'waterfront lands' in accordance with the *Water Management Act* (*WM Act*) 2000, due to their inclusion in the definition of a 'lake' under the same act.

Impacts on wetland communities must be assessed under the *BC Act* and if present the management of wetland communities must be given due consideration in accordance with the objectives and principles of management as contained within the NSW Wetlands Policy (2010), and appropriate management as determined by NSW DPI - Office of Water in their general terms of approval (GTA's). This may include but not limited to the provision of buffers, management of stormwater runoff and maintenance of natural inflows or runoff into those wetland communities.

- Artesian springs ecological community - endangered ecological community listing
- Castlereagh swamp woodland community - endangered ecological community listing
- Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions - endangered ecological community listing
- Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions - endangered ecological community listing
- Kurri sand swamp woodland in the Sydney Basin Bioregion - endangered ecological community listing
- Lagunaria swamp forest on Lord Howe Island - endangered ecological community listing

- Maroota Sands swamp forest - endangered ecological community listing
- Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion - endangered ecological community listing
- Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions - endangered ecological community listing
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions - endangered ecological listing
- Sydney Freshwater Wetlands in the Sydney Basin Bioregion - endangered ecological community listing
- The shorebird community occurring on the relict tidal delta sands at Taren Point - endangered ecological community listing
- Upland wetlands of the drainage divide of the New England Tableland Bioregion - endangered ecological community listing
- Wingecarribee Swamp - endangered ecological community listing

In accordance with the *WM Act*, endangered wetland communities are through the definition of 'lakes' potentially classed as waterfront land. Referral to DPI WaterNSW may be required for determination under the *WM Act* as a controlled activity. As well as protection, a buffer may be applied to these communities as specified by DPI WaterNSW.

Swamp Sclerophyll Forest on Coastal Floodplains is present within the southern portion of the study area, which is an EEC as listed within the *BC Act*, but not within the *EPBC Act*.

- *Impact on the extent of wetland vegetation*

  The concept proposal is not likely to impact significantly on the extent of this endangered wetland community.

- *Impact on acid sulphate soils*

  The study site is not identified as containing acid sulphate soils.

- *Indirect impacts of wetlands*

  Indirect impacts may include pedestrian usage and trampling of soils, dumping of rubbish and garden waste, accidental spillages post development.

  A Vegetation Management Plan (VMP) should be prepared to protect, and mitigate impacts on, the swamp sclerophyll forest.

- *Impacts due to storm water quality or quantity*

  It is expected that an appropriate storm water management plan will be prepared to avoid these impacts on the EEC.

- *Impacts on groundwater*

  The proposal is not expected to impact on groundwater resources or groundwater dependent ecosystems

- *Proposed mitigation measures*

  1. Appropriate design of construction of any works e.g. storm water outlets.
  2. Manage access to the area.

3. Undertake pest animal and weed control.
4. Preparation of a VMP to improve and maintain sensitive ecological landscapes, sediment and erosion control measures.

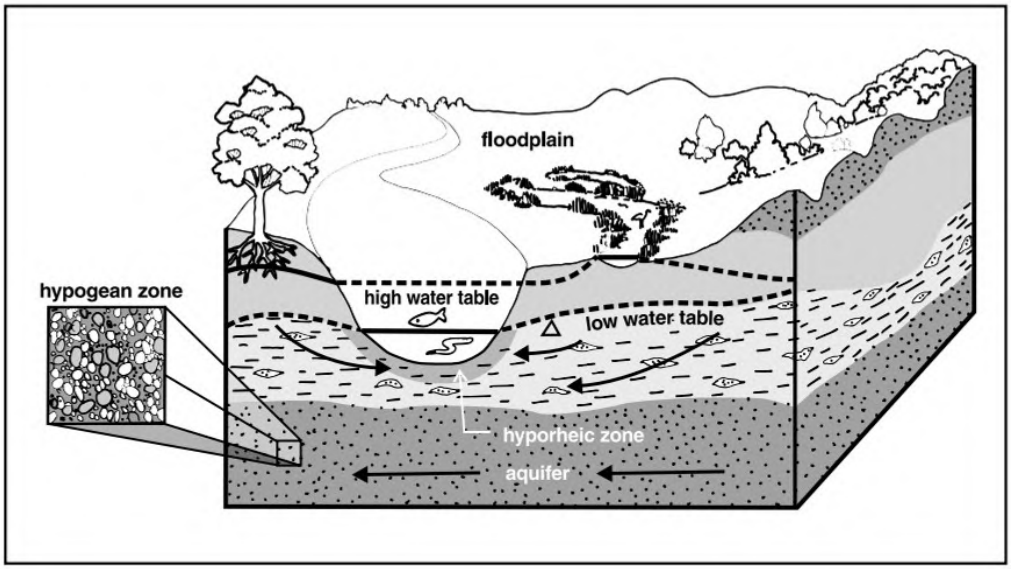
- Watercourses and waterfront lands

  There are no riparian streams or zones throughout the site with the exception of the Karignan Creek corridor which forms the southern boundary. The area of EEC – Swamp Sclerophyll Forest is classed as an endangered protected wetland and is a 'lake' as defined under the *WM Act* therefore it is deemed as 'waterfront land'.

5.2 Groundwater dependent ecosystems (GDEs)

Groundwater dependent ecosystems (GDEs) are communities of plants, animals and other organisms whose extent and life processes are dependent on groundwater. Some examples of ecosystems which depend on groundwater are:

- wetlands;
- red gum forests, vegetation on coastal sand dunes and other terrestrial vegetation;
- ecosystems in streams fed by groundwater;
- limestone cave systems;
- springs; and
- hanging valleys and swamps.



Alluvial groundwater system discharging into a river

Groundwater dependent ecosystems are therefore ecosystems which have their species composition and their natural ecological processes determined by groundwater (NSW State Groundwater Dependent Ecosystems Policy April 2002).

Swamp Sclerophyll Forest on Coastal Floodplains is considered to be a wetland community and, in the context of the landscape is likely to be a GDE. To assist in protecting this in the future, this community is recommended to be conserved and managed in accordance with a Vegetation Management Plan (VMP) should be prepared to protect, and mitigate impacts on, the swamp sclerophyll forest.

6.0 Conclusions

Ecological survey and biodiversity constraints assessment has been undertaken for a proposed development within Lot 5 DP 1228880, at 45 Mulloway Drive, Chain Valley Bay. Assessment has been undertaken in consideration to the *BC Act* through the relevant process outlined by the *EP&A Act*. The schedules and assessment criteria under the *EPBC Act* and the *FM Act* have also been considered for the proposal.

No threatened flora species have been observed. There is potential habitat within the study area for several threatened flora species. Seasonal targeted surveys for threatened flora will be required in the future during the appropriate survey period (see Table 3).

Five (5) threatened fauna species were recorded present during survey including Masked Owl (*Tyto novaehollandiae*), Eastern Bentwing-bat (*Miniopterus orianae oceanensis*), Little Bentwing-bat (*Miniopterus australis*), East-coast Freetail Bat (*Micronomus norfolkensis*) and Large-footed Myotis (*Myotis macropus*). The East-coast Freetail Bat was recorded to a 'probable' level of certainty.

Vegetation present within the south of the study area is attributable to *Swamp Sclerophyll Forest on Coastal Floodplains,* which is listed within the NSW *BC Act* as an Endangered Ecological Community (EEC).

6.1 Constraints for matters listed under the Biodiversity Conservation Act

No threatened flora species have been observed. There is potential habitat within the study area for several threatened flora species. Seasonal targeted surveys for threatened flora will be required in the future during the appropriate survey period (see Table 3).

The southern development footprint is constrained by the breeding presence of Masked Owl. Protection buffers are required from the identified nest tree and potential roosting trees as outlined in the owl expert report by John Young provided in Appendix 3. Mapping provided in this report shows these trees and the proposed buffers within a protection area.

Hollows within the development landscape may also be utilised by recorded threatened microbats or to a lesser extent Squirrel Glider. Whilst this is not necessarily expected, further survey should be undertaken to check more hollow activity on dusk. Other survey to be undertaken at this time is outlined at the end of Section 4.1.

Vegetation present within the south of the study area is attributable to *Swamp Sclerophyll Forest on Coastal Floodplains,* which is listed within the NSW *BC Act* as an Endangered Ecological Community (EEC).

The Biodiversity Offsets Scheme (BOS) and The Regulation (2017) and Biodiversity Assessment Method (2017) came into force under the *BC Act* on the 25th of August, 2017. There are two (2) elements to the threshold test – an area trigger and a Sensitive Biodiversity Values Land Map trigger. If clearing exceeds either trigger, the BOS applies to the proposed clearing.

- Sensitive Biodiversity Values Land has been mapped within the far south of study area. Based on the current concept proposal, Biodiversity Values Land may be impacted and an offset will be required under this trigger.

- The threshold for clearing above which the BAM and offsets scheme apply is 0.5ha or more. The based on the concept proposal, the development will impact more than 0.5ha of remnant native vegetation within the study area, therefore offsetting will be required under this trigger.

Any future development proposal will need to be assessed in accordance with the Significance of Impact Test of the *BC Act* to determine if the proposal constitutes a significant impact upon threatened species, endangered populations or threatened ecological communities.

6.2 Recommendations

To minimise adverse ecological impacts, the following mitigation measures are proposed:

1. A non-development area (allowing for a stormwater detention basin) is required in the southwestern corner of the subject site as a protection measure for a pair of Masked Owls utilising nearby trees for breeding. A dense planting of vegetation is required along this southern cleared edge as a sound and light barrier between the proposed activity and the owls. Further to this, a minimum 10m cleared setback from the road is also required along this edge to reduce potential for vehicle collisions.

2. Avoidance of impact on native vegetation within mapped Biodiversity Values Land and native vegetation to minimise offsetting requirements.

3. Reduce the impact on native vegetation to below 0.5ha, which will avoid offsetting under this trigger.

4. Replacement landscaping should consider the use of locally occurring (endemic) native species commensurate with Scribbly Gum – Red Bloodwood – *Angophora inopina* heathy woodland including trees, shrubs and ground covers to encourage fauna within the locality.

5. Sediment and erosion control measures in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) to minimise impact of possible sedimentation to local drainage lines.

6. A Vegetation Management Plan (VMP) is to be prepared to protect, and mitigate impacts on, the swamp sclerophyll forest EEC as a conservation area and to maintain or improve connective landscape along Karignan.

7. Control and eradication of invasive ecological weeds should be undertaken to prevent further invasion by these species. Invasive species such as Bitou Bush, Blackberry and Pampas Grass were observed within the study area.

8. Target threatened species survey is recommended to:

    a. Stag-watch remaining quality hollows within the subject site to determine any roosting/breeding use by recorded hollow-dependent microbats.
    b. Further survey could also determine nearest habitat breeding opportunity for Wallum Froglet.
    c. Target cryptic threatened flora species.
    d. Target Koala survey.

Appendix 1
Flora and Fauna Species Lists

Table A1.1 – Flora species recorded

Family	Scientific name	Common name
TREES		
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak
Myrtaceae	*Angophora costata*	Smooth-barked Apple
Myrtaceae	*Corymbia gummifera*	Red Bloodwood
Myrtaceae	*Eucalyptus haemastoma*	Broad-leaved Scribbly Gum
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany
Phyllanthaceae	*Glochidion ferdinandi* var. *ferdinandi*	Cheese Tree
Myrtaceae	*Melaleuca decora*	-
Meliaceae	*Melia azedarach*	White Cedar
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum
SHRUBS		
Fabaceae	*Acacia longifolia* var. *longifolia*	Sydney Golden Wattle
Fabaceae	*Acacia myrtifolia*	Red Stem Wattle
Fabaceae	*Acacia suaveolens*	Sweet Scented Wattle
Fabaceae	*Acacia ulicifolia*	Prickly Moses
Myrtaceae	*Baeckea diosmifolia*	Fringed Baekea
Proteaceae	*Banksia marginata*	Silver Banksia
Proteaceae	*Banksia oblongifolia*	Fern-leaf Banksia
Fabaceae	*Bossiaea heterophylla*	Variable Bossiaea
Asteraceae	*Chrysanthemoides monilifera* subsp. *rotundata**	Bitou Bush
Fabaceae	*Dillwynia retorta*	Eggs and Bacon
Epacridaceae	*Epacris pulchella*	Wallum Heath
Fabaceae	*Gompholobium glabratum*	Dainty Wedge-pea
Proteaceae	*Grevillea sericea*	Pink Spider Flower
Proteaceae	*Hakea dactyloides*	Broad-leaved Hakea
Proteaceae	*Isopogon anethifolius*	Round-leaved Drumsticks
Myrtaceae	*Kunzea ambigua*	Tick Bush
Proteaceae	*Lambertia formosa*	Mountain Devil
Myrtaceae	*Leptospermum trinervium*	Slender Tea-tree
Myrtaceae	*Melaleuca sieberi*	-
Fabaceae	*Mirbelia speciosa*	-
Proteaceae	*Persoonia levis*	Broad-leaved Geebung
Proteaceae	*Petrophile pulchella*	Conesticks
Apiaceae	*Platysace linearifolia*	Narrow-leafed Platysace
Fabaceae	*Pultenaea daphnoides*	Large-leaf Bush Pea
Fabaceae	*Pultenaea linophylla*	-
Fabaceae	*Pultenaea villosa*	Hairy Bush-pea
Rosaceae	*Rubus fruticosus* sp. agg.*	Blackberry complex
GROUNDCOVERS		
Asteraceae	*Actinotus minor*	Lesser Flannel Flower
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair
Poaceae	*Anthoxanthum avenaceus*	Oat Speargrass
Poaceae	*Austrostipa pubescens*	Tall Speargrass
Poaceae	*Axonopus fissifolius**	Narrow-leaved Carpet Grass
Asteraceae	*Bidens pilosa**	Cobbler's Pegs

Family	Scientific name	Common name
Poaceae	*Briza subaristata**	-
Anthericaceae	*Caesia parviflora* var. *parviflora*	Pale Grass Lily
Apiaceae	*Centella asiatica*	Swamp Pennywort
Asteraceae	*Conyza sumatrensis**	Tall Fleabane
Asteraceae	*Coreopsis lanceolata**	Coreopsis
Poaceae	*Cortaderia selloana**	Pampas Grass
Orchidaceae	*Cryptostylis subulata*	Large Tongue Orchid
Poaceae	*Cynodon dactylon*	Common Couch
Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge
Phormiaceae	*Dianella caerulea* var. *caerulea*	Flax Lily
Poaceae	*Dichelachne micrantha*	Short-hair Plume Grass
Poaceae	*Echinopogon caespitosus* var. *caespitosus*	Tufted Hedgehog Grass
Restionaceae	*Empodisma minus*	-
Poaceae	*Entolasia stricta*	Wiry Panic
Poaceae	*Eragrostis brownii*	Brown's Lovegrass
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge
Asteraceae	*Gamochaeta* sp.*	Cudweed
Haloragaceae	*Gonocarpus micranthus* subsp. *micranthus*	Creeping Raspwort
Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort
Haloragaceae	*Gonocarpus teucrioides*	Raspwort
Goodeniaceae	*Goodenia heterophylla* subsp. *heterophylla*	Variable Leaved Goodenia
Haemodoraceae	*Haemodorum planifolium*	Bloodroot
Apiaceae	*Hydrocotyle bonariensis**	Kurnell Curse / Pennywort
Apiaceae	*Hydrocotyle peduncularis*	Pennywort
Poaceae	*Hyparrhenia hirta**	Coolatai Grass
Clusiaceae	*Hypericum* sp.*	
Asteraceae	*Hypochaeris radicata**	Flatweed
Poaceae	*Imperata cylindrica*	Blady Grass
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge
Restionaceae	*Lepyrodia scariosa*	Scale Rush
Lindsaeaceae	*Lindsaea linearis*	Screw Fern
Lomandraceae	*Lomandra cylindrica*	-
Lomandraceae	*Lomandra glauca*	Pale Mat-rush
Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush
Lomandraceae	*Lomandra multiflora subsp. multiflora*	Many-flowered Mat-rush
Lomandraceae	*Lomandra obliqua*	Twisted Mat-rush
Poaceae	*Microlaena stipoides*	Weeping Grass
Myrtaceae	*Micromyrtus spp.*	
Poaceae	*Panicum simile*	Two Colour Panic
Poaceae	*Paspalidium distans*	-
Poaceae	*Paspalum urvillei**	Vasey Grass
Iridaceae	*Patersonia sericea*	Wild Iris
Poaceae	*Cenchrus clandestinum**	Kikuyu, Kikuyu Grass
Thymelaeaceae	*Pimelea linifolia* subsp. *linifolia*	Slender Rice Flower
Plantaginaceae	*Plantago lanceolata**	Ribwort
Lobeliaceae	*Pratia purpurascens*	Whiteroot
Dennstaedtiaceae	*Pteridium esculentum*	Bracken
Ranunculaceae	*Ranunculus spp.*	

Family	Scientific name	Common name
Rubiaceae	*Richardia* sp.*	
Goodeniaceae	*Scaevola ramosissima*	Purple Fan Flower
Selaginallaceae	*Selaginella uliginosa*	Swamp Selaginella
Poaceae	*Setaria parviflora**	Slender Pigeon Grass
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne
Solanaceae	*Solanum nigrum**	Black Nightshade, Black-berry Nightshade
Poaceae	*Sporobolus elongatus*	Slender Rat's Tail Grass
Stackhousiae	*Stackhousia nuda*	-
Poaceae	*Stenotaphrum secundatum**	Buffalo Grass
Stylidiaceae	*Stylidium lineare*	Narrow-leaved Trigger Plant
Asteraceae	*Taraxacum officinale**	Dandelion
Poaceae	*Themeda triandra*	Kangaroo Grass
Anthericaceae	*Thysanotus tuberosus*	Fringed Lily
Apiaceae	*Trachymene incisa* subsp. *incisa*	Native Parsnip
Verbenaceae	*Verbena bonariensis**	Purpletop
Menyanthaceae	*Villarsia exaltata*	Yellow Marsh Flower
Campanulaceae	*Wahlenbergia communis*	Tufted Bluebell
Xanthorrhoaceae	*Xanthorrhoea media*	Forest Grass Tree
VINES		
Lauraceae	*Cassytha glabella*	Slender Devil's Twine
Fabaceae	*Glycine clandestina*	Twining Glycine
Fabaceae	*Hardenbergia violacea*	False Sarsparilla
Dilleniaceae	*Hibbertia dentata*	Twining Guinea Flower
* denotes exotic species TS denotes threatened species		

It should be noted that not all garden, cultivar or landscape species have been identified as part of this assessment.

Table A1.2 – Fauna species recorded

Common name	Scientific name	Method observed
Birds		**June 2019**
Australasian Grebe	*Tachybaptus novaehollandiae*	O
Australian Hobby	*Falco longipennis*	O
Australian Magpie	*Cracticus tibicen*	O W
Australian Raven	*Corvus coronoides*	O W
Australian Wood Duck	*Chenonetta jubata*	O
Black-faced Monarch	*Monarcha melanopsis*	W[PO]
Brown Thornbill	*Acanthiza pusilla*	O W
Crested Pigeon	*Ocyphaps lophotes*	O
Eastern Rosella	*Platycercus eximius*	O W
Eastern Spinebill	*Acanthorhynchus tenuirostris*	W
Eastern Yellow Robin	*Eopsaltria australis*	W
Galah	*Eolophus roseicapillus*	O W
Grey Fantail	*Rhipidura albiscapa*	O W
Laughing Kookaburra	*Dacelo novaeguineae*	O W
Lewin's Honeyeater	*Meliphaga lewinii*	W
Magpie-lark	*Grallina cyanoleuca*	O W
Masked Owl [TS]	*Tyto novaehollandiae*	O W
Musk Lorikeet	*Glossopsitta concinna*	W
Noisy Miner	*Manorina melanocephala*	O W
Pied Butcherbird	*Cracticus nigrogularis*	O W
Rainbow Lorikeet	*Trichoglossus haematodus*	O W
Satin Bowerbird	*Ptilonorhynchus violaceus*	W
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*	W
Spotted Pardalote	*Pardalotus punctatus*	W
Striated Thornbill	*Acanthiza lineata*	O W
Superb Fairy-wren	*Malurus cyaneus*	O W
Welcome Swallow	*Hirundo neoxena*	O
White-throated Treecreeper	*Cormobates leucophaea*	W
Yellow-faced Honeyeater	*Caligavis chrysops*	W
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	W
Mammals		
Common Brushtail Possum	*Trichosurus vulpecula*	F
Common Ringtail Possum	*Pseudocheirus peregrinus*	O
East-coast Freetail Bat [TS]	*Micronomus norfolkensis*	U[PR]
Eastern Bentwing-bat [TS]	*Miniopterus orianae oceanensis*	U
Eastern Freetail-bat	*Mormopterus ridei*	U
Gould's Wattled Bat	*Chalinolobus gouldii*	U
Horse *	*Equus caballus*	O
Large Forest Bat	*Vespadelus darlingtoni*	U[PR]
Large-footed Myotis[TS]	*Myotis macropus*	U
Long-eared Bat	*Nyctophilus sp.*	U[PR]
Little Bentwing-bat [TS]	*Miniopterus australis*	U
Little Forest Bat	*Vespadelus vulturnus*	U[PR]
Rabbit *	*Oryctolagus cuniculus*	O
Sheep	*Ovis aries*	O
Swamp Wallaby	*Wallabia bicolor*	O

Common name	Scientific name	Method observed
Amphibians		
Common Eastern Froglet	*Crinia signifera*	W
Jervis Bay Tree Frog	*Litoria jervisiensis*	W
Striped Marsh Frog	*Limnodynastes peronii*	W

Note:
* indicates introduced species
TS indicates threatened species
MS indicates Migratory species

All species listed are identified to a high level of certainty unless otherwise noted as:

PR indicates species identified to a 'probable' level of certainty – more likely than not
PO indicates species identified to a 'possible' level of certainty – low-moderate level of confidence

E - Nest/roost	H - Hair/feathers/skin	P - Scat	W - Heard call
F - Tracks/scratchings	K - Dead	Q - Camera	X - In scat
FB - Burrow	O - Observed	T - Trapped/netted	Y - Bone/teeth/shell
G - Crushed cones	OW - Obs & heard call	U - Anabat/ultrasound	Z - In raptor/owl pellet

Appendix 2
Threatened Flora and Fauna Species Habitat Assessment

Table A2.1 – Threatened flora species habitat assessment

Scientific name DATABASE SOURCE1	***BC Act***	***EPBC Act***	**Growth form and habitat requirements** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and / or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Acacia bynoeana OEH EPBC	E1	V	Erect or spreading shrub to 0.3m high growing in heath and dry sclerophyll open forest on sandy soils. Often associated with disturbed areas such as roadsides. *Distribution limits N-Newcastle S-Berrima.*	x	✓	x	2011	x	x
Angophora inopina OEH EPBC	V	V	Small tree in open sclerophyll forest growing on deep sandy soils with associated lateritic outcrops. *Distribution limits N-Wyee S-Gorokan with a disjunct population near Karuah.*	x	✓	700m ENE	✓	✓	✓
Caladenia tessellata OEH EPBC	E1	V	Terrestrial orchid. Clay-loam or sandy soils. LHCCREMS guidelines suggest the species grows in Map Unit 34 – Coastal Sand Wallum Woodland - Heath. Flowers in September – November. *Distribution limits N-Swansea S-south of Eden.*	x	marginal	5km E	1998	x	x
Callistemon linearifolius OEH	V	-	Shrub to 4m high. Dry sclerophyll forest on coast and adjacent ranges. *Distribution limits N-Nelson Bay S-Georges River.*	x	✓	4km E	2018	low	✓
Chamaesyce psammogeton OEH	E1	-	Prostrate herb. Coastal dunes. *Distribution limits N-Tweed Heads S-Jervis Bay.*	x	x	-	-	x	x
Corybas downlingii OEH	E1	-	An orchid that forms clonal colonies and typically grows in gullies in tall open forest on well-drained gravelly soil at elevations of 10-200m. *Known from 4 localities including Port Stephens (2 localities), Bulahdelah and Freemans Waterhole.*	x	x	-	-	x	x

Scientific name DATABASE SOURCE1	***BC Act***	***EPBC Act***	**Growth form and habitat requirements** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and / or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Corunastylis sp. Charmhaven OEH EPBC	CE	CE	Terrestrial orchid currently only known from the Wyong Shire of NSW in the Gorokan/Charmhaven area. It occurs within low woodland to heathland with a shrubby understorey and ground layer. Dominants include *Allocasuarina littoralis, Leptospermum juniperinum, Melaleuca nodosa, Callistemon linearis* and *Schoenus brevifolius.* Flowers likely in Feb-Mar.	x	low	x	2017	x	x
Cryptostylis hunteriana OEH EPBC	V	V	Saprophytic orchid. Grows in swamp heath on sandy soils. *Distribution limits N-Gibraltar Range S-south of Eden.*	x	✓	3km N	2018	low	✓
Cynanchum elegans EPBC	E1	E	Climber or twiner to 1m. Grows in rainforest gullies, scrub & scree slopes. *Distribution limits N-Gloucester S-Wollongong.*	x	x	-	-	x	x
Diuris praecox OEH EPBC	V	V	Terrestrial orchid. Grows in sclerophyll forest near the coast. *Distribution limits N-Nelson Bay S-Ourimbah.*	x	moderate	1km N & E	2017	low	✓
Eucalyptus camfieldii OEH EPBC	V	V	Stringybark to 10m high. Grows on coastal shrub heath and woodlands on sandy soils derived from alluviums and Hawkesbury sandstone. *Distribution limits N-Norah Head S-Royal NP.*	x	moderate	4km E	2007	low	✓
Eucalyptus parramattensis subsp. *decadens* OEH EPBC	V	V	Red gum to 15m high. Grows in dry open forest on sandy to clay soils often in lowly elevated moist sites. *Distribution limits N-Port Macquarie S-Kurri Kurri.*	x	x	-	-	x	x

Scientific name DATABASE SOURCE1	***BC Act***	***EPBC Act***	**Growth form and habitat requirements** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and / or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Genoplesium insigne OEH EPBC	E4A	CE	Terrestrial orchid. Found in *Themeda* patches among shrubs and sedges in heathland and forest. *Known from 3 localities in Wyong-Charmhaven area.* Occurs in vegetation dominated by Scribbly Gum, Red Bloodwood, Smooth-barked Apple and Black She-oak at Charmhaven. Flowers Sept-Oct.	x	✓	500m E	2018	✓	✓
Grevillea parviflora subsp. *parviflora* OEH EPBC	V	V	Open to erect shrub to 1m. Grows in woodland on light clayey soils. *Distribution limits N-Cessnock S-Appin.*	x	moderate	x	2018	x	x
Melaleuca biconvexa OEH EPBC	V	V	Tall shrub. Grows in wetlands adjoining perennial streams and on the banks of those streams, generally within the geological series known as the Terrigal Formation. *Distribution limits N-Port Macquarie S-Jervis Bay.*	x	x	-	-	x	x
Persoonia hirsuta EPBC	E1	E	Erect to decumbent shrub. Grows in dry sclerophyll forest and woodland on Hawkesbury sandstone with infrequent fire histories. *Distribution limits N-Glen Davis S-Hill Top.*	x	x	-	-	x	x
Pterostylis gibbosa EPBC	E1	E	Terrestrial orchid which occurs near Wollongong and in Hunter Valley in sclerophyll forest, sometimes with paperbarks.	x	x	-	-	x	x
Pultenaea maritima OEH	V	-	Prostrate mat forming hairy stemmed shrub. 3.5-5mm long 1.8-2.8mm wide leaves. Pea flowers are 6.5-10mm long and are a buttery yellow in colour. Flowers August to March with fruit appearing January to March. Occurs along the coast from Newcastle to QLD. Occurs in grasslands, shrublands and heath on exposed coastal headlands and adjoining low coastal heath. Found on clay, sandy loam or clay loam over sandstone at altitude 5-30m.	x	x	-	-	x	x

Scientific name DATABASE SOURCE1	***BC Act***	***EPBC Act***	**Growth form and habitat requirements** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and / or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Rhodamnia rubescens *OEH*	E4A	-	Shrub to small tree to 25m tall. Widespread in warmer rainforest and on rainforest margins on range of volcanically derived and sedimentary soils. Mainly coastal areas; north from Batemans Bay. Flowers late winter to spring.	x	x	-	-	x	x
Rhodomyrtus psidioides OEH	E4A	-	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Distribution N – Maryborough Qld, S – Broken Bay NSW.	x	x	-	-	x	x
Rutidosis heterogama OEH EPBC	V	V	Erect herb to 30cm. Grows mostly in heath, often along roadsides. *Distribution limits N-Maclean S-Hunter Valley.*	x	moderate	4km SE	2015	unlikely	✓
Syzygium paniculatum OEH EPBC	V	V	Small tree. Subtropical and littoral rainforest on sandy soil. *Distribution limits N-Forster S-Jervis Bay.*	x	x	-	-	x	x
Tetratheca glandulosa OEH	V	-	Spreading shrub to 0.2m high. Sandy or rocky heath or scrub. *Distribution limits N-Mangrove Mountain S-Port Jackson.*	x	x	-	-	x	x
Tetratheca juncea OEH EPBC	V	V	Prostrate shrub to 1m high. Dry sclerophyll forest and heath. *Distribution limits N-Bulahdelah S-Port Jackson.*	x	✓	500m W	2018	✓	✓

Scientific name DATABASE SOURCE1	***BC Act***	***EPBC Act***	**Growth form and habitat requirements** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and / or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Thelymitra adorata EPBC	E4a	CE	Currently known from a few localised occurrences in the area bounded by the towns of Wyong, Warnervale and Wyongah on the New South Wales Central Coast, Occurs from 10-40 m a.s.l. in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. The vegetation type in which the majority of populations occur (including the largest colony) is a Spotted Gum - Ironbark Forest with a diverse grassy understorey and occasional scattered shrubs.	x	x	-	-	x	x
Thesium australe EPBC	V	V	Erect herb to 0.4m high. Root parasite. Themeda grassland or woodland often damp. *Distribution limits N-Tweed Heads S-south of Eden.*	x	x	-	-	x	x

OEH	- Denotes species listed within 10km of the subject site on the *Atlas of NSW Wildlife*
EPBC	- Denotes species listed within 10km of the subject site in the *EPBC Act* habitat search
TBE	- Denotes additional species considered by *Travers bushfire & ecology* to have potential habitat based on regional knowledge and other records
V	- Denotes vulnerable listed species under the relevant Act
E or E1	- Denotes endangered listed species under the relevant Act
E4A or CE	- Denotes critically endangered listed species under the relevant Act
NOTE:	1. This field is not considered if no suitable habitat is present within the subject site 2. 'records' refer to those provided by the *Atlas of NSW Wildlife* 3. 'nearby' or 'recent' records are species specific accounting for home range, dispersal ability and life cycle

.

Table A2.2 – Threatened fauna species habitat assessment

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Wallum Froglet *Crinia tinnula* OEH	V	-	Found in acidic paperbark swamps and wallum country with dense groundcover. Breeds in temporary and permanent pools and ponds of high acidity. *Distribution limit: N-Tweed Heads S-Kurnell.*	x	dispersal	✓	✓	✓	✓
Giant Burrowing Frog *Heleioporus australiacus* EPBC	V	V	Inhabits open forests and riparian forests along non-perennial streams, digging burrows into sandy creek banks. *Distribution limit: N-Near Singleton S-South of Eden.*	x	x	-	-	x	x
Green and Golden Bell Frog *Litoria aurea* OEH EPBC	E	V	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. *Distribution limit: N-Byron Bay S-South of Eden.*	x	Sub-optimal	x	x	Not likely	x
Littlejohn's Tree Frog *Litoria littlejohnii* EPBC	V	V	Found in wet and dry sclerophyll forest associated with sandstone outcrops at altitudes 280-1,000m on eastern slopes of Great Dividing Range. Prefers flowing rocky streams. *Distribution limit: N-Hunter River S-Eden.*	x	x	-	-	x	x
Stephens' Banded Snake *Hoplocephalus stephensii* OEH	V	-	A nocturnal and partly arboreal species that inhabits open and closed forest communities sheltering under bark, in hollows and under exfoliating slabs of granite. *Distribution limit: N-Border Ranges National Park. S-Gosford.*	x	marginal	x	x	Not likely	x

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Magpie Goose *Anseranas semipalmata* OEH	V	-	A strongly nomadic species found in tropical through to sub-tropical wetlands, flood plains, large swamps, dams and wet grasslands with dense growths of rushes and sedges. *Distribution limit: N-Tweed Heads. S-Mulwala.*	x	marginal	x	x	Not likely	x
Blue-billed Duck *Oxyura australis* OEH	V	-	A completely aquatic species occurring mainly throughout the Murray-Darling basin in cool to warm temperate deep permanent freshwater lakes, lagoons and swamps with extensive reed-beds. *Distribution limit: N-Tenterfield. S-Albury*.	x	x	-	-	x	x
Freckled Duck *Stictonetta naevosa* OEH	V	-	Occurs mainly within the Murray-Darling basin and the channel country within large cool temperate to sub-tropical swamps, lakes and floodwaters with cumbungi, lignum or melaleucas. *Distribution limit: N- Tenterfield. S-Albury.*	x	x	-	-	x	x
Rose-crowned Fruit-dove *Ptilinopus regina* OEH	V	-	Occurs in dense rainforests with a substantial understorey where it feeds entirely on fruit. *Distribution limit: N-Tweed Heads. S-Wollongong.*	x	x	-	-	x	x
Superb Fruit-dove *Ptilinopus superbus* OEH	V	-	Rainforests, adjacent mangroves, eucalypt forests, scrubland with native fruits. *Distribution limit: N-Border Ranges National Park. S-Batemans Bay.*	x	x	-	-	x	x

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Black-necked Stork *Ephippiorhynchus asiaticus* OEH	E	-	Occurs in tropical to warm temperate terrestrial wetlands, estuarine and littoral habitats such as mangroves, tidal mudflats, floodplains, open woodlands, irrigated lands, bore drains, sub-artesian pools, farm dams and sewerage ponds. *Distribution limit: N-Tweed Heads. S-Nowra.*	x	marginal	x	x	Not likely	x
Australasian Bittern *Botaurus poiciloptilus* EPBC	E	E	Found in or over water of shallow freshwater or brackish wetlands with tall reedbeds, sedges, rushes, cumbungi, lignum and also in ricefields, drains in tussocky paddocks, occasionally saltmarsh, brackish wetlands. *Distribution limit: N-North of Lismore. S- Eden.*	x	x	-	-	x	x
Black Bittern *Ixobrychus flavicollis* OEH	V	-	Found in shadowy, leafy waterside trees such as callistemons, casuarinas, paperbarks, eucalypts, mangroves and willows along tidal creeks, freshwater and brackish streams and ponds, sheltered mudflats and oyster slats. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	marginal	x	x	Not likely	x
White-bellied Sea Eagle (*Haliaeetus leucogaster*) OEH	V	-	Occupies coasts, islands, estuaries, inlets, large rivers, inland lakes and reservoirs. *Sedentary; dispersive. N-Tweed Heads. S-South of Eden.*	x	Sub-optimal	✓	✓	✓	✓
Little Eagle *Hieraaetus morphnoides* OEH	V	-	Utilises plains, foothills, open forests, woodlands and scrublands; river red gums on watercourses and lakes. *Distribution limit - N-Tweed Heads. S-South of Eden.*	x	marginal	x	x	unlikely	✓

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Square-tailed Kite *Lophoictinia isura* OEH	V	-	Utilises mostly coastal and sub-coastal open forest, woodland or lightly timbered habitats and inland habitats along watercourses and mallee that are rich in passerine birds. *Distribution limit: N-Goondiwindi. S-South of Eden.*	x	✓	x	✓	low	✓
Eastern Osprey *Pandion cristatus* OEH	V	-	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	x	-	-	x	x
Black Falcon *Falco subniger* OEH	V	-	Inhabits plains, grasslands, foothills, timbered watercourses, wetland environs, crops; occasionally over towns and cities. *N-Tweed Heads. S-South of Eden*	x	x	-	-	x	x
Bush Stone-curlew *Burhinus grallarius* OEH	E	-	Utilises open forests and savannah woodlands, sometimes dune scrub, savannah and mangrove fringes. *Distribution limit: N-Border Ranges National Park. S-Near Nowra.*	x	x	-	-	x	x
Australian Painted Snipe *Rostratula australis* EPBC	E	E	Most numerous within the Murray-Darling basin and inland Australia within marshes and freshwater wetlands with swampy vegetation. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	x	-	-	x	x
Gang-gang Cockatoo *Callocephalon fimbriatum* OEH	V	-	Prefers wetter forests and woodlands from sea level to > 2,000m on the Great Dividing Range, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens. *Distribution limit: mid north coast of NSW to western Victoria.*	x	marginal	x	✓	Not likely	x

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Glossy Black-Cockatoo *Calyptorhynchus lathami* OEH	V	-	Open forests with *Allocasuarina* species and hollows for nesting. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	✓	x	✓	low	✓
Little Lorikeet *Glossopsitta pusilla* OEH	V	-	Inhabits forests, woodlands; large trees in open country; timbered watercourses, shelterbeds, and street trees. *Distribution limit: N-Tweed Heads. S-South of Eden*.	x	✓	x	✓	✓	✓
Swift Parrot *Lathamus discolour* OEH EPBC	E	E	Inhabits eucalypt forests and woodlands with winter flowering eucalypts. *Distribution limit: N-Border Ranges National Park. S-South of Eden.*	x	✓	✓	✓	✓	✓
Turquoise Parrot *Neophema pulchella* OEH	V	-	Inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands. *Distribution limit: N-Near Tenterfield. S-South of Eden.*	x	marginal	x	✓	Not likely	x
Barking Owl *Ninox connivens* OEH	V	-	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting. *Distribution limit: N-Border Ranges National Park. S-Eden.*	x	✓	x	✓	unlikely	✓
Powerful Owl *Ninox strenua* OEH	V	-	Forests containing mature trees for shelter or breeding and densely vegetated gullies for roosting. *Distribution limits: N-Border Ranges National Park. S-Eden.*	x	✓	✓	✓	✓	✓

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Masked Owl *Tyto novaehollandiae* OEH	V	-	Open forest and woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. *Distribution limit: N-Border Ranges National Park. S-Eden.*	✓	-	-	-	-	✓
Sooty Owl *Tyto tenebricosa* OEH	V	-	Tall, dense, wet forests containing trees with very large hollows. *Distribution limit: N-Border Ranges National Park. S-South of Eden.*	x	x	-	-	x	x
Brown Treecreeper *Climacteris picumnus victoriae* OEH	V	-	Occupies eucalypt woodlands, open woodland lacking a dense understorey with fallen dead timber. *Distribution limit: (Sub species victoriae) Central NSW west of Great Div. Cumberland Plains, Hunter Valley, Richmond, Clarence, and Snowy River Valleys.*	x	x	-	-	x	x
Eastern Bristlebird *Dasyornis brachypterus* EPBC	E	E	Coastal woodlands, dense scrubs and heathlands, especially where low heathland borders taller woodland or dense tall tea-tree. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	x	-	-	x	x
Speckled Warbler *Chthonicola sagittata* OEH	V	-	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts. *Distribution limit: N-Urbanville. S-Eden.*	x	x	-	-	x	x
Regent Honeyeater *Xanthomyza Phrygia* OEH EPBC	E4A	CE	Found in temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts. *Distribution limit: N-Urbanville. S-Eden.*	x	✓	x	x	low	✓

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
White-fronted Chat *Epithianura albifrons* OEH	V	-	Found in open damp ground, grass clumps, fencelines, heath, samphire saltmarshes, mangroves, dunes, saltbush plains. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	✓	x	x	Not likely	x
Painted Honeyeater *Grantiella picta* EPBC	V	V	A nomadic bird occurring in low densities within open forest, woodland and scrubland feeding on mistletoe fruits. Inhabits primarily Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. *Distribution limit: N-Boggabilla. S-Albury with greatest occurrences on the inland slopes of the Great Dividing Range.*	x	x	-	-	x	x
Grey-crowned Babbler *Pomatostoomus temporalis temporalis* OEH	V	-	Found in dry open forests, woodland scrubland, farmland with isolated trees. Distribution Limit mostly west of Great Dividing Range except Hunter Valley. *Distribution limit: N-Qld widespread. S-Mornington Pen. E-se SA.*	x	x	-	-	x	x
Varied Sittella *Daphoenositta chrysoptera* OEH	V	-	Open eucalypt woodlands / forests (except heavier rainforests); mallee, inland acacia, coastal tea-tree scrubs; golf courses, shelterbelts, orchards, parks, scrubby gardens. *Distribution limit: N-Border Ranges National Park. S-South of Eden.*	x	✓	✓	x	✓	✓

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Dusky Woodswallow *Artamus cyanopterus cyanopterus* OEH	V	-	Found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Prefers habitat with an open understorey. Often observed in farmland tree patches or roadside remnants. *Widespread in eastern, southern and south-western Australia.*	x	✓	x	x	unlikely	✓
Scarlet Robin *Petroica boodang* OEH	V	-	Found in foothill forests, woodlands, watercourses; in autumn-winter, more open habitats: river red gum woodlands, golf courses, parks, orchards, gardens. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	✓	x	x	Not likely	x
Diamond Firetail *Stagonopleura guttata* OEH	V	-	Found in eucalypt woodlands, forests and mallee where there is grassy understorey west of the Great Div. also drier coastal woodlands of the Cumberland Plain and Hunter Richmond and Clarence River Valleys. *Distribution limit: N-Rockhampton Q. S-Eyre Pen Kangaroo Is. SA.*	x	x	-	-	x	x
Spotted-tailed Quoll *Dasyurus maculatus* OEH EPBC	V	E	Dry and moist open forests containing rock caves, hollow logs or trees. *Distribution limit: N-Mt Warning National Park. S-South of Eden.*	x	✓	✓	✓	✓	✓

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Koala *Phascolarctos cinereus* OEH EPBC	V	V	Inhabits both wet and dry eucalypt forest on high nutrient soils containing preferred feed trees. *Distribution limit: N-Tweed Heads. S-South of Eden.*	x	✓	✓	x	unlikely	✓
Eastern Pygmy Possum *Cercatetus nanus* OEH	V	-	Found in a variety of habitats from rainforest through open forest to heath. Feeds on insects but also gathers pollen from banksias, eucalypts and bottlebrushes. Nests in banksias and myrtaceous shrubs. *Distribution limit: N-Tweed Heads. S-Eden.*	x	Sub-optimal	x	x	unlikely	✓
Squirrel Glider *Petaurus norfolcensis* OEH	V	-	Mixed aged stands of eucalypt forest & woodlands including gum barked & high nectar producing species & hollow bearing trees. *Distribution limit: N-Tweed Heads. S-Albury.*	x	✓	✓	✓	✓	✓
Greater Glider *Petauroides volans* EPBC	-	V	Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. Population density is optimal at elevation levels at 845 m above sea level. Prefer overstorey basal areas in old-growth tree stands. Highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant hollows *Distribution limit: N-Border Ranges National Park. S- South of Eden.*	x	Sub-optimal	x	x	Not likely	x
Long-nosed Potoroo *Potorous tridactylus* EPBC	V	V	Coastal heath and dry and wet sclerophyll forests with a dense understorey. *Distribution limit: N-Mt Warning National Park. S-South of Eden.*	x	x	-	-	x	x

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Grey-headed Flying-fox *Pteropus poliocephalus* OEH EPBC	V	V	Found in a variety of habitats including rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Forms camps commonly found in gullies and in vegetation with a dense canopy. *Distribution limit: N-Tweed Heads. S-Eden.*	x	✓	✓	✓	✓	✓
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris* OEH	V	-	Rainforests, sclerophyll forests and woodlands. *Distribution limit: N-North of Walgett. S-Sydney.*	x	✓	x	✓	low	✓
East-coast Freetail Bat *Micronomus norfolkensis* OEH	V	-	Inhabits open forests and woodlands foraging above the canopy and along the edge of forests. Roosts in tree hollows, under bark and buildings. *Distribution limit: N-Woodenbong. S-Pambula.*	✓	-	-	-	-	✓
Large-eared Pied Bat *Chalinolobus dwyeri* EPBC	V	V	Warm-temperate to subtropical dry sclerophyll forest and woodland. Roosts in caves, tunnels and tree hollows in colonies of up to 30 animals. *Distribution limit: N-Border Ranges National Park. S-Wollongong.*	x	x	-	-	x	x
Eastern Falsistrelle *Falsistrellus tasmaniensis* OEH	V	-	Recorded roosting in caves, old buildings and tree hollows. *Distribution limit: N-Border Ranges National Park. S-Pambula.*	x	✓	x	✓	✓	✓

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
Little Bentwing-bat *Miniopterus australis* OEH	V	-	Roosts in caves, old buildings and structures in the higher rainfall forests along the south coast of Australia. *Distribution limit: N-Border Ranges National Park. S-Sydney.*	✓	-	-	-	-	✓
Eastern Bentwing-bat *Miniopterus orianae oceanensis* OEH	V	-	Prefers areas where there are caves, old mines, old buildings, stormwater drains and well-timbered areas. *Distribution limit: N-Border Ranges National Park. S-South of Eden.*	✓	-	-	-	-	✓
Large-footed Myotis *Myotis macropus* OEH	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water. *Distribution limit: N-Border Ranges National Park. S-South of Eden.*	✓	-	-	-	-	✓
Greater Broad-nosed Bat *Scoteanax rueppellii* OEH	V	-	Inhabits areas containing moist river and creek systems, especially tree lined creeks. *Distribution limit: N-Border Ranges National Park. S-Pambula.*	x	✓	✓	✓	✓	✓
Eastern Cave Bat *Vespadelus troughtoni* OEH	V	-	Inhabits drier open forests and woodlands. Roosts in well-lit parts of caves and mineshafts. *Distribution limit: Along GDR from N-Tweed Heads. S-Kempsey.*	x	✓	✓	✓	✓	✓

Common name ***Scientific name*** Database source	***BC Act***	***EPBC Act***	**Preferred habitat** ***Distribution limit***	**Recorded on site (✓)**	**If not recorded on site**				**Further assessment required (✓)**
					Suitable habitat present (✓)	**Nearby and/or high number of record(s) (✓)** *Notes 1,2 & 3*	**Record(s) from recent years (✓)** *Notes 1,2 & 3*	**Potential to occur**	
New Holland Mouse *Pseudomys novaehollandiae* EPBC	-	V	Occurs in heathlands, woodlands, open forest and paperbark swamps and on sandy, loamy or rocky soils. Coastal populations have a marked preference for sandy substrates, a heathy understorey of leguminous shrubs less than 1m high and sparse ground litter. Recolonise of regenerating burnt areas. *Distribution limit: N-Border Ranges National Park. S-South of Eden.*	x	x	-	-	x	x
Giant Dragonfly *Petalura gigantean* OEH	E	-	Inhabits large relatively deep permanent swamps and bogs with high water quality and moss or other soft vegetation along the edge for egg laying. *It occurs in the far NE NSW, south to Kempsey, & in a patch between Gosford & Nowra.*	x	x	-	-	x	x
Australian Grayling *Prototroctes maraena* EPBC	Part 2, Section 19 – Protected Fish (*FM Act 1994*)	V	Clear, moderate to fast flowing water in the upper reaches of rivers (sometimes to altitudes above 1,000m). Typically found in gravel bottom pools. Often forming aggregations below barriers to upstream movement (e.g. weirs, waterfalls).	x	x	-	-	x	x

OEH	Denotes species listed within 10km of the subject site on the *Atlas of NSW Wildlife*
EPBC	Denotes species listed within 10km of the subject site in the *EPBC Act* habitat search
TBE	Denotes additional species considered by *Travers bushfire & ecology* to have potential habitat based on regional knowledge and other records
V	Denotes vulnerable listed species under the relevant Act
E or E1	Denotes endangered listed species under the relevant Act
E4A or CE	Denotes critically endangered listed species under the relevant Act
NOTE:	1. This field is not considered if no suitable habitat is present within the subject site 2. 'records' refer to those provided by the *Atlas of NSW Wildlife* 3. 'nearby' or 'recent' records are species specific accounting for home range, dispersal ability and life cycle

Common name *Scientific name* Database source	*BC Act*	*EPBC Act*	Preferred habitat *Distribution limit*	Recorded on site (✓)	If not recorded on site				Further assessment required (✓)
					Suitable habitat present (✓)	Nearby and/or high number of record(s) (✓) *Notes 1,2 & 3*	Record(s) from recent years (✓) *Notes 1,2 & 3*	Potential to occur	
Unlikely	Represents such a low margin but not enough to 100% rule it one. A significance of impact test is required.								
Not likely	Means 0% change of occurring, despite there being potential habitat. A significance of impact test is not applied to these species.								

A detailed assessment in accordance with Section 1.7 of the *EPA Act* will be completed for these species in Appendix 3 of this report.

Table A2.3 provides an assessment of potential habitat within the subject site for nationally *protected* migratory fauna species recorded within 10km on the *EPBC Act* Protected Matters Tool. Nationally *threatened* migratory species are considered in Table A2.3.

Table A2.3 – Migratory fauna habitat assessment

Common name ***Scientific name***	**Preferred habitat** ***Migratory breeding***	**Suitable habitat present (✓)**	**Recorded present (✓)**	**Comments on potential impacts**
Oriental or Horsfield's Cuckoo (*Cuculus optatus*)	It mainly inhabits forests, occurring in coniferous, deciduous and mixed forest. It feeds mainly on insects and their larvae, foraging for them in trees and bushes as well as on the ground.	✓	x	No likely impact
Osprey *Pandion cristatus*	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding. *Distribution Limit: N-Tweed Heads. S-South of Eden.*	x	-	-
White-throated Needletail (*Hirundapus caudacutus*)	Airspace over forests, woodlands, farmlands, plains, lakes, coasts, towns; companies forage often along favoured hilltops and timbered ranges. *Breeds Siberia, Himalayas, east to Japan. Summer migrant to eastern Australia.*	✓	x	No likely impact
Black-faced Monarch (*Monarcha melanopsis*)	Rainforests, eucalypt woodlands; coastal scrubs; damp gullies in rainforest, eucalypt forest; more open woodland when migrating. *Summer breeding migrant to coastal south east Australia, otherwise uncommon.*	✓	✓	An individual was heard at a distance within the southern forest area. No potential breeding or likely foraging habitat will be impacted.
Spectacled Monarch (*Monarcha trivirgatus*)	Understorey of mountain / lowland rainforest, thickly wooded gullies, waterside vegetation, mostly well below canopy. *Summer breeding migrant to south-east Qld and north-east NSW down to Port Stephens from Sept/Oct to May. Uncommon in southern part of range.*	x	-	-
Yellow Wagtail (*Motacilla flava*)	The yellow wagtail typically forages in damp grassland and on relatively bare open ground at edges of rivers, lakes and wetlands, but also feeds in dry grassland and in fields of cereal crops.	x	-	-
Satin Flycatcher (*Myiagra cyanoleuca*)	Heavily vegetated gullies in forests, taller woodlands, usually above shrub-layer; during migration, coastal forests, woodlands, mangroves, trees in open country, gardens. *Breeds mostly south east Australia and Tasmania over warmer months, winters in north east Qld.*	x	-	-
Rufous Fantail (*Rhipidura rufifrons*)	Undergrowth of rainforests / wetter eucalypt forests / gullies; monsoon forests, paperbarks, sub-inland and coastal scrubs; mangroves, watercourses; parks, gardens. On migration, farms, streets buildings. *Breeding migrant to south east Australia over warmer months. Altitudinal migrant in north east NSW in mountain forests during warmer months.*	✓	x	No likely impact
Fork-tailed Swift (*Apus pacificus*)	Aerial: over open country, from semi-arid deserts to coasts, islands; sometimes over forests, cities. *Breeds Siberia, Himalayas, east to Japan south east Asia. Summer migrant to east Australia. Mass movements associated with late summer low pressure systems into east Australia. Otherwise uncommon.*	✓	x	No likely impact

Appendix 3
Report on the Chain Valley Bay Masked Owls by John Young

Report on the "Chain Valley Bay"

Masked Owls

By

John Young

(Wildlife Consultant and large forest Owl specialist.)

Chain Valley Bay Site, Subject to a Development Proposal

Background

On the eve of 27th June 2019 soon after dusk, Mr Corey Mead of Travers Bushfire and Ecology, a senior Fauna Ecologist, suspecting suitable habitat (several large hollows and mosaic understorey structure) attracted a single Masked Owl by mimicry of the bird's call. The owl approached quietly within minutes of Corey's call and landed on a branch overhead.

Given that this bird arrived rapidly and just after dusk, it was clearly occupying the site and surrounds. The bird was confirmed at the time in torch light as Corey was quite familiar with the species, having worked with many other pairs.

Following this event Mr Mead surveyed the site in the vicinity for all suitable hollows and one in particular stood out as being centrally located within the others and suitable for nesting at point Lat: 33° 14' 44.72881"S – Long: 151° 34' 45.30851"E.

A number of other hollow bearing tree's suitable for roosting were also discovered within a 300m radius of the suspected nest tree.

Suspected nest tree for Masked Owls discovered by Corey Mead. Typical site.

30th August

On August 30th 2019, I visited the site with Mr Mead for a brief look at the location and all potential use trees identified along with a brief from him of what he had seen and heard.

Later in the afternoon I returned again to within 30 metres of the suspected tree and stayed till well after dark in heavy rain. A useless night as very few owls call when in heavy rain, instead they often sit motionless and quiet. Not surprisingly, not a sound was heard, nor was there any sign of the bird so I departed at 7.55pm.

31st August

Morning session - I arrived at the site at 3.45am, again in pouring rain and positioned myself across the creek at the same spot and waited until daylight.

Still not a sign or sound, so I departed at 6.30am.

Evening session - Once again I arrived at the same spot in heavy rain at 5.15pm.

This time the rain eased and after a long wait a Masked Owl arrived from the east at 7.27pm, cackling softly as it approached with what appeared to be something in its bill.

It did not go to the obvious hollow but, instead went to the dead hollow upright in the centre of the tree and went in.

Entrance to Masked Owl nest – 31st August 2019

I expect that both entrances to the hollow will join up. I stayed in position as the rain got heavier but, did not see the bird come out. I departed at 8.21pm.

There is no doubt that this tree is the nesting site of the pair and most likely has been for many years.

1st September

Morning session - Again, I arrived at the site close to the discovered nest tree at 4.05am in very light rain with clearing skies. Not a sound nor sign of anything until 5.06am then there was a call approximately 200 m to the south east. Seemingly the last call of the night before going to roost in a hollow.

I spent many hours going over the site during the day, looking at all the possible hollows that Mr Mead had discovered and marked, and one in particular seemed to be in line with where I heard the call on daylight, so I decided to come back in the late evening and sit half way between the two discovered sites.

Showing typical Masked Owl habitat midway between nest site and discovered roost tree

Evening session - I arrived again at the planned site at 5pm and waited.

6.05pm in dim light the male called directly at the suspected roost tree and on my approach, he was clearly visible on a horizontal branch, just out from the hollow preening.

A roost tree at Lat: 33° 10’ 46.72024”S – Long: 151° 34’ 52.36077”E is confirmed.

Within 5 minutes he flew overhead, directly towards the discovered nest tree, cackling softly as he went. He did not have food but was visiting the female.

No further sound was heard so I departed under relatively clear skies at 7.45pm.

2nd September

Morning session - I arrived back near the nest tree at 3.48am and sat quietly close to the tree and heard nothing. Not a sound or even a sighting of the bird.

These birds become so quiet and secretive when they have young (which I believe they had from 40 years of experience in viewing many nest sites). From normal behaviour of some pairs, you would not know that they even existed in the area.

I departed at 6.10am.

Evening session - Again, I sat just across the creek from the discovered nest tree before dusk and waited. This time under very clear skies.

At 6.28pm in dim light the male appeared, seemingly from nowhere, I was lucky to see him. He landed on the rim of the main entrance to the hollow, chuckled softly for a few seconds, then flew south up over the canopy calling once in flight well off in the distance as he went hunting.

With no further sound I departed at 8pm.

3rd September

Last morning session - I arrived again near the nest tree under clear skies at 4.21am and waited until daylight without hearing or seeing the bird. Not surprising when these birds have young as they will often come in towards midnight with food, then no more.

Conclusion

The map below shows the locations of all large hollows with potential use, from Corey Meads initial survey work. The authors work has followed on to confirm those findings of suitable hollows, the nest tree and a roost tree.

I expect that the recorded breeding pair of Masked Owls have occupied this area at Chain Valley Bay for many years. The identified nest tree is central to this activity and very important for protection with appropriate buffers.

One hollow was also confirmed as a roost site, however a number of others located by Mr Mead are also potential roost sites. I have taken a precautionary approach to ensure each of these also receive appropriate buffers from development and activity.

The forested habitat surrounding the breeding area is extensive, so provided that these buffers are enforced with some additional measures to screen out development and future activity, I believe the birds will continue to remain here.

Recommendations

I have taken the approach that the prescriptive buffers of 100m from a nest tree and 50m from a roost tree be applied to the trees identified.

I am recommending that the “blue” line on the following map is the southern boundary of the proposed development to incorporate the nest tree and a potential roost tree buffers within a protection zone. This outer area should be heavily revegetated with local dense foliage plants to act both as a sound and light barrier. This area may include the stormwater detention basin for the development provided that the same extent of vegetation is planted on either side to permit the sound and light barrier.

Special thanks to Corey Mead for his excellent field work and support during the survey.

Also, to Michael Sheather-Reid, Managing Director of Travers Bushfire and Ecology for his strong support.

John Young.

12th September 2019

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05 B – *Traffic Impact Assessment*

TRAFFIC ASSESSMENT REPORT

FOR

PLANNING PROPOSAL

MANUFACTURED HOME ESTATE

MULLOWAY ROAD

CHAIN VALLEY BAY

24 JUNE 2019

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1.0 INTRODUCTION

This Traffic Assessment Report examines potential traffic impacts of a Planning Proposal for a new manufactured home estate to provide approximately 190 new manufactured home sites.

The site is located on the western side of Chain Valley Bay Road at the intersection with Mulloway Road at Chain Valley Bay.

2.0 LOCALITY DIAGRAM

(Image Courtesy of Google Earth

3.0 EXISTING USE OF SITE

The land has a variable downhill slopes from Mulloway Road towards Karignan Creek along the southern boundary of the site of the Planning Proposal.

The site contains a residential dwellings on the northern end with frontage to Mulloway Road, situated outside the boundary of the Planning Proposal.

The site is fenced, with grassed areas and areas containing trees and shrubs.

There are several structures along the southern end of the site closer to the creek with a residential dwelling and other improvements along Mulloway Road, not included in this Planning Proposal.

4.0 ADJACENT DEVELOPMENTS

The property immediately west of the subject Planning Proposal is currently occupied by a mobile home / caravan park, known as Valhalla Village. The existing Valhalla Village contains 407 residential sites.

Existing properties in this general area comprise residential developments.

There are no commercial retail centres near the Planning Proposal.

There is another existing manufactured home estate at the western end along the northern side of Mulloway Road – Teraglin Lakeshore Home Village.

Land on the northern side of Mulloway Road opposite the site of the Planning Proposal is undeveloped land that forms part of the Lake Macquarie State Conservation Area.

5.0 TRAFFIC VOLUMES ON THE PACIFIC HIGHWAY

Traffic volumes were surveyed at the intersection of Chain Valley Bay Road and Pacific Highway on Wednesday 11 August 2005 between 7.30am and 9.30am, and also between 3.30pm and 5.30pm.

The peak hours during these survey periods were found to be between 7.30am and 8.30am and between 3.30pm and 4.30pm.

Individual movements are shown diagrammatically below:

Traffic volumes on the Pacific Highway were previously published by the RTA for various counting stations along the Highway.

There are no RTA counting stations close to Chain Valley Bay Road that have recent count data. However, there was a counting stations north of Chain Valley Bay Road which would provide reasonably representative data, as below:

Counting station No. 05.002 - Swansea – 2km south of Lake Macquarie Bridge

AADT data for the above counting stations are as follows:

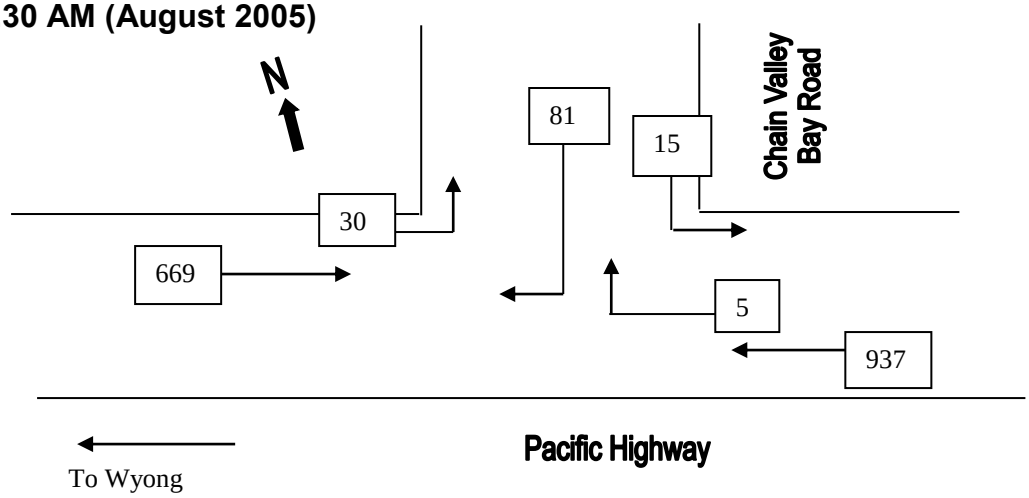
RTA Counting Station	1995	1998	2001	2004	
05.002	13,346	13,948	14,771	15,732	→ *Ave Annual Growth Rate = 2.0%*

The average annual traffic growth rate on the Pacific Highway near Chain Valley Bay Road between 2004 and 2019 is assumed to be approximately 2.0% based on the data between 1995 and 2004.

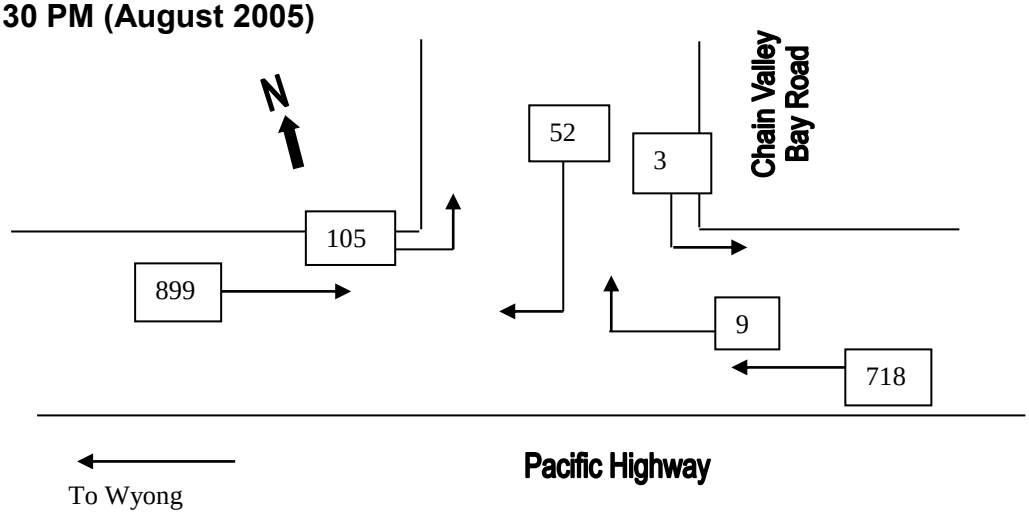
The projected 2019 AADT on the Pacific Highway at Chain Valley Bay Road is estimated to be approximately 32% higher than the surveyed traffic volumes in 2005.

Traffic volumes on Chain Valley Bay Road would not have increase noticeably since the 2005 surveys because of the restricted area for residential development at Chain Valley Bay, apart from the extensions to Valhalla Village afterwards.

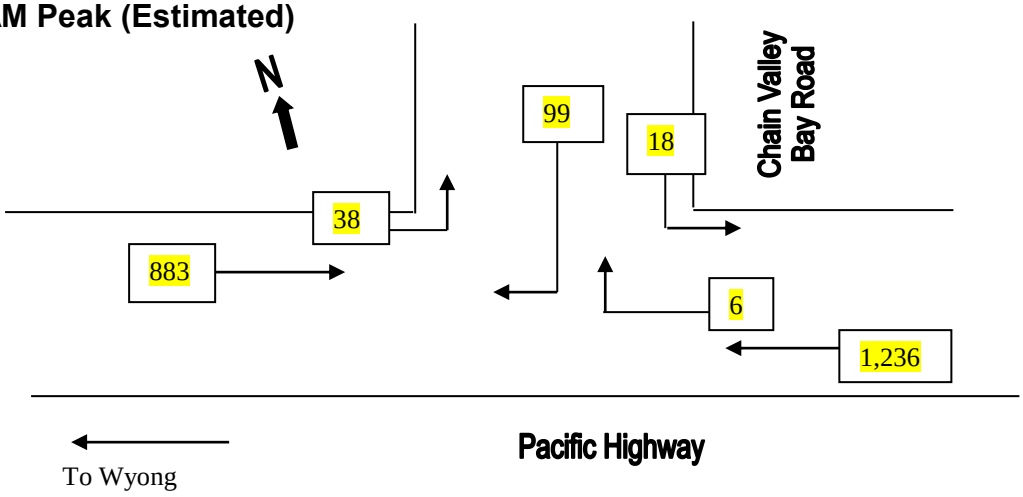
7.30-8.30 AM (August 2005)



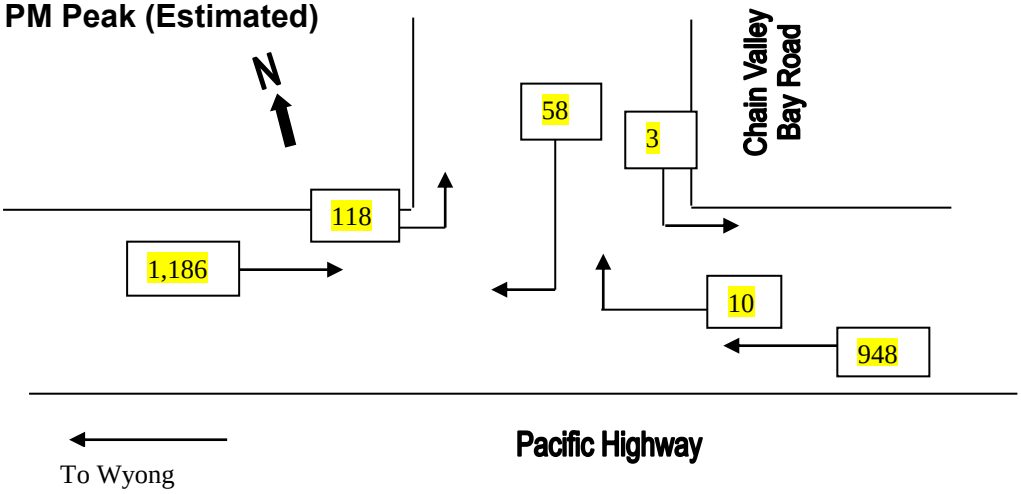
3.30-4.30 PM (August 2005)



2019 AM Peak (Estimated)



2019 PM Peak (Estimated)



6.0 TRAFFIC ENVIRONMENT ON MULLOWAY ROAD

Mulloway Road is a Local Road aligned generally east-west that provides a link between other residential streets in Chain Valley Bay and Chain Valley Bay Road.

Mulloway Road has kerb and gutter and a paved footpath along the southern side along the frontage of Valhalla Village.

Mulloway Road has a straight horizontal alignment and a slight downhill gradient towards the west from Chain Valley Bay Road.

There is no street-lighting along Mulloway Road except at street junctions.

The existing speed zone along Mulloway Road is 50km/h.

7.0 TRAFFIC ENVIRONMENT ON CHAIN VALLEY BAY ROAD

Chain Valley Bay Road is a Local Road aligned north-south that provides a link between the Pacific Highway and the local road system servicing the residential areas in Chain Valley Bay.

Chain Valley Bay Road has no kerb and gutter or formed footways along its length. Chain Valley Bay Road has a sealed pavement width of approximately 6.4 metres wide past the proposed development, and along its entire length apart from the recent widening for the culvert upgrading at Karignan Creek.

The pavement has been upgraded recently either end of the culvert under Chain Valley Bay Road over a length approximately 300 metres long with two lanes each approximately 3.5 metres wide and sealed shoulder outside the new edgelines each approx. 1.5 metres wide, commencing just south of the access for the Manufactured Home Estate that is subject of this Planning Proposal.

Chain Valley Bay Road has painted centrelines along its length.

Chain Valley Bay Road has a straight horizontal alignment and slightly undulating gradients, with a sag vertical curve at .

There is no street-lighting along Chain Valley Bay Road except at street junctions, including the Pacific Highway.

The existing speed zone along Chain Valley Bay Road is 80km/h.

There are no formed footways along Chain Valley Bay Road. There is an irregular gravel track along the western side of Chain Valley Bay Road north of Mulloway Road.

8.0 TRAFFIC ENVIRONMENT ON PACIFIC HIGHWAY

The Pacific Highway is an arterial State Road connecting larger regions along the east coast of NSW.

The Pacific Highway has dual carriageways throughout the area, north of Doyalson to Newcastle.

The Pacific Highway has a gently winding alignment and undulating vertical gradients near Chain Valley Bay Road.

There is a deceleration land for northbound traffic to turn into Chain Valley Bay Road, and also a right-turn lane for southbound traffic to turn into Chain Valley Bay Road.

There are two travel lanes in each direction between Doyalson and Newcastle.

There is no street lighting on the Pacific Highway except at street intersections such as Chain Valley Bay Road.

The speed zone on the Pacific Highway past Chain Valley Bay Road is 80km/h.

There are no pedestrian footpaths along either side of the Pacific Highway near Chain Valley Bay Road.

9.0 PEDESTRIAN AMENITY

There are currently no paved pedestrian footpaths along the Pacific Highway near Chain Valley Bay Road.

There is a paved footpath along the southern side of Mulloway Road along the frontage of Valhalla Village to Trevally Avenue.

There are no close attractions near the in the Chain Valley Bay area that would attract significant pedestrian activity associated with the subject Planning Proposal.

Central Coast Council has been constructing pedestrian / cycle paths along sections of the northern side of the Pacific Highway generally west of Carters Road but are unlikely to extend to Chain Valley Bay Road.

The availability of public bus transport along Chain Valley Bay Road and the potential to provide a courtesy bus enables convenient access to recreational, social and medical amenities for those residents who won't drive.

10.0 PROPOSED MANUFACTURED HOME ESTATE

The subject Planning Proposal is to provide up to up to 190 sites in accordance with the Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005.

11.0 TRAFFIC GENERATION FROM PROPOSED MANUFACTURED HOME ESTATE

The RTA Guide to Traffic Generating Developments does not suggest traffic generation rates for manufactured home estates or caravan parks. The RTA Guide to Traffic Generating Developments does suggest specific traffic generation rates for residential unit development as follows:

Evening Peak Hour

- 0.4 to 0.5 trips per dwelling for smaller flats and units.

The RTA Guide to Traffic Generating Developments also suggests that where surveys of similar establishments are available, that data should be utilised. The traffic generation from the existing Valhalla Village manufactured home estate provides a more representative picture of traffic generation from the proposed development as the attractions to traffic generation already exist.

Traffic generation from the adjacent Valhalla Village site when it contained 259 sites was surveyed in 2005 was found to be 0.19 trips per site in the morning peak hour and 0.14 trips per site in the evening peak hours. This compares with a 2005 survey at Erina Gardens manufactured home estate that indicated a traffic generation rate of 0.19 trips per home site in the evening peak hour. The Erina Gardens manufactured home estate did not operate a courtesy bus.

Traffic Generation for the subject Planning Proposal for up to 190 sites on based on the previously surveyed rates at the adjacent Valhalla Village Manufactured Home Estate, would be:

AM Peak

190 manufactured homes @ 0.19 trips per unit	=	36.1 vehicle trips **Say 37 trips**

PM Peak

190 manufactured homes @ 0.14 trips per unit	=	26.6 vehicle trips **Say 27 trips**

12.0 PROPOSED PARKING PROVISION

Car parking will be provided to comply with the Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005.

13.0 PROPOSED ACCESS ON CHAIN VALLEY BAY ROAD

The proposed Manufactured Home Estate will provide up to 190 manufactured home sites.

It is proposed that vehicular access to the site will be from Chain Valley Bay Road approximately 150 metres north of Karignan Creek.

The adjacent Valhalla Village currently has vehicular access only to Mulloway Road.

AS/NZS 2890.1 - 2004 recommends that a Category 2 driveway, having combined entry and exit 6.0 metres wide to 9.0 metres wide, is suitable to serve 101 to 300 car spaces in a class 1A parking facility on a local road.

The proposed access will satisfy the requirements of the Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005 which states the following:

"Division 3 – Manufactured home estates
Subdivision 3 Roads

20 Entrance and exit roads

(1) A road that forms an entrance to or exit from a manufactured home estate must be at least 8 metres wide.

(2) In the case of a divided road, the width of the sealed portion of the road on either side of the median strip must be at least 5 metres."

The new driveway will comply with the requirements of the Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005 and is therefore considered satisfactory.

14.0 SERVICING REQUIREMENTS

Servicing of the proposed Manufactured Home Estate will be negligible.

Garbage truck access will be the only ongoing regular servicing at the proposed Manufactured Home Estate which is the subject of this Planning Proposal.

15.0 SIGHT DISTANCES

The available sight distances at the proposed new drivewa*y* access on Chain Valley Bay Road, will be satisfactory because of the straight alignment of Chain Valley Bay Road. Some minor trimming of street-side trees may be desirable from time-to-time to maintain satisfactory sight distances.

AS/NZS 2890.1 – 2004 sight distance recommendations are:

Frontage Road Speed (km/h)	Minimum Sight Distance (m)	Desirable Sight Distance (m)
80	105	111

The proposed access on Chain Valley Bay Road will provide sight distances that are in excess of 250 metres in both directions, considerably greater than the desirable requirement in AS/NZS2890.1 - 2004.

16.0 PUBLIC TRANSPORT AVAILABILITY

Busways operates Routes 95 and 98 plus School Bus services along Chain Valley Bay Road and Mulloway Road to connect with other route buses, including Route 99 which enables travel north to Newcastle and south to Lakehaven Shopping Centre where connections can be made with numerous other routes.

There is a Bus Stop on Chain Valley Bay Road at the Pacific Highway intersection.

There is a bus stop outside the access to Valhalla Village.

Busways route 98 travels between Chain Valley Bay to Wyong via Lake Haven shops and route 99 travels between Charlestown and Wyong via Lake Haven shops. Most of the services also continue to Westfield Tuggerah.

17.0 ORIGIN / DESTINATION CONSIDERATIONS

The modal split of vehicle movements associated with the proposed development is likely to be the same as adjacent Valhalla Village Manufactured Home Estate. These would be relatively consistent because of the location of the site relative to Lake Macquarie and the Chain Valley Bay Road connection to the Pacific Highway.

The population distribution and the geographic location of the proposed Manufactured Home Estate at Chain Valley Bay, indicates that approximately 95% of trips are likely to come from and return to the Pacific Highway and further destinations north and south.

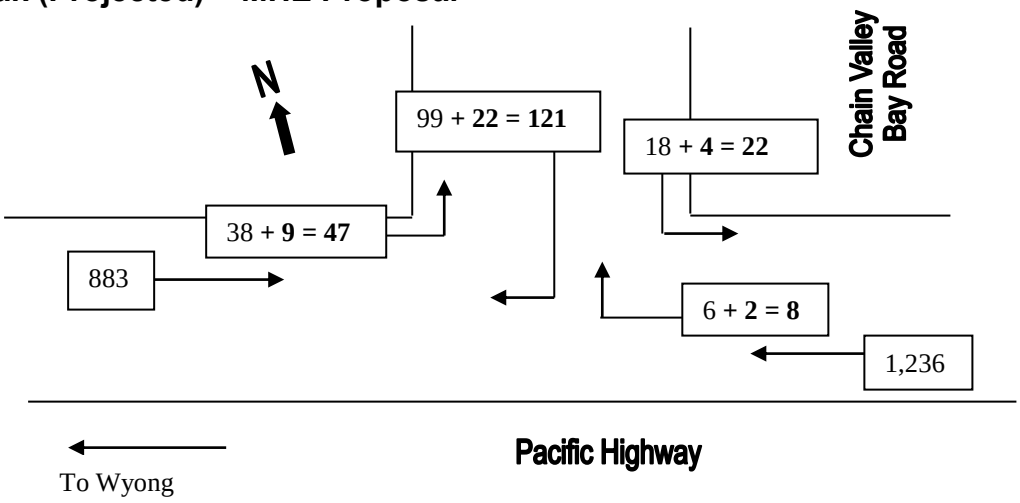
The traffic generation rates for the morning peak are likely to be the same as the those at the adjacent Valhalla Village, and the modal split is expected to reflect the existing split. That is, it is also assumed that approximately 30% of trips may be inward trips, and 70% of trips may be outward trips during the morning peak.

It is also assumed that approximately 70% of trips may be inward trips, and 30% of trips may be outward during the evening peak.

18.0 POTENTIAL TRAFFIC MOVEMENTS FOR PROPOSED MANUFACTURED HOME DEVELOPMENT

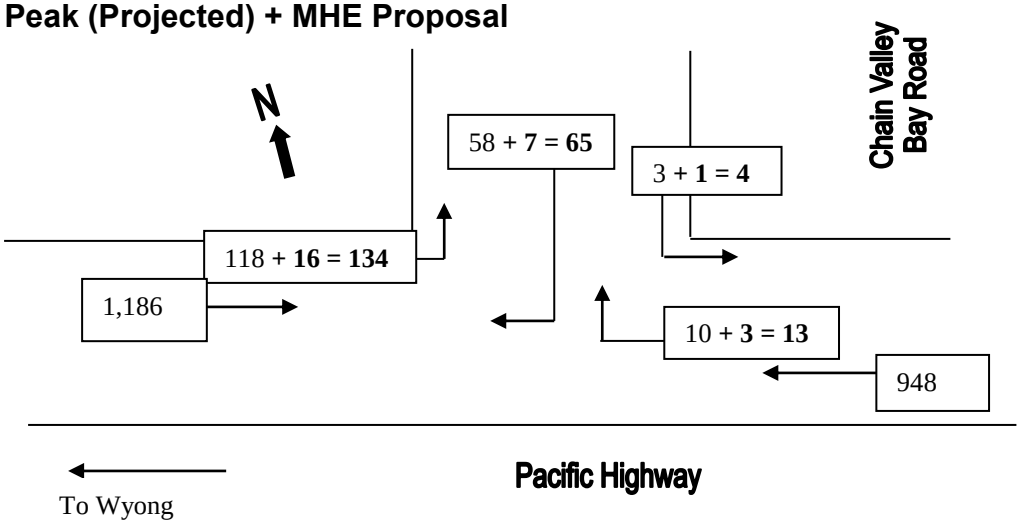
Traffic volumes associated with the Planning Proposal for the proposed Manufactured Home Estate development, superimposed onto projected traffic volumes at the intersection of Chain Valley Bay Road and Pacific Highway are shown diagrammatically below:

2019 AM Peak (Projected) + MHE Proposal

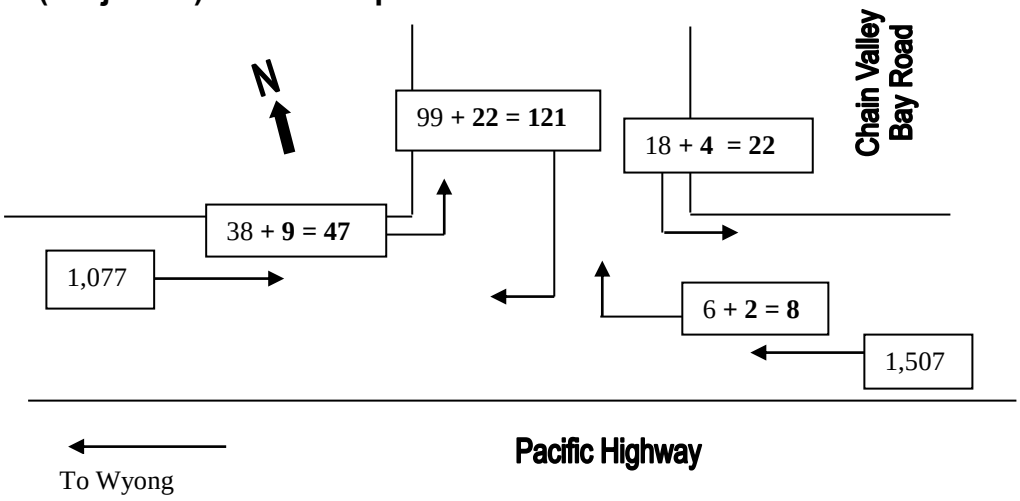


Numerals in **bold** font represent additional traffic generated by the proposed development.

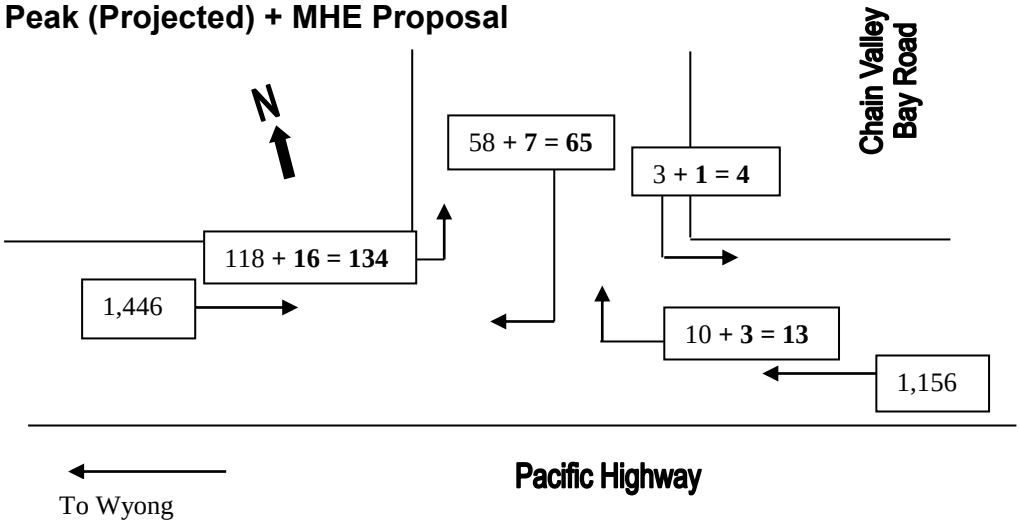
2019 PM Peak (Projected) + MHE Proposal



2029 AM Peak (Projected) + MHE Proposal



2029 PM Peak (Projected) + MHE Proposal



19.0 SIDRA ASSESSMENT

SIDRA simulations have been undertaken at the intersection of Chain Valley Bay Road and Pacific Highway for projected 2019 and 2029 traffic volumes including the additional traffic generated by the Manufactured Homes Estate which is the subject of this Planning Proposal.

The SIDRA program was developed in conjunction with ARRB Transport Research Ltd to analyse the operation of intersections controlled by traffic signals, Give Way signs, Stop signs, conventional roundabouts and signal controlled roundabouts. It is widely used by consulting traffic engineers and is recognised and used by the Roads and Traffic Authority of NSW. SIDRA is now owned and developed by Akcelik & Associates Pty Ltd.

The parameters used in the SIDRA program are measured against the following performance standards developed by the Roads and Traffic Authority of NSW and the American Transportation Research Board.

Table 19.1 - Level of Service for Unsignalised Intersections Controlled by Stop or Give Way Signs.

Average Delay per vehicle (secs)	Level of Service	Operational Conditions
0 to 14	A	Good
15 to 28	B	Acceptable delays and spare capacity
29 to 42	C	Satisfactory but accident study required
43 to 56	D	Near capacity and accident study required
57 to 70	E	At capacity and requires other control mode
> 70	F	Unsatisfactory and requires other control mode

Table 19.2: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2019 AM Peak

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0	A	0
Westbound on HW10 right into Chain Valley Bay Rd	16.3	B	0.4
Chain Valley Bay Rd left onto HW10	11.2	A	0.6
Chain Valley Bay Rd right onto HW10	6256.5	F	741.6
Eastbound on HW10 left into Chain Valley Bay Rd	6.9	A	0
Eastbound through on HW10	0	A	0
Overall Intersection	**271.8**	**NA**	**741.6**

The SIDRA simulation indicates that average delays for existing 2019 AM peak movements right out of Chain Valley Bay Road are excessively high with a Level of Service of F.

All other movements operate with satisfactory average delays and acceptable Level of Service.

Observation suggests that some drivers turning right out of Chain Valley Bay Road utilise the small area between the southern and northern medians as a de-facto seagull storage.

Table 19.3: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2019 PM Peak

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0	A	0
Westbound on HW10 right into Chain Valley Bay Rd	19.3	B	0.9
Chain Valley Bay Rd left onto HW10	11.4	A	19.5
Chain Valley Bay Rd right onto HW10	100.7	F	19.5
Eastbound on HW10 left into Chain Valley Bay Rd	7.0	A	0
Eastbound through on HW10	0	A	0
Overall Intersection	**3.0**	**NA**	**19.5**

The SIDRA simulation indicates that average delays for existing 2019 PM peak movements right out of Chain Valley Bay Road are excessively high with a Level of Service of F.

All other movements operate with satisfactory average delays and acceptable Level of Service.

Table 19.4: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2019 AM Peak + MHE Planning Proposal

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0	A	0
Westbound on HW10 right into Chain Valley Bay Rd	16.6	B	0.6
Chain Valley Bay Rd left onto HW10	11.2	A	0.7
Chain Valley Bay Rd right onto HW10	8181.7	F	953.8
Eastbound on HW10 left into Chain Valley Bay Rd	6.9	A	0
Eastbound through on HW10	0	A	0
Overall Intersection	**427.4**	**NA**	**953.8**

The SIDRA simulation indicates that average delays for existing 2019 AM peak movements right out of Chain Valley Bay Road with the additional traffic generated by the Manufactured Home Estate traffic associated with the subject Planning Proposal are excessively high with a Level of Service of F.

All other movements operate with satisfactory average delays and acceptable Level of Service.

Table 19.5: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2019 PM Peak + MHE Planning Proposal

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0	A	0
Westbound on HW10 right into Chain Valley Bay Rd	19.7	B	1.1
Chain Valley Bay Rd left onto HW10	11.5	A	0.1
Chain Valley Bay Rd right onto HW10	138.5	F	27.8
Eastbound on HW10 left into Chain Valley Bay Rd	7.0	A	0
Eastbound through on HW10	0	A	0
Overall Intersection	**4.4**	**NA**	**27.8**

The SIDRA simulation indicates that average delays for existing 2019 AM peak movements right out of Chain Valley Bay Road with the additional traffic generated by the Manufactured Home Estate traffic associated with the subject Planning Proposal are excessively high with a Level of Service of F.

All other movements operate with satisfactory average delays and acceptable Level of Service.

Table 19.6: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2029 AM Peak

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0.1	A	0
Westbound on HW10 right into Chain Valley Bay Rd	22.1	B	0.6
Chain Valley Bay Rd left onto HW10	12.2	A	0.6
Chain Valley Bay Rd right onto HW10	28050.1	F	1,056.5
Eastbound on HW10 left into Chain Valley Bay Rd	6.9	A	0
Eastbound through on HW10	0	A	0
Overall Intersection	**1,011.6**	**NA**	**1056.5**

The SIDRA simulation indicates that average delays for projected 2029 AM peak movements right out of Chain Valley Bay Road will be excessively high with a Level of Service of F.

All other movements will operate with satisfactory average delays and acceptable Level of Service.

Table 19.7: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2029 PM Peak

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0	A	0
Westbound on HW10 right into Chain Valley Bay Rd	24.6	B	1.1
Chain Valley Bay Rd left onto HW10	12.2	A	0.1
Chain Valley Bay Rd right onto HW10	911.0	F	180.5
Eastbound on HW10 left into Chain Valley Bay Rd	7.0	A	0
Eastbound through on HW10	0.1	A	0
Overall Intersection	**19.4**	**NA**	**180.5**

The SIDRA simulation indicates that average delays for projected 2029 PM peak movements right out of Chain Valley Bay Road will be excessively high with a Level of Service of F.

All other movements will operate with satisfactory average delays and acceptable Level of Service.

Table 19.8: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2029 AM Peak + MHE Planning Proposal

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0.1	A	0
Westbound on HW10 right into Chain Valley Bay Rd	22.4	B	0.8
Chain Valley Bay Rd left onto HW10	12.2	A	0.8
Chain Valley Bay Rd right onto HW10	34634.7	F	1,302.3
Eastbound on HW10 left into Chain Valley Bay Rd	6.9	A	0
Eastbound through on HW10	0	A	0
Overall Intersection	**1,506.2**	**NA**	**1,302.3**

The SIDRA simulation indicates that average delays for existing 2029 AM peak movements right out of Chain Valley Bay Road with the additional traffic generated by the Manufactured Home Estate traffic associated with the subject Planning Proposal will be excessively high with a Level of Service of F.

All other movements operate with satisfactory average delays and acceptable Level of Service.

Table 19.9: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2029 PM Peak + MHE Planning Proposal

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0	A	0
Westbound on HW10 right into Chain Valley Bay Rd	25.1	B	1.5
Chain Valley Bay Rd left onto HW10	12.2	A	0.1
Chain Valley Bay Rd right onto HW10	1,241.0	F	248.8
Eastbound on HW10 left into Chain Valley Bay Rd	7.0	A	0
Eastbound through on HW10	0.1	A	0
Overall Intersection	**29.1**	**NA**	**248.8**

The SIDRA simulation indicates that average delays for existing 2029 PM peak movements right out of Chain Valley Bay Road with the additional traffic generated by the Manufactured Home Estate traffic associated with the subject Planning Proposal will be excessively high with a Level of Service of F.

All other movements operate with satisfactory average delays and acceptable Level of Service.

Table 19.10: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2029 AM Peak + MHE Planning Proposal + Seagull Upgrade

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0.1	A	0
Westbound on HW10 right into Chain Valley Bay Rd	22.4	B	0.8
Chain Valley Bay Rd left onto HW10	12.2	A	0.8
Chain Valley Bay Rd right onto HW10	39.0	C	19.1
Eastbound on HW10 left into Chain Valley Bay Rd	6.9	A	0
Eastbound through on HW10	0	A	0
Overall Intersection	**2.0**	**NA**	**19.1**

The provision of a short seagull lane within the median will enable the intersection to operate with low average delays for all movements and minimal 95% queue lengths in the 2029 AM Peak with the additional traffic attributable to the MHE Planning Proposal included.

Delays to through-traffic on the Pacific Highway will be minimal.

Table 19.11: SIDRA Outputs at Pacific Highway and Chain Valley Bay Road for Projected 2029 PM Peak + MHE Planning Proposal + Seagull Upgrade

Movement	Average Delay for Movement (sec)	Level of Service	95% Queue Length (m)
Westbound through on HW10	0	A	0
Westbound on HW10 right into Chain Valley Bay Rd	25.1	B	1.5
Chain Valley Bay Rd left onto HW10	12.2	A	0.1
Chain Valley Bay Rd right onto HW10	32.1	C	8.5
Eastbound on HW10 left into Chain Valley Bay Rd	7.0	A	0
Eastbound through on HW10	0.1	A	0
Overall Intersection	**1.3**	**NA**	**8.5**

The provision of a short seagull lane within the median will enable the intersection to operate with low average delays for all movements and minimal 95% queue lengths in the 2029 AM Peak with the additional traffic attributable to the MHE Planning Proposal included.

Delays to through-traffic on the Pacific Highway will be minimal.

20.0 SUMMARY

a) The Planning Proposal is for all vehicular access for the proposed 190 site manufactured home estate to be via a new access entry / exit onto Chain Valley Bay Road.

b) The existing speed zone on Chain Valley Bay Road past the proposed manufactured home estate is 80km/h.

c) The site of the proposed manufactured home estate is rural land apart from a residential dwelling, a large shed and other minor improvements. An existing dwelling on the northern part of the site has frontage to Mulloway Road and will be subdivided from the MHE Planning Proposal.

d) The adjacent Valhalla Village manufactured home estate contains a total of 407 units.

e) The proposed manufactured home estate will generate negligible additional traffic volumes during the afternoon peak period, based on a survey of traffic generated by the Valhalla Village mobile home park.

f) Service vehicle movements would be negligible. Garbage trucks would comprise the only regular service activity.

g) Approval to the Planning Proposal for a manufactured home estate would have no adverse affect on the Level of Service, capacity or traffic safety of Chain Valley Bay Road or Mulloway Road at Chain Valley Bay.

h) There are currently no paved footpaths along Chain Valley Bay Road or Mulloway Road along the site frontages.

i) There are no close pedestrian attractions in the vicinity of the Manufactured Home Estate subject to this Planning Proposal and pedestrian generation along Chain Valley Bay Road is highly unlikely.

j) SIDRA simulations indicate that the existing intersection of Chain Valley Bay Road and Pacific Highway does not perform well in the 2019 morning and evening peak periods for vehicles turning right out of Chain Valley Bay Road with undesirably high average delays. The existing intersection requires upgrading to provide a satisfactory level of performance and improved safety for vehicles turning right out of Chain Valley Bay Road in the weekday peak periods.

k) The intersection of Chain Valley Bay Road and Pacific Highway should be upgraded by the provision of a seagull acceleration lane to enable traffic turning right out of Chain Valley Bay Road to enter the intersection without having to yield to southbound highway traffic before merging in the southbound traffic flows.

l) The suggestion to upgrade the intersection of Chain Valley Bay Road and Pacific Highway to provide a seagull-lane is necessary for existing traffic volumes and is not triggered by the subject Planning Proposal calculated to generate an additional 37 trips in the weekday morning peak and 27 trips in the weekday evening peak periods.

m) On-site parking provision will be provided to comply with the requirement in the "Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005" document.

21.0 RECOMMENDATIONS

* I recommend acceptance of the Planning Proposal to provide a 190-site Manufactured Home Estate on the site immediately east of Valhalla Village with a new access to Chain Valley Bay Road on the basis that the additional traffic generation of 37 morning peak trips and 27 evening peak trips, traffic impacts on Mulloway Road would be negligible.

B J Bradley BE Grad Dip Man MIE Aust

APPENDIX A –

SITE PHOTOGRAPHS

Photo No. 1: Looking generally west across Chain Valley Bay Road showing the approximate location of the proposed access driveway for the subject Planning Proposal.

Photo No. 2: Looking right (generally south) along Chain Valley Bay Road from the approximate location of the proposed access for the Planning Proposal showing the existing traffic environment and available sight distance.

Photo No. 3: Looking left (generally north) along Chain Valley Bay Road from the approximate location of the proposed access for the Planning Proposal showing the existing traffic environment and available sight distance.

Photo No. 4: Looking left (generally north) along the Pacific Highway from Chain Valley Bay Road showing the existing traffic environment and available sight distance.

Photo No. 5: Looking right (generally south) along the Pacific Highway from Chain Valley Bay Road showing the existing traffic environment and available sight distance.

APPENDIX B

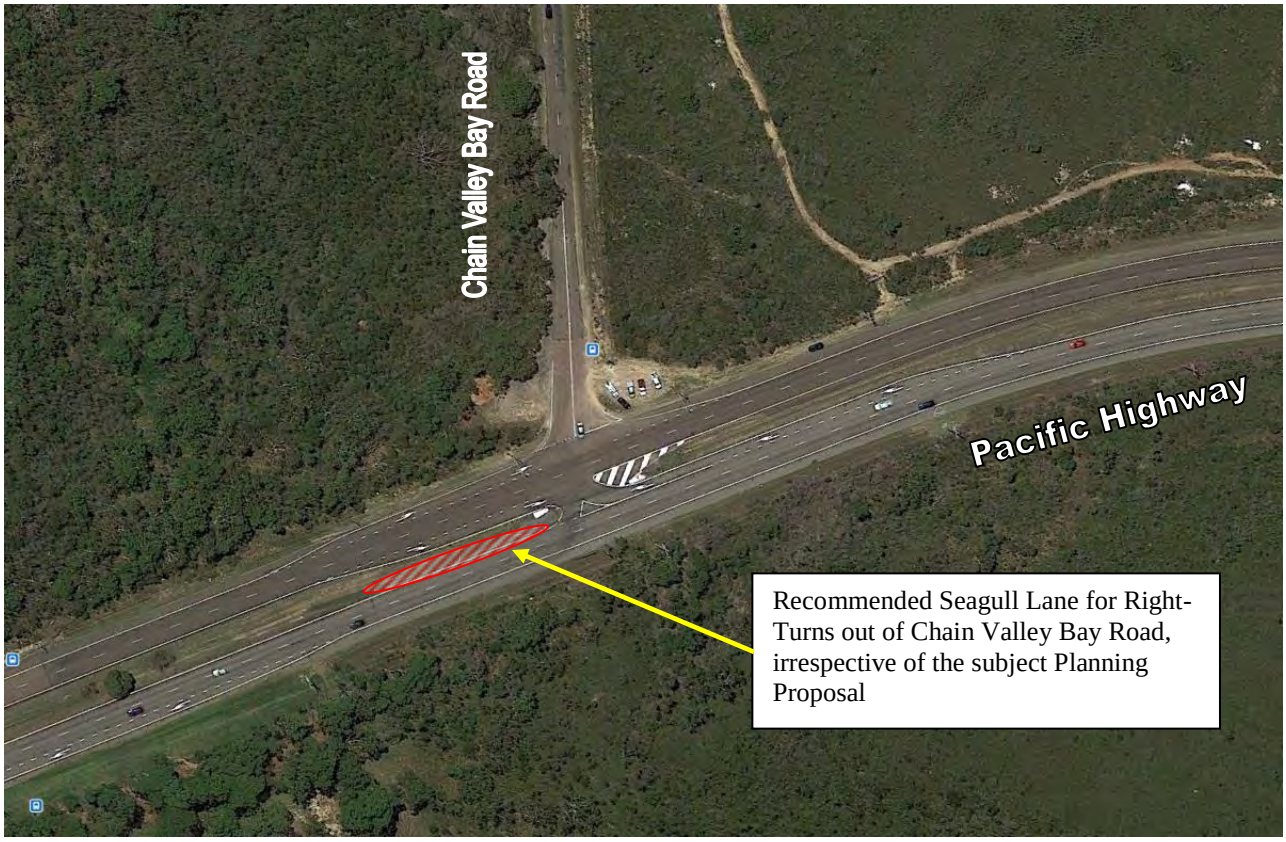
BUS ROUTES AT CHAIN VALLEY BAY


Wyong Network Map Effective 5 October 2018
Busways
Morisset
Charlestown
Windale
Belmont
Blacksmiths
Swansea Heads
Swansea
Caves Beach
Cams Wharf
Catherine Hill Bay
Wyong
See inset above
Mardi
Tacoma
Tuggerawong
Wyong
Watanobbi
Wadalba
Tacoma
Warnervale
Hamlyn Terrace
Woongarrah
Wallarah
Bushells Ridge
Wyee
Wyee Point
Lake Macquarie
Gwandalan
Summerland Point
Mannering Park
Chain Valley Bay
Chain Valley Bay North
Chain Valley Bay South
Doyalson North
Doyalson
Colongra
Colongra Lake
Mannering Lake
Blue Haven
San Remo
Charmhaven
Halekulani
Budgewoi
Buff Point
Budgewoi Peninsula
Lake Munmorah
Lake Haven
Gorokan
Karwal
Wyongah
Tuggerah Lakes
Toukley
Noraville
Norah Head
Canton Beach
Magenta
Crangan Bay
Nords Wharf
Catherine Hill Bay
Moonee
Frazer Park
Wybung
Lake Munmorah
Munmorah State Conservation Area


Mannering Park
Chain Valley Bay North
Findlay Av
Houston Av
Lakeshore Av
Karooda Av
Chain Valley Bay South
95 98
95 99 95X
Mulloway Rd
Lloyd Av
Ivy Av
Elabana Av
Seaview Dr
Trevarty Av
Kanangra Dr
95 97
Doyalson North
Scaysbrook Av
Tall Timbers Rd
Chain Valley Bay Rd
95 98
Pacific Hwy
95 98 95X 99
Boronia Rd
Anita Av
Elizabeth Bay Rd
Lake Munmorah
Colongra Lake
95 98 95X 99
Terence Av

APPENDIX C

INTERSECTION OF PACIFIC HIGHWAY AND CHAIN VALLEY BAY ROAD



(Image Courtesy of Google Earth)

APPENDIX D SIDRA DATA

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2019 AM Peak]

2019 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1236	5.0	0.322	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	6	0.0	0.020	16.3	LOS B	0.1	0.4	0.71	0.87	0.71	56.0
Approach		1242	5.0	0.322	0.1	NA	0.1	0.4	0.00	0.00	0.00	79.7
North: Chain Valley Bay Road North												
7	L2	18	0.0	0.024	11.2	LOS A	0.1	0.6	0.44	0.89	0.44	61.7
9	R2	99	0.0	4.429	6256.5	LOS F	105.9	741.6	1.00	2.80	12.04	0.6
Approach		117	0.0	4.429	5295.7	LOS F	105.9	741.6	0.91	2.51	10.25	0.7
West: Pacific Highway West												
10	L2	38	0.0	0.020	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	883	0.0	0.222	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12u	U	1	0.0	0.009	36.4	LOS C	0.0	0.2	0.89	0.95	0.89	42.8
Approach		922	0.0	0.222	0.3	NA	0.0	0.2	0.00	0.03	0.00	79.1
All Vehicles		2281	2.7	4.429	271.8	NA	105.9	741.6	0.05	0.14	0.53	11.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2019 PM Peak]

2019 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	948	5.0	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	10	0.0	0.042	19.3	LOS B	0.1	0.9	0.77	0.92	0.77	53.6
Approach		958	4.9	0.247	0.2	NA	0.1	0.9	0.01	0.01	0.01	79.5
North: Chain Valley Bay Road North												
7	L2	3	0.0	0.004	11.4	LOS A	0.0	0.1	0.47	0.84	0.47	61.5
9	R2	58	0.0	0.795	100.7	LOS F	2.8	19.5	0.98	1.14	1.77	25.0
Approach		61	0.0	0.795	96.3	LOS F	2.8	19.5	0.96	1.12	1.70	25.7
West: Pacific Highway West												
10	L2	118	0.0	0.063	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1186	5.0	0.308	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12u	U	1	0.0	0.003	16.8	LOS B	0.0	0.1	0.70	0.75	0.70	55.5
Approach		1305	4.5	0.308	0.7	NA	0.0	0.1	0.00	0.06	0.00	78.3
All Vehicles		2324	4.6	0.795	3.0	NA	2.8	19.5	0.03	0.07	0.05	74.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2019 AM Peak +MHE PP]

2019 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1236	5.0	0.322	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	8	0.0	0.027	16.6	LOS B	0.1	0.6	0.72	0.89	0.72	55.8
Approach		1244	5.0	0.322	0.1	NA	0.1	0.6	0.00	0.01	0.00	79.6
North: Chain Valley Bay Road North												
7	L2	22	0.0	0.030	11.2	LOS A	0.1	0.7	0.44	0.90	0.44	61.7
9	R2	121	0.0	5.504	8181.7	LOS F	136.3	953.8	1.00	2.87	12.48	0.4
Approach		143	0.0	5.504	6924.7	LOS F	136.3	953.8	0.91	2.57	10.62	0.5
West: Pacific Highway West												
10	L2	47	0.0	0.025	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	883	0.0	0.222	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12u	U	1	0.0	0.009	36.4	LOS C	0.0	0.2	0.89	0.95	0.89	42.8
Approach		931	0.0	0.222	0.4	NA	0.0	0.2	0.00	0.03	0.00	79.0
All Vehicles		2318	2.7	5.504	427.4	NA	136.3	953.8	0.06	0.17	0.66	7.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2019 PM Peak + MHE PP]

2019 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	948	5.0	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	13	0.0	0.055	19.7	LOS B	0.2	1.1	0.78	0.92	0.78	53.3
Approach		961	4.9	0.247	0.3	NA	0.2	1.1	0.01	0.01	0.01	79.4
North: Chain Valley Bay Road North												
7	L2	4	0.0	0.006	11.5	LOS A	0.0	0.1	0.47	0.85	0.47	61.5
9	R2	65	0.0	0.903	138.5	LOS F	4.0	27.8	0.99	1.25	2.44	19.9
Approach		69	0.0	0.903	131.2	LOS F	4.0	27.8	0.96	1.23	2.33	20.7
West: Pacific Highway West												
10	L2	134	0.0	0.071	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1186	5.0	0.308	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12u	U	1	0.0	0.003	16.8	LOS B	0.0	0.1	0.70	0.75	0.70	55.5
Approach		1321	4.5	0.308	0.8	NA	0.0	0.1	0.00	0.06	0.00	78.1
All Vehicles		2351	4.5	0.903	4.4	NA	4.0	27.8	0.03	0.08	0.07	72.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2029 AM Peak]

2029 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1507	5.0	0.393	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
6	R2	6	0.0	0.029	22.1	LOS B	0.1	0.6	0.81	0.93	0.81	51.5
Approach		1513	5.0	0.393	0.1	NA	0.1	0.6	0.00	0.00	0.00	79.6
North: Chain Valley Bay Road North												
7	L2	18	0.0	0.029	12.2	LOS A	0.1	0.6	0.50	0.92	0.50	60.9
9	R2	99	0.0	16.500	28050.1	LOS F	150.9	1056.5	1.00	1.62	4.96	0.1
Approach		117	0.0	16.500	23736.5	LOS F	150.9	1056.5	0.92	1.51	4.27	0.2
West: Pacific Highway West												
10	L2	38	0.0	0.020	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1077	5.0	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12u	U	1	0.0	0.018	67.2	LOS E	0.0	0.3	0.95	0.98	0.95	31.5
Approach		1116	4.8	0.279	0.3	NA	0.0	0.3	0.00	0.02	0.00	79.2
All Vehicles		2746	4.7	16.500	1011.6	NA	150.9	1056.5	0.04	0.08	0.18	3.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2029 PM Peak]

2029 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1156	5.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	10	0.0	0.057	24.6	LOS B	0.2	1.1	0.84	0.94	0.84	49.7
Approach		1166	5.0	0.301	0.2	NA	0.2	1.1	0.01	0.01	0.01	79.5
North: Chain Valley Bay Road North												
7	L2	3	0.0	0.005	12.2	LOS A	0.0	0.1	0.51	0.86	0.51	60.8
9	R2	58	0.0	1.431	911.0	LOS F	25.8	180.5	1.00	2.30	8.85	3.7
Approach		61	0.0	1.431	866.8	LOS F	25.8	180.5	0.98	2.23	8.44	3.9
West: Pacific Highway West												
10	L2	118	0.0	0.063	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1446	5.0	0.375	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
12u	U	1	0.0	0.004	20.4	LOS B	0.0	0.1	0.77	0.80	0.77	52.6
Approach		1565	4.6	0.375	0.6	NA	0.0	0.1	0.00	0.05	0.00	78.5
All Vehicles		2792	4.7	1.431	19.4	NA	25.8	180.5	0.02	0.08	0.19	55.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2029 AM Peak + MHE PP]

2029 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1507	5.0	0.393	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
6	R2	8	0.0	0.040	22.4	LOS B	0.1	0.8	0.81	0.93	0.81	51.2
Approach		1515	5.0	0.393	0.2	NA	0.1	0.8	0.00	0.00	0.00	79.6
North: Chain Valley Bay Road North												
7	L2	22	0.0	0.035	12.2	LOS A	0.1	0.8	0.50	0.93	0.50	60.8
9	R2	121	0.0	20.167	34634.7	LOS F	186.0	1302.3	1.00	1.63	5.01	0.1
Approach		143	0.0	20.167	29308.2	LOS F	186.0	1302.3	0.92	1.52	4.31	0.1
West: Pacific Highway West												
10	L2	47	0.0	0.025	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1077	5.0	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12u	U	1	0.0	0.018	67.2	LOS E	0.0	0.3	0.95	0.98	0.95	31.5
Approach		1125	4.8	0.279	0.4	NA	0.0	0.3	0.00	0.03	0.00	79.0
All Vehicles		2783	4.6	20.167	1506.2	NA	186.0	1302.3	0.05	0.09	0.22	2.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2029 PM Peak + MHE PP]

2029 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

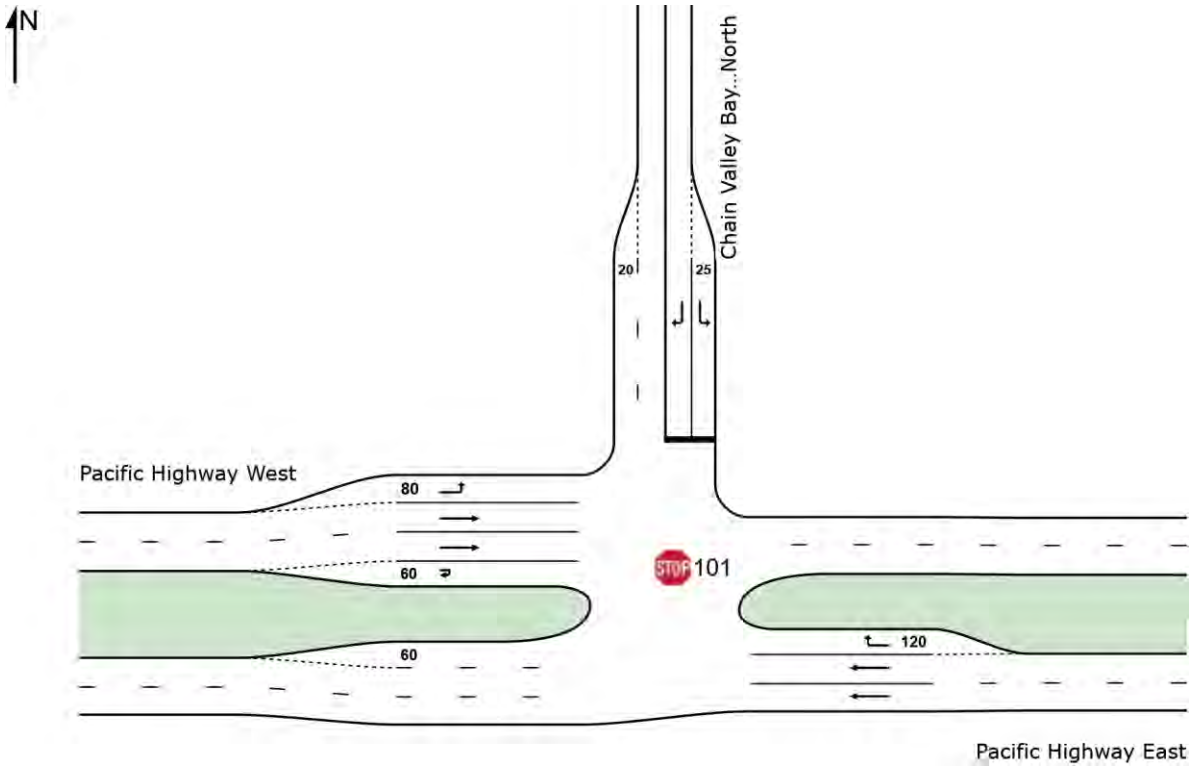
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1156	5.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	13	0.0	0.075	25.1	LOS B	0.2	1.5	0.84	0.94	0.84	49.3
Approach		1169	4.9	0.301	0.3	NA	0.2	1.5	0.01	0.01	0.01	79.3
North: Chain Valley Bay Road North												
7	L2	4	0.0	0.007	12.2	LOS A	0.0	0.1	0.51	0.87	0.51	60.8
9	R2	65	0.0	1.625	1241.0	LOS F	35.5	248.8	1.00	2.61	10.70	2.8
Approach		69	0.0	1.625	1169.8	LOS F	35.5	248.8	0.97	2.51	10.11	3.0
West: Pacific Highway West												
10	L2	134	0.0	0.071	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1446	5.0	0.375	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
12u	U	1	0.0	0.004	20.4	LOS B	0.0	0.1	0.77	0.80	0.77	52.6
Approach		1581	4.6	0.375	0.6	NA	0.0	0.1	0.00	0.05	0.00	78.3
All Vehicles		2819	4.6	1.625	29.1	NA	35.5	248.8	0.03	0.10	0.25	48.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2029 AM Peak + MHE PP + Seagull]

2029 AM Peak
Site Category: (None)
Stop (Two-Way)



MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2029 AM Peak + MHE PP + Seagull]

2029 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1507	5.0	0.393	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
6	R2	8	0.0	0.040	22.4	LOS B	0.1	0.8	0.81	0.93	0.81	51.2
Approach		1515	5.0	0.393	0.2	NA	0.1	0.8	0.00	0.00	0.00	79.6
North: Chain Valley Bay Road North												
7	L2	22	0.0	0.035	12.2	LOS A	0.1	0.8	0.50	0.93	0.50	60.8
9	R2	121	0.0	0.669	39.0	LOS C	2.7	19.1	0.92	1.13	1.60	43.0
Approach		143	0.0	0.669	34.9	LOS C	2.7	19.1	0.86	1.10	1.43	45.0
West: Pacific Highway West												
10	L2	47	0.0	0.025	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1077	5.0	0.279	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12u	U	1	0.0	0.018	67.6	LOS E	0.0	0.3	0.95	0.98	0.95	31.5
Approach		1125	4.8	0.279	0.4	NA	0.0	0.3	0.00	0.03	0.00	79.0
All Vehicles		2783	4.6	0.669	2.0	NA	2.7	19.1	0.05	0.07	0.08	76.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Pacific Highway_Chain Valley Bay Rd 2029 PM Peak + MHE PP + Seagull]

2029 AM Peak
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway East												
5	T1	1156	5.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	13	0.0	0.075	25.1	LOS B	0.2	1.5	0.84	0.94	0.84	49.3
Approach		1169	4.9	0.301	0.3	NA	0.2	1.5	0.01	0.01	0.01	79.3
North: Chain Valley Bay Road North												
7	L2	4	0.0	0.007	12.2	LOS A	0.0	0.1	0.51	0.87	0.51	60.8
9	R2	65	0.0	0.393	32.1	LOS C	1.2	8.5	0.88	1.04	1.10	46.7
Approach		69	0.0	0.393	30.9	LOS C	1.2	8.5	0.86	1.03	1.06	47.3
West: Pacific Highway West												
10	L2	134	0.0	0.071	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	1446	5.0	0.375	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
12u	U	1	0.0	0.004	20.7	LOS B	0.0	0.1	0.77	0.80	0.77	52.6
Approach		1581	4.6	0.375	0.6	NA	0.0	0.1	0.00	0.05	0.00	78.3
All Vehicles		2819	4.6	0.393	1.3	NA	1.2	8.5	0.03	0.06	0.03	77.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

05 B – *Traffic Impact Assessment - Addendum*

Ref: 19/134

2nd September 2019

CorVal Partners Pty Ltd
C/- Vivacity Property
Level 54, Governor Phillip Tower
1 Farrer Place
SYDNEY NSW 2000

Attention:- Tom Copping

Dear Tom,

RE: Traffic Advice – Proposed Manufactured Home Estate – Lot 5 DP 1228880 – 45 Mulloway Road, Chain Valley Bay.

Reference is made to your request for traffic advice regarding the cumulative impacts of all known proposed developments within the Chain Valley Bay area as requested by NSW Roads and Maritime Services (NSW RMS) as part of the assessment of your development.

The following advice is provided as an addendum report to the Traffic Impact Assessment prepared by BJ Bradley & Associates for the development dated 24 June 2019. Data used in this advice has been sourced from this report as well as reports by Intersect Traffic for the three other known developments in the area.

Introduction

Intersect Traffic has been engaged by Vivacity Property Pty Ltd to prepare an addendum report for a 190 site Manufactured Home Estate on Lot 5 DP 1228880 – 45 Mulloway Road, Chain Valley Bay. This addendum report is to specifically address the cumulative impacts of other known developments in the area on the local road network. Intersect Traffic having undertaken the traffic assessments for all the other known developments in the area recently is well placed to undertake this assessment.

The cumulative impact assessment has been requested by NSW RMS as part of its assessment of the proposed development which is the subject of a development application to Central Coast Council as the consent authority. This advice is required to support the development application and will allow Council and NSW RMS officers to consider the cumulative impacts of development in the area in their assessments of this development.

Background

The proposed development is one of four major developments proposed in the Chain Valley Bay area that will likely have an impact on the local and state road network in the area. The issues that need to be assessed when considering the cumulative impact of these developments are;

1. Two-way mid-block capacity of the Pacific Highway, Chain Valley Bay Road and Mulloway Road; and
2. Intersection capacity of the Pacific Highway / Chain Valley Bay Road stop sign controlled rural seagull intersection and the Chain Valley Bay Road / Mulloway Road give way controlled T-intersection.

The other known developments considered in this assessment are;

- Low density residential at 405 – 425 Pacific Highway, Lake Munmorah and 2 Kanangra Drive, Crangan Bay for Darkinjung LALC – 545 lots (Intersect Traffic – April 2018).
- Low Density residential at 15 Mulloway Road for Optima Developments – 110 lots (Intersect Traffic – February 2019); and
- Low density residential (72 lots) and extension to existing Manufactured Home Estate (Teraglin Lakeshore Home Village – 138 sites) at 2 & 10 Mulloway Road, Chain Valley Bay for ADW Johnson Pty Ltd (Intersect Traffic – August 2019).

Traffic Generation

In undertaking this assessment the following peak hour traffic generation from each development has been used all sourced from the relevant traffic reports for each development;

1. MHE – 45 Mulloway Road, Chain Valley Bay – 37 vtph in the AM peak and 27 vtph in the PM peak;
2. Residential Subdivision – 15 Mulloway Road, Chain Valley Bay – 94 vtph in the AM peak and 99 vtph in the PM peak;
3. Residential Subdivision – 405 – 425 Pacific Highway Lake Munmorah and 2 Kanangra Drive, Crangan Bay – 390 vtph in the AM peak and 428 vtph in the PM peak; and
4. Residential subdivision (72 lots) plus extension of MHE (138 sites) – 2 and 10 Mulloway Road, Chain Valley Bay – 79 vtph in the AM peak and 77 vtph in the PM peak.

It is noted that development 1 and 3 have access directly to Chain Valley Bay Road south of Mulloway Road and thus do not have a major impact on the traffic flows on Mulloway Road and through the Chain Valley Bay Road / Mulloway Road intersection.

Adopting the trip distributions within the traffic reports the following cumulative traffic generation on the road network occurs with all developments (***Table 1***).

Table 1 – Cumulative AM and PM peak traffic generation

Road	Development AM (vtph)	Development PM (vtph)
Pacific Hwy west of Chain Valley Bay Rd	450	477
Pacific Hwy east of Chain Valley Bay Rd	88	90
Chain Valley Bay Rd north of Pacific Hwy	538	567
Mulloway Rd west of Chain Valley Bay Rd	165	172
Chain Valley Bay Rd north of Mulloway Rd	13	15
Chain Valley Bay Rd south of Mulloway Rd	152	157

Two-way mid-block road capacity

From the Intersect Traffic report (August 2019) for 2 and 10 Mulloway Road, Chain Valley Bay Road the local and state road network has the following two-way mid-block capacities based on *Table 4.3 of RTA's Guide to Traffic Generating Developments (2002)* noting these roads have been assessed as urban roads as speed limits are less than or equal to 80 km/h.

- Pacific Highway – 3,800 vtph;
- Chain Valley Bay Road – 1,800 vtph; and
- Mulloway Road – 1,800 vtph.

Therefore the likely traffic volumes post development in 2029, which is considered the earliest that full development of the area would occur, compared to these road capacities is shown in ***Table 2*** below;

Table 2 – Mid-block road capacity assessment 2029 – all developments

				Post Development - all developments			
Road	Capacity (vtph)	Development AM (vtph)	Development PM (vtph)	2019 AM peak (vtph)	2019 PM peak (vtph)	2029 AM peak (vtph)	2029 PM peak (vtph)
Pacific Hwy west of Chain Valley Bay Rd	3800	450	477	2910	2817	3305	3193
Pacific Hwy west of Chain Valley Bay Rd	3800	450	477	2643	2972	2995	3373
Pacific Hwy east of Chain Valley Bay Rd	3800	88	90	2351	2254	2714	2601
Chain Valley Bay Rd north of Pacific Hwy	1800	538	567	761	800	797	838
Chain Valley Bay Rd north of Pacific Hwy	1800	538	567	804	846	847	891
Mulloway Rd west of Chain Valley Bay Rd	1800	165	172	359	369	390	401
Chain Valley Bay Rd north of Mulloway Rd	1800	13	15	82	85	93	96
Chain Valley Bay Rd south of Mulloway Rd	1800	152	157	377	388	413	425

This assessment shows that with all developments considered the two-way mid-block road capacity of the local and state road network is not reached by 2029 therefore it is reasonable to conclude the cumulative traffic from the developments in Chain Valley Bay do not adversely impact on the local and state road network.

Intersection Capacity

In assessing intersection performance the main intersection of concern will be the Pacific Highway / Chain Valley Bay Road roundabout.

The impacts of the development are best assessed using the SIDRA intersection modelling software. This software package predicts likely delays, queue lengths and thus levels of service that will occur at intersections. Assessment is then based on the level of service requirements of the RMS shown below;

Table 4.2
Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

Source: - RTA's Guide to Traffic Generating Developments (2002).

Assumptions made in this modelling were;

- The intersection layout will remain as per current conditions which operates as a seagull. A two stage network model is used to model the intersection.
- Traffic volumes used in the modelling were collected by NTPE in December 2016 provided within the Intersect Traffic reports.
- A 1.5 % per annum background traffic growth rate has been adopted on the local and state road network.
- Cumulative development traffic from all known developments have been included in the 2029 modelling based on the trip distribution diagrams contained in each of the traffic reports for these developments.

The results of the modelling are summarised in ***Table 3*** below showing the 'all vehicles' summary results except for the LoS which is the worst result for any movement. The Sidra Movement Summary Tables are provided in ***Attachment 1***.

Table 3 – The Pacific Highway / Chain Valley Bay Road T Intersection – Sidra Modelling – Results Summary

Model Scenario	Degree of Saturation (v/c)	Average Delay (s)	Right turn out LoS	Network LoS	95% back of Queue Length (cars)
2019 AM	1.178	29.1	F	C	8.1
2029 AM + cumulative development	8.965	1711.8	F	F	120.1
2019 PM	0.747	5.8	F	A	1.3
2029 PM + cumulative development	9.406	995.3	F	F	73.7

This modelling shows that the Pacific Highway / Chain Valley Bay Road intersection does not currently operate satisfactorily during both the AM and PM peak periods and obviously would continue to do so post development through to 2029 with all known developments considered. Whilst average delays, LoS and 95 % back of queue lengths for the majority of movements at the intersection remain at acceptable levels based on the NSW RMS assessment criteria listed above the right turn movement from Chain Valley Bay Road has unacceptable average delays, LoS and 95 % back of queue lengths. The intersection would therefore require upgrading with a higher level of intersection control required most likely signalisation.

As the intersection is currently 'failing' the upgrading of the intersection would also provide benefit to existing road users and future developments in the area. It would therefore be unreasonable to expect the developer to fully fund the development and the upgrading of the intersection should be contained within a Section 94 developer contributions plan or a voluntary planning agreement providing a mechanism for a fair and reasonable contribution to the intersection upgrade from all developers who would gain benefit from the intersection upgrade as well as the road authority for existing traffic. It is noted that post development 2029 traffic generated from the MHE at 45 Mulloway Road would make up approximately 1.1 % of PM traffic and 0.7 % of AM traffic through the intersection during the peak hour periods.

In assessing the performance of the Chain Valley Bay Road / Mulloway Road intersection it is noted that by observation this intersection is currently operating with uninterrupted flow conditions. However with the cumulative impacts of all the proposed developments this may not be guaranteed in the future. Therefore this intersection has also been modelled using the SIDRA INTERSECTION 8 program.

Assumptions made in this modelling were;

- The intersection layout will remain as per current conditions.
- Traffic volumes used in the modelling were collected by Intersect Traffic in September 2016.
- A 1.5 % per annum background traffic growth rate has been adopted on the local road network; and
- Cumulative development traffic from other known developments have been included in the 2029 modelling based on the trip distribution diagrams contained in each of the traffic reports for these developments.

The results of the modelling are summarised in ***Table 4*** below showing the 'all vehicles' summary results except for the LoS which is the worst result for any movement. The Sidra Movement Summary Tables are provided in ***Attachment 1***.

Table 4 –Chain Valley Bay Road / Mulloway Road T Intersection – Sidra Modelling – Results Summary

Model Scenario	Degree of Saturation (v/c)	Average Delay (s)	Worst LoS	95% back of Queue Length (cars)
2019 AM	0.104	4.6	A	0.4
2029 AM + cumulative development	0.208	5.2	A	0.8
2019 PM	0.081	4.6	A	0.2
2029 PM + cumulative development	0.149	5.2	A	0.5

On this basis it is concluded that the cumulative traffic from all known developments in the area will not adversely impact on the operation of the Chain Valley Bay Road / Mulloway Road intersection with average delays, LoS and 95 % back of queue lengths for all movements at the intersection remaining at acceptable levels based on the NSW RMS assessment criteria through to 2029 and beyond.

Conclusion

This assessment has determined that the cumulative traffic generated by all the known developments in the Chain Valley Bay area including the proposed Manufactured Home Estate at 45 Mulloway Road, Chain Valley Bay will not adversely impact on the local and state road network subject to the Pacific Highway / Chain Valley Bay Road being upgraded to traffic signals prior to the first development occurring as the intersection is already failing in the both the AM and PM peak periods. Funding of the intersection should be via a S94 developer contributions plan or a voluntary planning agreement involving all developments as this provides a fair and reasonable mechanism for all developments to contribute to the intersection upgrade based on the proportion of development traffic to total traffic on the road network.

For further information or clarification please do not hesitate to contact me on 0423 324 188 or 02 4936 6200.

Yours sincerely

Jeff Garry

Director
Intersect Traffic

M: 0423 324 188 **E: jeff@intersecttraffic.com.au**
PO BOX 268 EAST MAITLAND NSW 2323

Attachment 1 – Sidra Summary Tables

MOVEMENT SUMMARY

Site: 101 [2019AM] — **Network: N101 [2019AM]**

Pacific Highway / Chain Valley Bay intersection
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway														
6	R2	9	22.2	9	22.2	0.056	24.6	LOS B	0.1	0.6	0.82	0.93	0.82	41.4
Approach		9	22.2	9	22.2	0.056	24.6	NA	0.1	0.6	0.82	0.93	0.82	41.4
North: Chain Valley Bay Road														
7	L2	18	0.0	18	0.0	0.028	11.3	LOS A	0.0	0.3	0.50	0.91	0.50	50.2
8	T1	141	2.2	141	2.2	1.178	249.6	LOS F	8.1	58.0	1.00	2.28	6.19	6.6
Approach		159	2.0	159	2.0	1.178	222.7	LOS F	8.1	58.0	0.94	2.12	5.55	8.0
West: Pacific Highway														
10	L2	53	12.0	53	12.0	0.031	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	53.1
11	T1	1005	6.0	1005	6.0	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	12	0.0	12	0.0	0.008	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1069	6.2	1069	6.2	0.268	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
All Vehicles		1238	5.8	1238	5.8	1.178	29.1	NA	8.1	58.0	0.13	0.31	0.72	39.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2019PM] — **Network: N101 [2019PM]**

Pacific Highway / Chain Valley Bay intersection
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pacific Highway														
6	R2	23	4.5	23	4.5	0.136	25.1	LOS B	0.2	1.2	0.85	0.94	0.85	41.6
Approach		23	4.5	23	4.5	0.136	25.1	NA	0.2	1.2	0.85	0.94	0.85	41.6
North: Chain Valley Bay Road														
7	L2	15	0.0	15	0.0	0.024	11.6	LOS A	0.0	0.2	0.52	0.91	0.52	50.0
8	T1	71	1.5	71	1.5	0.747	87.3	LOS F	1.3	9.4	0.97	1.18	1.74	16.1
Approach		85	1.2	85	1.2	0.747	74.2	LOS F	1.3	9.4	0.89	1.14	1.53	20.1
West: Pacific Highway														
10	L2	122	5.2	122	5.2	0.068	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
11	T1	1084	2.0	1084	2.0	0.282	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	12	0.0	12	0.0	0.008	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1218	2.3	1218	2.3	0.282	0.7	NA	0.0	0.0	0.00	0.06	0.00	59.1
All Vehicles		1326	2.3	1326	2.3	0.747	5.8	NA	1.3	9.4	0.07	0.15	0.11	54.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029AM + cumulative development]

Network: N101 [2029AM+ cumulative development]

Pacific Highway / Chain Valley Bay intersection
includes 2 Mulloway Rd , 15 Mulloway Rd, 45 Mulloway Rd &
405 - 425 Pacific Highway developments
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pacific Highway														
6	R2	42	5.0	42	5.0	0.400	46.7	LOS D	0.5	3.7	0.93	1.02	1.13	33.4
Approach		42	5.0	42	5.0	0.400	46.7	NA	0.5	3.7	0.93	1.02	1.13	33.4
North: Chain Valley Bay Road														
7	L2	84	0.0	84	0.0	0.156	13.0	LOS A	0.2	1.5	0.59	1.00	0.59	49.1
8	T1	492	0.6	492	0.6	8.965	7197.5	LOS F	120.1	845.5	1.00	3.79	13.29	0.3
Approach		576	0.5	576	0.5	8.965	6146.8	LOS F	120.1	845.5	0.94	3.39	11.43	0.3
West: Pacific Highway														
10	L2	218	2.9	218	2.9	0.120	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
11	T1	1220	4.9	1220	4.9	0.323	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	14	0.0	14	0.0	0.010	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1452	4.6	1452	4.6	0.323	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.8
All Vehicles		2069	3.5	2069	3.5	8.965	1711.8	NA	120.1	845.5	0.28	1.03	3.20	1.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2029PM + cumulative development]

Network: N101 [2029PM + cumulative development]

Pacific Highway / Chain Valley Bay intersection
Includes 2 Mulloway Road development only
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pacific Highway														
6	R2	86	1.2	86	1.2	1.361	429.1	LOS F	7.6	54.0	1.00	2.12	6.04	7.2
Approach		86	1.2	86	1.2	1.361	429.1	NA	7.6	54.0	1.00	2.12	6.04	7.2
North: Chain Valley Bay Road														
7	L2	55	0.0	55	0.0	0.108	13.4	LOS A	0.1	1.0	0.61	1.00	0.61	48.9
8	T1	283	0.4	283	0.4	9.406	7612.4	LOS F	73.7	517.9	1.00	2.62	8.41	0.2
Approach		338	0.3	338	0.3	9.406	6381.4	LOS F	73.7	517.9	0.94	2.36	7.15	0.3
West: Pacific Highway														
10	L2	453	1.4	453	1.4	0.246	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
11	T1	1316	1.7	1316	1.7	0.341	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	14	0.0	14	0.0	0.010	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1782	1.6	1782	1.6	0.341	1.5	NA	0.0	0.0	0.00	0.15	0.00	58.1
All Vehicles		2206	1.4	2206	1.4	9.406	995.3	NA	73.7	517.9	0.18	0.57	1.33	3.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [2019AM]

Chain Valley Bay Road / Mulloway Road
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 3 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	62	5.0	0.040	5.6	LOS A	0.0	0.0	0.00	0.49	0.00	54.1
2	T1	11	5.0	0.040	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	55.7
Approach		73	5.0	0.040	4.8	NA	0.0	0.0	0.00	0.49	0.00	54.3
North: Chain Valley Bay Road												
8	T1	41	5.0	0.028	0.1	LOS A	0.1	0.5	0.08	0.12	0.08	58.5
9	R2	11	5.0	0.028	5.8	LOS A	0.1	0.5	0.08	0.12	0.08	56.5
Approach		52	5.0	0.028	1.3	NA	0.1	0.5	0.08	0.12	0.08	58.1
West: Mulloway Road												
10	L2	9	5.0	0.006	5.6	LOS A	0.0	0.2	0.05	0.55	0.05	53.3
12	R2	120	5.0	0.104	5.9	LOS A	0.4	2.6	0.18	0.58	0.18	52.4
Approach		129	5.0	0.104	5.9	LOS A	0.4	2.6	0.17	0.58	0.17	52.5
All Vehicles		253	5.0	0.104	4.6	NA	0.4	2.6	0.10	0.46	0.10	54.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [2019PM]

Chain Valley Bay Road / Mulloway Road
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 3 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	111	5.0	0.081	5.6	LOS A	0.0	0.0	0.00	0.44	0.00	54.5
2	T1	36	5.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.44	0.00	56.1
Approach		147	5.0	0.081	4.2	NA	0.0	0.0	0.00	0.44	0.00	54.9
North: Chain Valley Bay Road												
8	T1	18	5.0	0.017	0.3	LOS A	0.1	0.4	0.19	0.22	0.19	57.2
9	R2	11	5.0	0.017	6.0	LOS A	0.1	0.4	0.19	0.22	0.19	55.3
Approach		29	5.0	0.017	2.5	NA	0.1	0.4	0.19	0.22	0.19	56.5
West: Mulloway Road												
10	L2	8	5.0	0.005	5.7	LOS A	0.0	0.1	0.10	0.54	0.10	53.1
12	R2	75	5.0	0.066	6.0	LOS A	0.2	1.6	0.20	0.58	0.20	52.4
Approach		83	5.0	0.066	5.9	LOS A	0.2	1.6	0.19	0.58	0.19	52.4
All Vehicles		259	5.0	0.081	4.6	NA	0.2	1.6	0.08	0.46	0.08	54.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [2029AM + cumulative development]

Chain Valley Bay Road / Mulloway Road
Includes 2 Mulloway Rd, 15 Mulloway Road, 45 Mulloway Road and 405 - 420 Pacific Highway development traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	142	5.0	0.086	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	53.8
2	T1	13	5.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.53	0.00	55.4
Approach		155	5.0	0.086	5.1	NA	0.0	0.0	0.00	0.53	0.00	53.9
North: Chain Valley Bay Road												
8	T1	47	5.0	0.039	0.2	LOS A	0.1	0.9	0.17	0.17	0.17	57.8
9	R2	20	5.0	0.039	6.1	LOS A	0.1	0.9	0.17	0.17	0.17	55.7
Approach		67	5.0	0.039	2.0	NA	0.1	0.9	0.17	0.17	0.17	57.2
West: Mulloway Road												
10	L2	19	5.0	0.012	5.6	LOS A	0.0	0.3	0.06	0.55	0.06	53.2
12	R2	228	5.0	0.208	6.2	LOS A	0.8	5.7	0.26	0.60	0.26	52.2
Approach		247	5.0	0.208	6.1	LOS A	0.8	5.7	0.25	0.60	0.25	52.3
All Vehicles		469	5.0	0.208	5.2	NA	0.8	5.7	0.15	0.52	0.15	53.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [2029PM + cumulative development]

Chain Valley Bay Road / Mulloway Road
Includes 2 Mulloway Rd, 15 Mulloway Rd, 45 Mulloway Road and 405 - 420 Pacific Highway Lake Munmorah development traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	212	5.0	0.140	5.6	LOS A	0.0	0.0	0.00	0.48	0.00	54.1
2	T1	42	5.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	55.7
Approach		254	5.0	0.140	4.7	NA	0.0	0.0	0.00	0.48	0.00	54.4
North: Chain Valley Bay Road												
8	T1	20	5.0	0.027	0.7	LOS A	0.1	0.9	0.32	0.30	0.32	56.1
9	R2	22	5.0	0.027	6.4	LOS A	0.1	0.9	0.32	0.30	0.32	54.2
Approach		42	5.0	0.027	3.7	NA	0.1	0.9	0.32	0.30	0.32	55.1
West: Mulloway Road												
10	L2	15	5.0	0.010	5.7	LOS A	0.0	0.3	0.11	0.54	0.11	53.1
12	R2	158	5.0	0.149	6.3	LOS A	0.5	3.8	0.28	0.61	0.28	52.1
Approach		173	5.0	0.149	6.3	LOS A	0.5	3.8	0.27	0.61	0.27	52.2
All Vehicles		468	5.0	0.149	5.2	NA	0.5	3.8	0.13	0.51	0.13	53.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

05 C – *Bushfire Assessment*

Bushfire Review

45 Mulloway Road, Chain Valley Bay

Prepared for Corval Partners Pty Ltd

Project: 18041

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1.0 INTRODUCTION

1.1 Purpose

This report has been prepared to examine the subject land in relation to bushfire hazards and protection measures as they relate to a proposal to rezone the land to allow development of the land for the purposes of a manufactured home estate.

The report will examine key issues that will influence bushfire behaviour in the area, as well as matters that will influence the ability to provide passive and active bushfire protection measures for the area.

As part of the planning proposal, consultation will be undertaken with the NSW Rural Fire Service and this document provides information in relation to compliance with the provisions of relevant guidelines of the NSW Rural Fire Service.

Whilst *Planning for Bush Fire Protection 2006* is the current version of the document for legislation, its replacement *Planning for Bush Fire Protection 2018* has been released and adoption is imminent. This assessment has utilised *Planning for Bush Fire Protection 2018* as its basis.

1.2 Site Description

1.2.1 – Site Details

The following details identify the subject site:

Real Property Description	Lot 5 DP 1228880
Address	45 Mulloway Road, Chain Valley Bay
Site Area	10.61 hectares
Zoning Wyong LEP 2013	E3 – Environmental Management

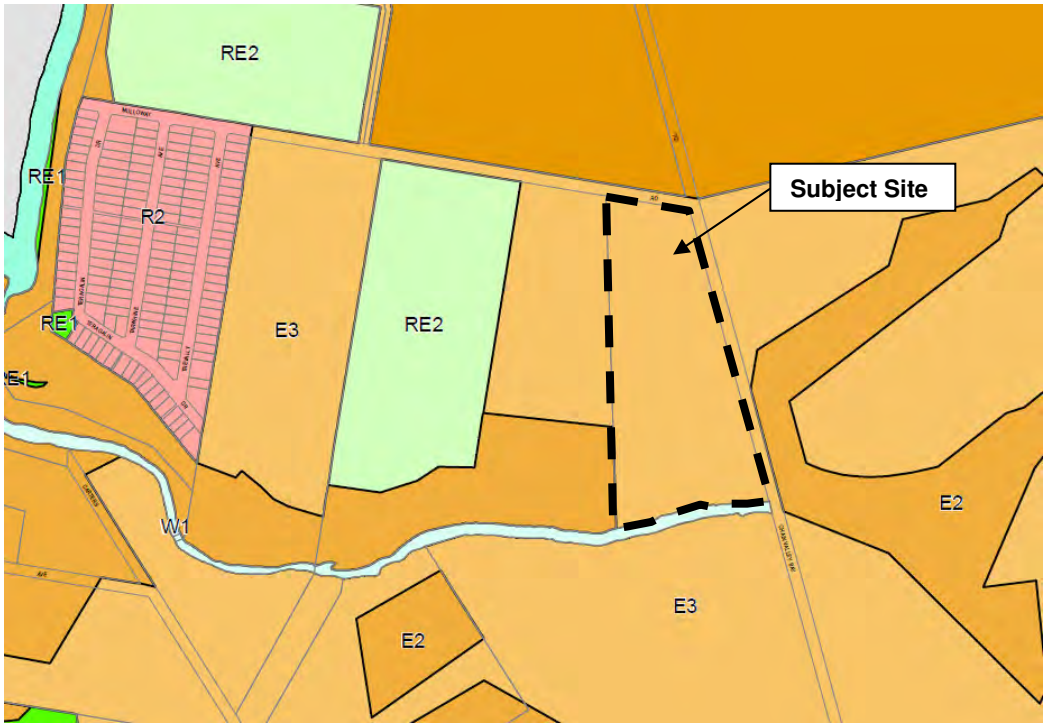

Figure 1: Map of Site (Zoning) **[Source: www.legislation.nsw.gov.au]**

Figure 2: Map of Site (Satellite) **[Source: LPMA SIX Maps]**

1.2.2 – Site Context

The site is located at the eastern end of Mulloway Road at the intersection with Chain Valley Bay Road. The site appears to contain at least two (2) dwellings, as well as an automotive repair business and other commercial/industrial uses (extractive materials stockpiles and/or earthmoving depot).

Land to the north, east and west is dominated by native vegetation within conservation reserves (north) and private property.

Land immediately adjoining to the west along Mulloway Road has been developed as a land lease community (Valhalla caravan park) and land further west is part of the Chain Valley Bay Urban area. Another land lease community (Teralgin Lakeshore Home Village) also exists approximately 450 metres west of the site on the northern side of Mulloway Road.

Vehicular access to the site is available from both Mulloway Road and Chain Valley Bay Road.

1.2.3 – Bushfire Prone Land

The subject land is identified as Bushfire Prone Land as described in Section 4.14 of the *Environmental Planning and Assessment Act 1979*. The area is mapped as containing areas of Category 1 vegetation along the southern parts of the site, and buffer areas to category 1 vegetation.

Figure 3: Bushfire Prone Land Map) **[Source: NSW Planning Portal]**

2.0 CONCEPT PROPOSAL

A planning proposal is being lodged with Central Coast Council to facilitate development of a manufactured home estate on the land. The proposal would see parts of the land zoned RE2 – Private Recreation which would permit the development of a caravan park on the land. The provisions of SEPP 36 would then permit development of a manufactured home estate on the land.

The planning proposal has also identified that the vegetation along the southern part of the site (along Karignan Creek) is Endangered Ecological Community and will be zoned E2 – Environmental Conservation.

When a development application is submitted for the land, a more detailed bushfire assessment will be submitted identifying specific provisions for development on the land. Use of the proposed land as a manufactured home estate is identified as an Additional Special Fire Protection Purpose under clause 46 of the *Rural Fires Regulation 2013*. As such any development application lodged for this use will be integrated development and would seek a concurrent approval from the NSW Rural Fire Service for a Bushfire Safety Authority.

3.0 EXISTING CONDITIONS AFFECTING BUSHFIRE PROTECTION

The following provides information in relation to the existing environmental conditions which will affect bushfire hazards and risk.

Vegetation

The vegetation over the majority of the land is generally of low threat and is comprised of grasslands and scattered trees. There is a strip of forest vegetation along the southern part of the site which will be conserved that is contiguous with other forest vegetation on adjoining lands. There is also a narrow band of vegetation along the western boundary; however, this is a very narrow row of trees disconnected with other areas of vegetation and is considered low threat vegetation.

Vegetation on adjoining lands to the north, east and south is comprised of forest vegetation. Vegetation on the adjoining land to the west is managed land for the majority with an area of conserved forest vegetation in the southern parts of the site.

Slope

The slope of the land within the site falls from the north to the south (from Mulloway Road to Karignan Creek) with a slope of approximately 2^0. The slope of adjoining land to the east and west is similar. The land on the opposite side of the creek starts to rise and is upslope.

The effective slopes for the purposes of determining Asset Protection Zones, etc., for a future manufactured home estate would be:

Direction	**Effective Slope**
North	Flat/Upslope
East	Flat/Upslope (cross slope)
South	$0\text{-}5^0$ Downslope
West	Flat/Upslope (cross slope)

Access

A Manufactured Home estate on the subject land would obtain access from Chain Valley Bay Road.

Chain Valley Bay Road passes along the eastern boundary of the site and provides a large capacity connection to the Pacific Highway at its southern end and also connects to other residential areas to the north. There is also a National Parks road connection (Link Road) between Chain Valley Bay Road to Kangara Drive, offering alternate access.

The site also has connects to Mulloway Road which connects with the remainder of the residential area in this part of Chain Valley Bay. Mulloway Road connects with open areas at the lake front and other residential streets but does not provide any connection to other egress routes.

Services

At present, the land is not connected to urban services; however, future development of the land will only be possible through the extension of urban services, such as reticulated water/sewer, electricity and telecommunications which are available in the area.

4.0 BUSHFIRE PROTECTION MEASURES REQUIRED

Asset Protection Zones

The provision of an Asset Protection Zone for further development will be necessary to provide a fuel-free break between bushfire prone vegetation and development as well as defendable space for fire fighting operations.

In relation to suitable Asset Protection Zones for the provisions of *Planning for Bush Fire Protection 2018* provide that, where the installation of homes can be required to meet AS 3959-2009 or NASH standards, the APZ can be based on residential requirements to meet 29kW/m^2. The construction of homes to meet AS3959 is possible and it is common practice for BAL construction requirements to be incorporated into consents. In additions such construction can be included in the estate approval and checked as part of the completion notice under the *Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005*.

Based on the acceptable solutions (Table A1.12.2), the following APZs would apply to the land:

Direction	**Vegetation**	**Slope**	**APZ required**
North	Forest	Flat/Upslope	24m
East	Forest	Flat/Upslope	24m
South	Forest	0-5^0 Downslope	29m
West	Managed	Flat/Upslope	N/A

The Asset Protection Zones to the north and east can be partly contained within the road reserves of Mulloway Road and Chain Valley Bay Road. The extent of required Asset Protection Zones within the site is illustrated in the plan below.

Figure 4: Asset Protection Zones **[Base Map Source: LPMA SIX Maps]**

Access

As discussed, access is available from both Mulloway Road and Chain Valley Bay Road to the site. Both roads are wide two-way sealed roads with a large capacity and are unlikely to be blocked in a bushfire emergency. Chain Valley Bay Road connects with the Pacific Highway at its southern end and also connects to Kangara Drive to the east via Link Road within the Lake Macquarie Conservation area.

Internally, the development design would incorporate the following features:

- Perimeter road to the southern edge of the development between the forest vegetation and any manufactured home sites.
- Circulating road system to allow fire fighting vehicles to turn within the development.
- Road design to accommodate heavy vehicles, including rural fire service vehicles.
- Vehicular entry point from Chain Valley Bay Road.

The access arrangements would be considered suitable to meet the requirements of *Planning for Bush Fire Protection 2018.*

Construction

The Asset Protection Zones would be sufficient to restrict exposure of any homes on sites to no greater than 29kW/m^2 and construction requirements would vary between BAL-29 and BAL–LOW, depending on location. A development application will identify required BALs for sites within the future manufactured home estate and these would be incorporated in consent conditions, etc.

Services

As part of the development of the land, urban services will be extended and augmented to serve the subject land. This will include the provision of reticulated water and sewer. It is a requirement for any manufactured home estate that a hydrant system be provided and the future manufactured home estate on the land will be required to provide a ring main and hydrant system which will include provision of hydrants so that any site is within the required 90m radius of any hydrant. This provision of water supply for fire fighting purposes meets the requirements of *Planning for Bush Fire Protection 2018*.

Electricity will be supplied to the sites and will be undergrounded throughout the site. No reticulated gas is available to the site and any bottled gas installation will need to be undertaken as per the requirements in *Planning for Bush Fire Protection 2018*.

5.0 CONCLUSION

A draft planning proposal has been prepared for land at 45 Mulloway Road, Chain Valley Bay which would have the effect of permitting a manufactured home estate on the land. The subject land is mapped as bushfire prone and consultation with the NSW Rural Fire Service is required as part of the planning proposal process.

The report has shown that development of the land can be undertaken in a manner consistent with *Planning for Bush Fire Protection 2018.*

05 D – *Preliminary Site Investigation*

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary Site Investigation for Contamination

Proposed Residential Development
45 Mulloway Road, Chain Valley Bay

Prepared for
CorVal Partners Ltd

Project 83515.01
November 2018

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Executive Summary

This report presents the results of a preliminary site investigation for contamination (PSI) undertaken for a proposed residential development at 45 Mulloway Road, Chain Valley Bay. The investigation was commissioned by CorVal Partners Ltd and was undertaken in accordance with Douglas Partners' proposal CCT180390 dated 1 November 2018.

The objective of the study was to provide an initial assessment of the site's contamination status for due diligence purposes. For the purposes of this investigation, it is understood that future development is likely to comprise residential use (i.e. a land lease community with movable dwellings).

This PSI report presents the results of a site history review and a walkover of the site. No intrusive investigation or testing was undertaken for this PSI.

Based on the findings of the desktop review and site walkover, DP considers that the site has been subject to potentially contaminating activities or land uses. Potential contamination sources were identified (refer Table 2 – Section 6); including importation and placement contaminated filling, storage of equipment/materials and the existing buildings.

The site would not be considered compatible (from a site contamination perspective) with the proposed residential land use in its current condition. Further detailed site investigation and potentially remediation and validation works would be required, prior to the site being considered suitable for the proposed residential use.

The preliminary CSM (presented as Table 3) will form the basis for development of a *Sampling and Analysis Quality Plan* (SAQP) prior to the completion of a *Detailed Site Investigation* (DSI).

It is recommended that a combined systematic and judgemental sampling strategy be adopted for a DSI to substantiate DP's assessment of the low to moderate contamination risk at the site. A DSI scope of work could be further developed during the preparation of a Sampling and Analysis Quality Plan with consideration given to the land uses proposed. Furthermore, it is expected that any remedial works are unlikely to prevent redevelopment of the site for the proposed residential uses.

Prior to completion of the further intrusive contamination investigations it is recommended that a licensed contractor is engaged to remove all debris and waste materials and suspected ACM fragments observed at the ground surface.

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Report on Preliminary Site Investigation for Contamination
Proposed Residential Development
45 Mulloway Road, Chain Valley Bay

1. Introduction

This report presents the results of a preliminary site investigation for contamination undertaken for a proposed residential development at 45 Mulloway Road, Chain Valley Bay. The investigation was commissioned by CorVal Partners Ltd on 1 November 2018, and was undertaken in accordance with Douglas Partners' proposal CCT180390 dated 1 November 2018.

The objective of the study was to provide an initial assessment of the site's contamination status for due diligence purposes. For the purposes of this investigation, it is understood that future development is likely to comprise residential use (i.e. a land lease community with movable dwellings).

This PSI report presents the results of a site history review and a walkover of the site. No intrusive investigation or testing was undertaken for this PSI. The PSI was undertaken with respect to the staged investigation approach outlined in State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55 – Ref 1) and the National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013) (NEPC, 2013 – Ref 2).

1.1 Objectives

The objectives of the PSI were to:

- Identify potential sources of contamination and determine potential contaminants of concern;
- Identify areas of potential contamination;
- Identify potential human and ecological receptors;
- Identify potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air);
- Provide a preliminary assessment of the site's contamination status and likely compatibility with a residential use; and
- Assess the need for further investigation and/or site remediation.

1.2 Site Identification

The site is identified as part of Lot 5 in Deposited Plan 1228880 and has a street address of 45 Mulloway Road, Chain Valley Bay, NSW. The site is located within the parish of Munmorah, County of Northumberland and in the Central Coast Council (CCC) local government area.

The site is currently zoned E3 Environmental Management under Wyong Local Environmental Plan 2013. The site has an irregular shape and comprises an area of approximately 7.3 hectares.

Figure 1, is a plan of the local area and shows the site in relation to various local features.

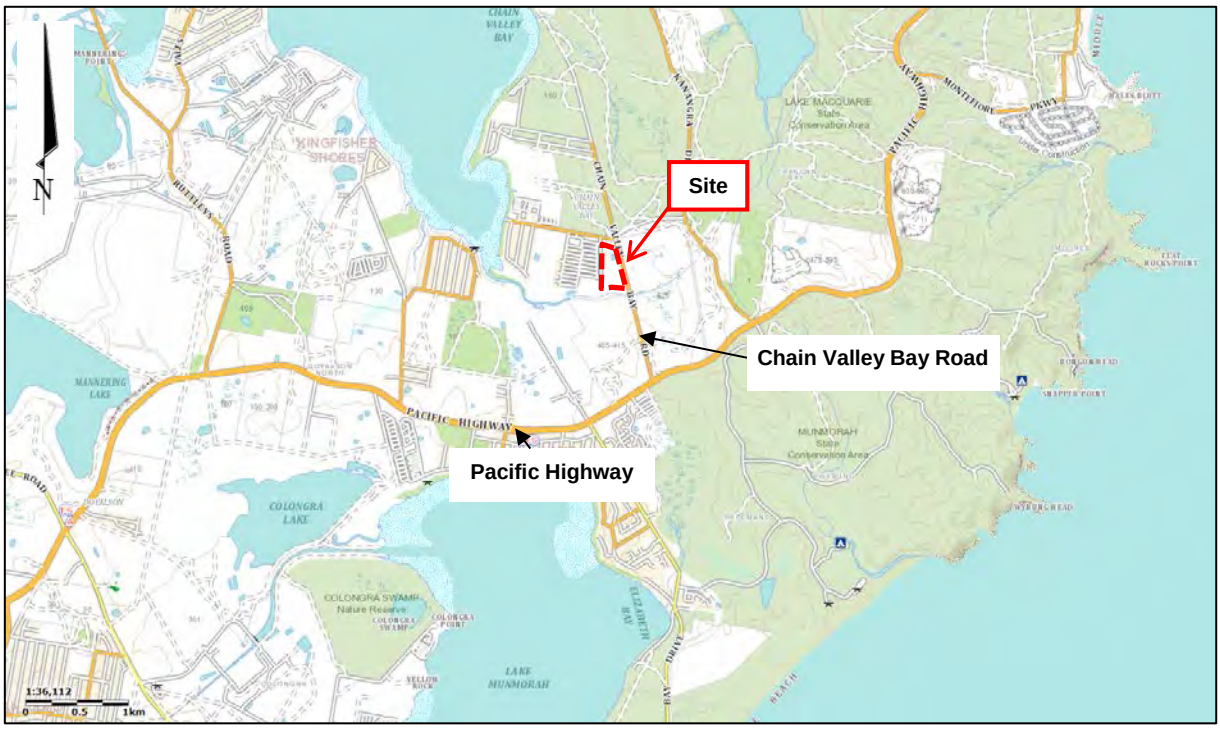

Figure 1: Location of the site within Chain Valley Bay
(image sourced from SIX Maps)

Figure 2, is an aerial view of the local area and shows the site in relation to the nearest cross street.

At the time of the PSI, the site primarily comprised open grassland (paddocks) with an earth dam in the northern area of the site. Existing development was generally located in the southern area of the site and comprised a fibro cottage, garage and colorbond shed. Other site features are discussed in Section 5.

Drawing 1, which is included in Appendix A, shows the existing layout of the site.

Figure 2 – Aerial view of the site (image sourced from nearmap.com dated 2 October 2018)

2. Scope of Work

The scope of work for the PSI comprised:

- Collation and interpretation of readily available site data from the following sources:
  - Published public data, including topographical, geological and hydrogeological maps;
  - Registered groundwater bore licence search;
  - NSW EPA Contaminated Land and Protection of Environment Operations databases;
  - CCC Property Enquiry Information; and
  - Historical aerial photographs; and
  - Other historical information available for the site.
- Site walkover to provide a visual assessment of potential contamination sources;
- Development of a preliminary conceptual site model (CSM); and
- Preparation of this report outlining the works undertaken and the findings of the PSI.